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Paper 9
Entered: May 21, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INERGY TECHOLOGY, INC.,
Petitioner,

v.

FORCE MOS TECHNOLOGY CO., LTD.,
Patent Owner.

IPR2024-00094
Patent 7,812,409 B2

Before GRACE KARAFFA OBERMANN, CHRISTOPHER L. OGDEN, and MARY C. HOFFMAN, *Administrative Patent Judges*.

HOFFMAN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

uPI Semiconductor Corp. Exhibit 1002

I. INTRODUCTION

Inergy Technology, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 1–6 of U.S. Patent No. 7,812,409 B2 (Ex. 1001, "the '409 patent"). Force MOS Technology Co., Ltd. ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314; 37 C.F.R. § 42.4(a). Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted "unless . . . the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." Based on the current record and for the reasons explained below, Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one of the challenged claims of the '409 patent. Thus, we institute this *inter partes* review.

We provide the following preliminary findings of fact and conclusions of law for the sole purpose of explaining our reasons for instituting this *inter partes* review. Any final determinations shall be based on the full trial record.

A. REAL PARTIES IN INTEREST

Petitioner identifies itself, Inergy Technology, Inc., as well as ASUSTek Computer, Inc. ("ASUS") and Panjit International Inc. as real parties in interest. Pet. 1. Patent Owner identifies itself, Force MOS Technology Co., Ltd., as a real party in interest. Paper 5, 2.

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B. RELATED PROCEEDINGS

Inter partes review IPR2024-00093 challenges U.S. Patent No. 7,629,634 B2 and involves the same parties. The parties also identify *Force MOS Technology Co. Ltd. v. ASUSTek Computer, Inc.*, No. 2:22-cv-00460 (E.D. Tex.) ("parallel proceeding") as challenging the '409 patent in federal district court. Pet. 1; Paper 5, 2.

II. BACKGROUND

A. THE '409 PATENT (EX. 1001)

The '409 patent describes a "semiconductor power device that includes a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells," wherein the trenched gate surrounds the transistor cells "as closed cells having truncated corners or rounded corners." Ex. 1001, code (57). "[T]he semiconductor power device further includes a contact dopant region . . . having [a] substantially circular shape to achieve a uniform space between the contact dopant region and the trenched gate surrounding the closed cells." *Id.*

According to the '409 patent, conventional semiconductor power devices included a "non-uniform" space between the trenched gate and the contact, as seen in Figure 1A below. Ex. 1001, 1:49–50.

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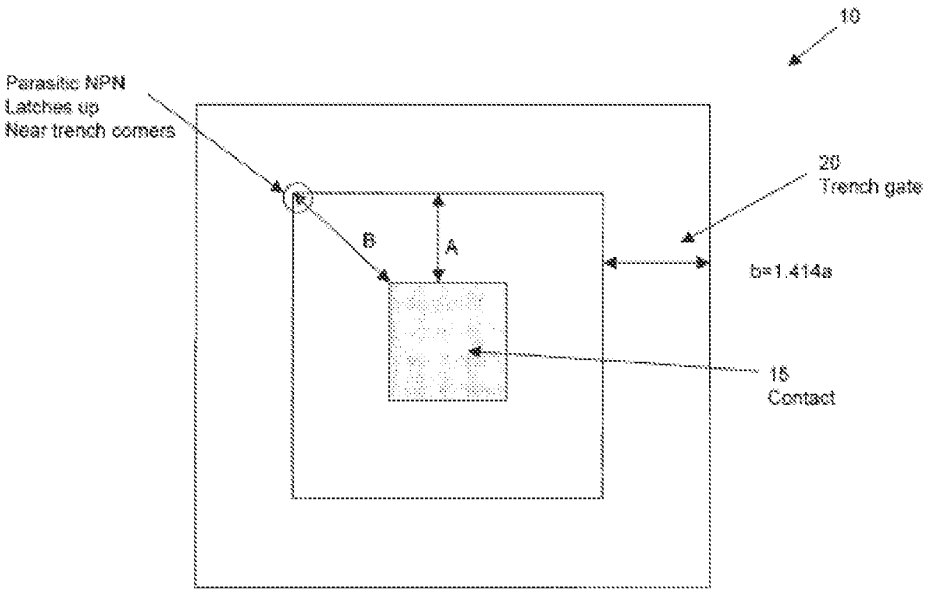


Fig. 1A (Prior Art)

Figure 1A above illustrates closed cell unit 10 of a prior art semiconductor power device, including trenched gate 20 forming a square surrounding square-shaped metal contact 15. Ex. 1001, 1:20–30. As seen in the figure, Distance B, from a corner of contact 15 to the nearest interior corner of trenched gate 20, is 1.414 times greater than Distance A between contact 15 and the interior of trenched gate 20 at their peripheral sides. *Id.* at 1:28–38. Due to the non-uniform space between trenched gate 20 and metal contact 15, weak points occur at the four trenched gate corners. *Id.* at 1:48–53. This results in low avalanche current and reduced device ruggedness due to parasitic NPN latch up near the corners. *Id.*; *id.* at 1:18–19.

To remedy this, the '409 patent describes a semiconductor power device having a "more uniform" space in the closed cell between the trenched gate and contact, as seen in Figure 3 below. Ex. 1001, 2:3–7.

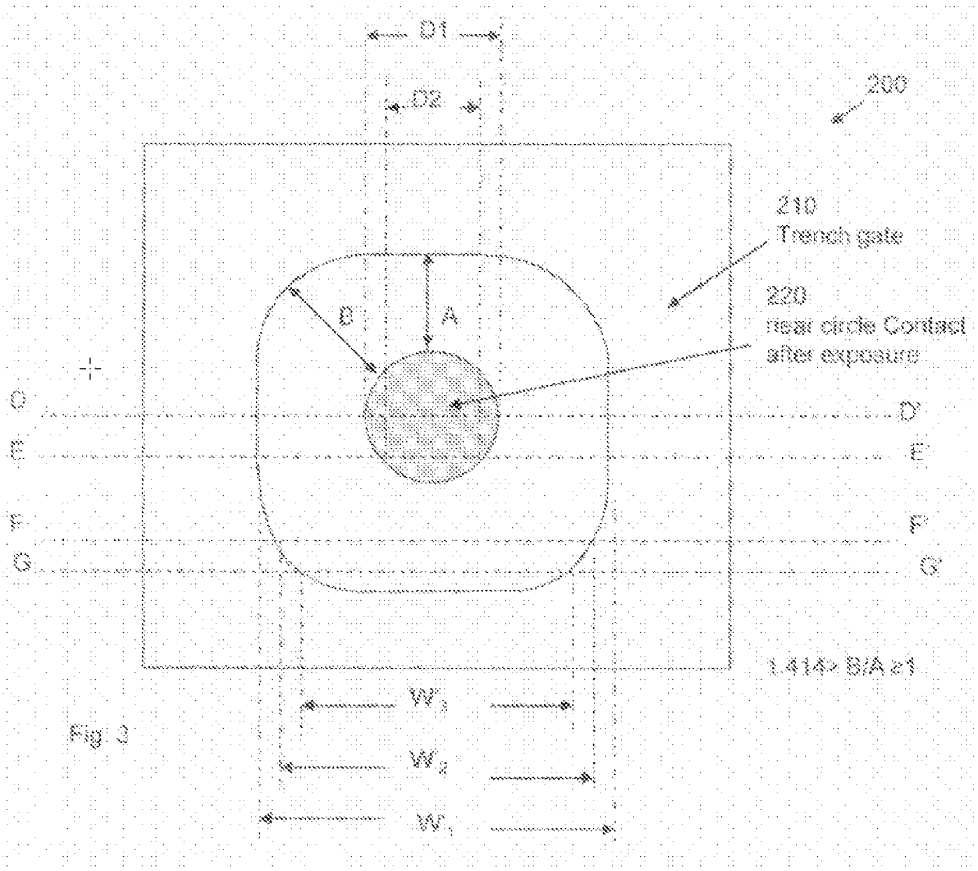


Fig. 3

Figure 3 above illustrates closed cell unit 200 of a MOSFET[1] device, including trenched gate 210 surrounding doped contact region 220 and a metal contact being disposed above doped contact region 220. Ex. 1001, 4:4–7. Trenched gate 210 includes rounded or truncated corners forming a substantially square-shaped cell, and region 220 is substantially circular shaped. *Id.* at 4:7–9, 4:37–39. Due to the geometries of trench gate 210 and doped contact region 220, the distance from trenched gate 200 to doped contact region 220, including Distances A and B, is more uniform, i.e., "the ratio of B/A is substantially kept near 1.0 and certainly smaller than 1.414."

[1] "MOSFET" refers to "Metal Oxide Semiconductor Field Effect Transistor." *See, e.g.*, Ex. 1005, 1:7–8.

Id. at 4:9–15. This improved uniformity eliminates the weak spots at the trenched gate corners to enhance device ruggedness. *Id.* at 4:15–17, 3:24–27.

B. CHALLENGED CLAIMS

The Petition challenges all claims, claims 1–6, of the '409 patent. Pet. 3–4.

Claim 1, one of the two independent claims of the '409 patent, reads as follows:

> 1. A trenched semiconductor power device comprising a plurality of trenched gates surrounding a plurality of transistor cells formed in a semiconductor substrate, wherein:
>
> said trenched gates surrounding said transistor cells as closed cells constituting substantially square-shaped cells with rounded corners;
>
> each of said closed cells further includes a circular trench contact disposed substantially in a central portion of said closed cells, penetrating through a source region surrounding said trenched gates and extending into a body region encompassing said source region;
>
> said circular trench contact comprises a hole opened from a top surface of said semiconductor substrate and is filled with a contact metal plug wherein sidewalls of said hole are surrounded by and in contact said source and body regions and said circular trench contact is separate from said trenched gates with said source region and body region disposed between a gate oxide lining of said trenched gates and all circumferential points of the circular trench contact; and
>
> said contact metal plug connected to a source metal disposed on top of said circular trench contact.

Ex. 1001, 5:7–28.

Claims 2–5 depend directly from claim 1. Ex. 1001, 5:29–6:11. Claim 2 further recites a titanium layer. *Id.* Claim 3 further limits the

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material used for the contact metal plug. *Id.* Claim 4 further recites an aluminum alloy layer. *Id.* Claim 5 further limits the circular trench contact to have a top surface diameter smaller than 1.0 micrometer. *Id.* Independent claim 6 recites similar subject matter as claims 1–5 but recites "truncated" corners instead of rounded corners. *Id.* at 6:12–6:38.

C. ASSERTED GROUNDS OF UNPATENTABILITY

The Petition advances six grounds, as summarized in the table below:

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1	1, 3–5	102(b)[2]	Kobayashi[3,4]
2	2, 6	103(a)	Kobayashi, Kikkawa[5]
3	5	103(a)	Kobayashi

[2] 35 U.S.C. §§ 102, 103 (2006), *amended by* Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112–29 §§ 102, 103, sec. (n)(1), 125 Stat. 284, 287, 293 (2011) (effective Mar. 16, 2013). The pre-AIA versions of §§ 102, 103 apply because the '409 patent issued from a U.S. application filed on December 4, 2006, which is before the effective date of the AIA amendments. *See* Ex. 1001, code (22).

[3] Kobayashi, US 6,888,196 B2, issued May 3, 2005. Ex. 1005.

[4] Grounds 1, 3, 4, and 6 each challenge claim 5. Grounds 1 and 3 rely on Kobayashi, and Grounds 4 and 6 rely on Kobayashi and Hshieh. In Grounds 1 and 4, Petitioner contends that the subject matter of claim 5 is disclosed in Kobayashi. In Grounds 3 and 6, Petitioner alternatively contends that the subject matter of claim 5 would have been obvious over the applied prior art and the knowledge of a person of ordinary skill in the art.

[5] Kikkawa et al., *A Quarter-Micrometer Interconnection Technology Using a TiN/Al–Si–Cu/TiN/Al–Si–Cu/TiN/Ti Multilayer Structure*, IEEE Transactions on Electron Devices, Vol. 40, No. 2, February 1993. Ex. 1007. Petitioner avers, and Patent Owner does not currently contest, that this reference qualifies as prior art because it "was published and made publicly available in or around January-February 1993." Pet. 12; Ex. 1008.

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
4	1, 3–5	103(a)	Kobayashi, Hshieh[6]
5	2, 6	103(a)	Kobayashi, Hshieh, Kikkawa
6	5	103(a)	Kobayashi, Hshieh

Pet. 3–4.

In support of its arguments, Petitioner relies on a declaration of Dr. David Kuan-Yu Liu. Ex. 1003.

III. ANALYSIS

A. LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art at the time of the invention is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Petitioner asserts that a person of ordinary skill in the art ("POSITA"), "at the filing date of the '409 [p]atent[,] would have a master's degree in electrical engineering, and at least two years of relevant work experience in the field of integrated circuit design and manufacturing." Pet. 13 (citing Ex. 1003 ¶ 52). Patent Owner does not dispute Petitioner's proffered level of ordinary skill in the art. *See generally* Prelim. Resp.

[6] Hshieh et al., US 5,763,914, issued June 9, 1998. Ex. 1006 ("Hshieh").

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We adopt Petitioner's proffered level of ordinary skill in the art, which is supported by declaration testimony and consistent with the '409 patent and prior art of record. *See* Ex. 1001, 1:6–3:8 (describing the invention and related art in terms of integrated circuit design and fabrication).

B. CLAIM CONSTRUCTION

In an *inter partes* review, the Board construes the terms of a patent claim "in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." 37 C.F.R. § 42.100(b). Under that standard, claim terms generally are given their plain and ordinary meaning as would have been understood by the ordinarily skilled artisan at the time of the invention and within the context of the entire patent disclosure. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

1. "substantially square-shaped cells with rounded corners"

Claim 1 recites "said trenched gates surrounding said transistor cells as closed cells constituting substantially square-shaped cells with rounded corners." Ex. 1001, 5:10–12.

Petitioner does not provide an express claim construction for "substantially square-shaped cells." *See* Pet. 14–19. Petitioner argues that the term "rounded corners" is properly construed as "corners that are truncated by design layout and then rounded." *Id.* at 15 (citing Ex. 1003 ¶ 55; Ex. 1001, 2:10–20, 4:53–64). Petitioner argues that the claim language cannot include a cell designed to be square but having rounded corners as a natural or incidental result of photolithography. *Id.* at 16–18. According to Petitioner, this is because (1) "[i]t is well known in the art" that corners, such as those illustrated in Figure 1A (Prior Art) of the '409 patent, become

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rounded as an incidental result of lithography (*id.* at 16 (citing Ex. 1003 ¶ 56)), and because (2) the claims were amended during prosecution to distinguish over prior art reference Pfirsch[7], which allegedly shows square corners incidentally rounded by lithography (*id.* at 17–19 (citing Ex. 1002, 302)).

Patent Owner disputes Petitioner's proposed construction as improperly limiting apparatus claims to products made by a particular process of manufacture (i.e., truncated by design layout and then rounded). Prelim. Resp. 8–11. Patent Owner also disputes Petitioner's characterization of the prosecution history. *Id.* at 9 (citing Ex. 1002, 302). Specifically, Patent Owner argues that the claims were amended to add a feature (i.e., a circular trench contact hole) missing from Pfirsch, not to distinguish the claimed rounded corners over Pfirsch's rounded corners. *Id.* (citing Ex. 1002, 302, 295).

Based on the preliminary arguments and evidence, we disagree with Petitioner's proposed construction requiring the corners to be rounded via a particular process because it improperly imports a process of manufacture from the Specification into apparatus claims. *See Cont'l Circuits LLC v. Intel Corp.*, 915 F.3d 788, 799 (Fed. Cir. 2019) (citing *Vanguard Prods. Corp. v. Parker Hannifin Corp.*, 234 F.3d 1370, 1372–73 (Fed. Cir. 2000) ("Generally, '[a] novel product that meets the criteria of patentability is not limited to the process by which it was made.'")). We also preliminarily disagree with Petitioner's assessment of the prosecution history, i.e., that the claims were amended to distinguish the claimed rounded corners from

[7] Pfirsch et al., US 6,541,818, issued April 1, 2003. Ex. 1011.

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Pfirsch's rounded corners. Indeed, both the Examiner found and Patent Owner admitted that Pfirsch has the recited "rounded corner[s]." *See* Ex. 1002, 237, 302. Patent Owner appears, at this stage, to be correct that the claims were amended to include a "circular" contact to distinguish over Pfirsch's square contact. *See id.* at 295, 302.

Patent Owner also proposes a claim construction, arguing that the term "substantially square-shaped cells with rounded corners" means "the cells have, from the top view perspective, largely or essentially the shape of a square (a shape that has four equal sides and four right angles) with all corners rounded (i.e.[,] having a curved shape like a portion of a circle or oval)." Prelim. Resp. 4; *see also id.* at 4–7 (citing Ex. 1001, Figs. 2, 3, 1:20–1:33, 3:32–34, 1:18–57, 1:66–2:7, 3:34–45, 3:55–4:3, 4:9–20, 4:33–51; Ex. 1002, 302; Ex. 2007, 5–7).

At this stage, we do not adopt Patent Owner's proposed construction, which requires "all" corners being rounded from a "top view perspective." The claims do not recite language directed to all corners, and we decline to import this particular embodiment into the claims based on the current record. At this stage, we need not resolve whether the corners need be rounded solely from a top view perspective because, as we discuss below, we preliminarily determine that the combination of Kobayashi and Hshieh teaches rounding from a top view perspective. *See infra* Section III.D.3.

Rather, at this stage of the proceeding and on this record, we see no reason to determine that "substantially square-shaped cells with rounded corners" deviates from its ordinary and customary meaning, and we determine that, apart from our discussion above, no other claim construction analysis is necessary for our decision to institute an *inter partes* review. *See*

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Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co., 868 F.3d 1013, 1017 (Fed. Cir. 2017) (holding that only terms in controversy must be construed "and only to the extent necessary to resolve the controversy") (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). Thus, we preliminarily determine that the term does not include any process limitations and does not necessarily require all four corners to be rounded.

2. "substantially square-shaped cells with truncated corners"

Claim 6 recites "said trenched gates surrounding said transistor cells as closed cells constituting substantially square-shaped cells with truncated corners." Ex. 1001, 6:14–16.

Petitioner and Patent Owner make similar claim construction arguments as those discussed above. Pet. 18–19; Prelim. Resp. 9–11.

Petitioner argues that "truncated corners" is properly construed as "corners that are truncated by design layout." Pet. 18–19. Patent Owner argues that "substantially square-shaped cells with truncated corners" is properly construed as "the cells have, from the top view perspective, largely or essentially the shape of a square (a shape that has four equal sides and four right angles) with all corners truncated (i.e.[,] being cut off)." Prelim. Resp. 9.

For reasons similar to those discussed above, we decline to adopt either of the parties' proposed claim constructions. Rather, at this stage and on this record, we see no reason to determine that the term deviates from its ordinary and customary meaning, which does not include any process limitations and does not necessarily require all four corners to be truncated.

C. OVERVIEW OF ASSERTED PRIOR ART

1. Kobayashi (Ex. 1005)

Kobayashi describes a MOSFET, and more specifically, a UMOSFET. Ex. 1005, 1:7–10. The UMOSFET includes a unit cell formed in a region of semiconductor layer surrounded by U-shaped trenches, the unit cell having a central contact hole. *Id.* at 6:25–37. According to the Kobayashi, the MOSFET can have several layouts, including having square-shaped unit cells with square-shaped contact holes, as seen in Figure 3A below. *Id.*

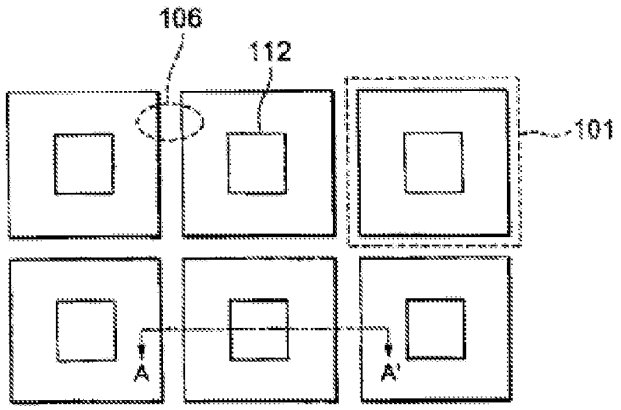


FIG.3A

Kobayashi Figure 3A depicts trench 106 surrounding a square-shaped unit cell 101. Ex. 1005, 6:25–37. Figure 3A also depicts square contact hole 112, however, Kobayashi states that "contact holes may have any desired shape," including "a circular shape." *Id.* at 6:37–39. Figure 4A, below, shows an alternative layout with hexagonal-shaped unit cells with circular contact holes.

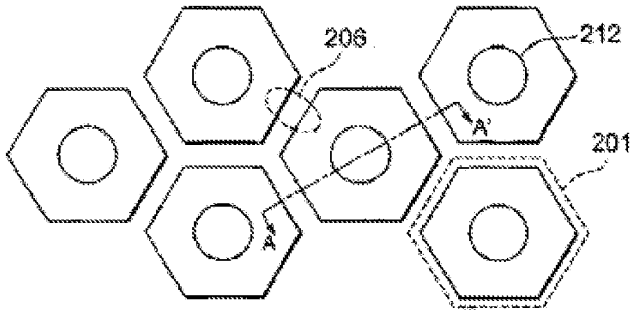


FIG.4A

Kobayashi Figure 4A depicts trench 206 surrounding a hexagonal-shaped unit cell 201. Ex. 1005, 6:32–34. Figure 3A also depicts circular contact hole 212. *Id.* at 6:37–39.

Kobayashi further describes rounded trench corners, as seen from the side view perspective in Figure 6C below.

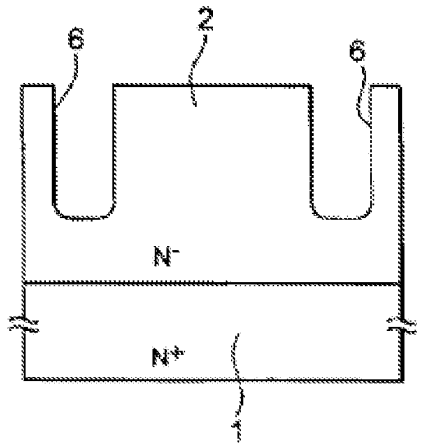


FIG.6C

Above Figure 6C depicts N^+-type silicone substrate layer 1 beneath N^--type epitaxial layer 2. Within layer 2, trench 6 is formed with rounded bottom corners. Ex. 1005, 7:57–59. Kobayashi further describes a non-illustrated embodiment in which the "corners of each trench 6 at an opening

portion may also be rounded." *Id.* at 7:59–60. Kobayashi explains that the bottom and opening portion corners can be rounded via etching or hydrogen annealing. *Id.* at 7:60–8:4.

Figure 5A, reproduced below, illustrates several other features described in Kobayashi.

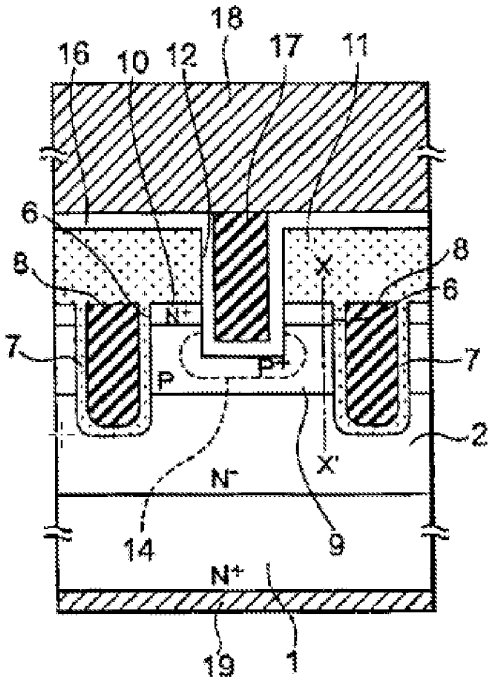
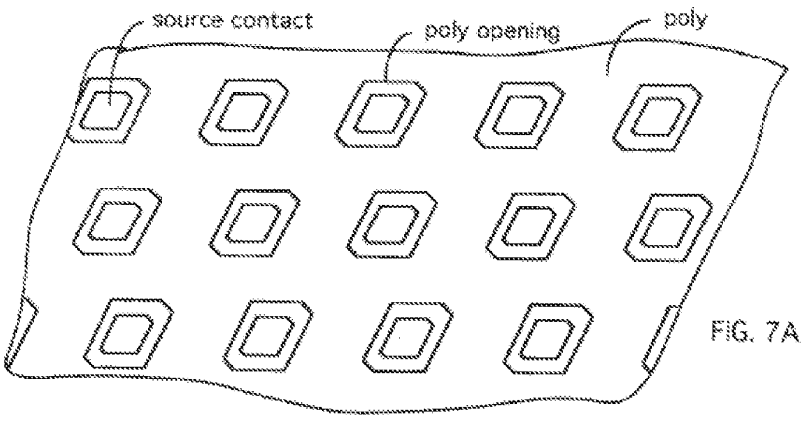


FIG.5A

In Figure 5A, trench 6, located above layer 1 and within layer 2, is filled with gate oxide film 7 and polysilicon trench gate 8. Ex. 1005, 6:53–57. Interlayer oxide film 11 is formed on trench gate 8. *Id.* Barrier metal 16 extends over interlayer oxide film 11 and into contact hole 12. *Id.* at 6:58–66. Contact hole 12 extends to P-type base layer 9 through N^+-type source layer 10 and is filled with tungsten metal plug 17. *Id.* Barrier metal 16 and plug 17 are in contact with source electrode 18. *Id.* Drain electrode 19 is formed below layer 1.

2. Hshieh (Ex. 1006)

Hshieh describes a power transistor cell supported on a semiconductor substrate with improved MOSFET cell topography. Ex. 1006, code (57), 2:60. Specifically, the power transistor cell implements a non-orthogonal parallelogram cell topography, which increases cell packing density because a non-orthogonal parallelogram cell occupies less total area than a square cell. *Id.* at 5:10–17. Figure 7A below illustrates an embodiment with non-orthogonal parallelogram transistor cells.



Hshieh Figure 7A depicts cells, each cell constituting a polysilicon opening of non-orthogonal parallelogram shape and a central source contact, wherein the cells are separated by a polysilicon gate layer. Ex. 1006, 3:30–38. The two sharper corners of the parallelogram-shaped cells are blunted "to prevent corner vulnerability where punch through weak points may be formed . . . due to a three-dimension diffusion effect." *Id.* at 5:3–8. In a similar embodiment, all corners may be blunted or rounded, as in Figure 8A, reproduced below. *Id.* at 5:23–25.

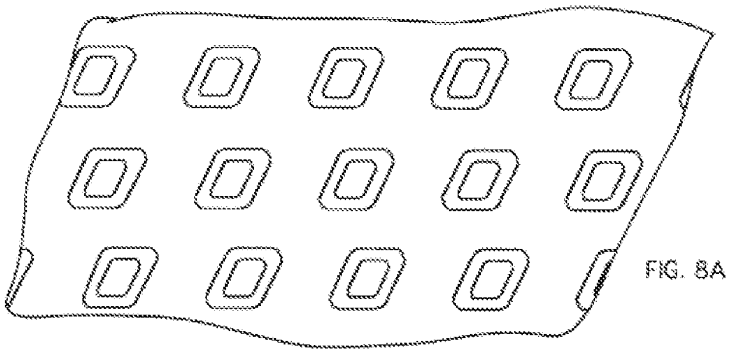
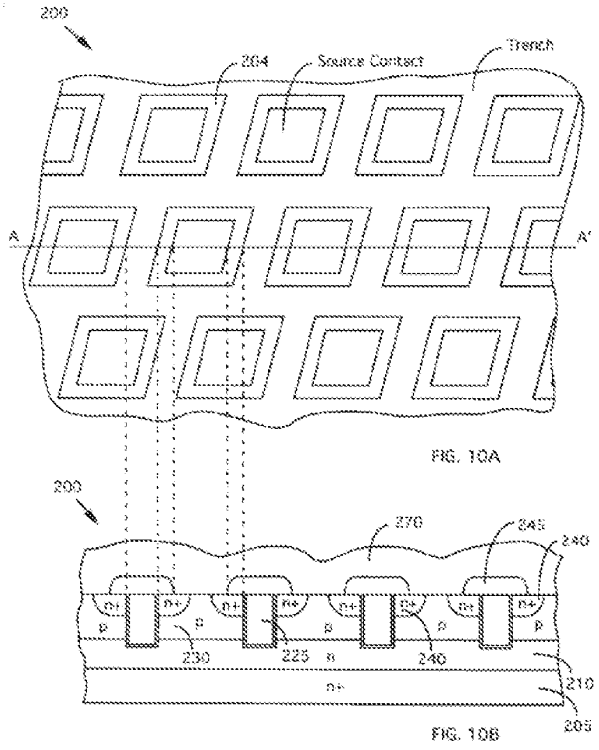


FIG. 8A

Hshieh Figure 8A, above, depicts all corners of the non-orthogonal parallelogram-shaped cells and the source contacts being blunted or rounded. Ex. 1006, 5:23–25. Hshieh further describes a similar embodiment, as seen in Figures 10A and 10B below, having trenches and trenched gates.



Hshieh Figure 10A, above, depicts MOSFET device 200 with an array of non-orthogonal parallelogram-shaped cells 204 surrounded by a trench. Ex. 1006, 7:26–8:5. Cells 204 may have rounded corners. *Id.* at 12:32–36. Figure 10B, above, shows a cross-sectional view of device 200, illustrating N^+ substrate layer 205, N^- epitaxial layer 210, doped body region 230, doped source region 240, source contact 270 (which extends to regions 230 and 240 except at layer 245), and trenched gate 225. *Id.* at 7:26–8:5.

3. Kikkawa (Ex. 1007)

Kikkawa describes a semiconductor device using a multilayer structure including a barrier bilayer of titanium nitride ("TiN") and titanium ("Ti") to improve electromigration resistance. Ex. 1007, Abstr., Fig. 1.

D. GROUND 4: OBVIOUS OVER KOBAYASHI AND HSHIEH

We focus our analysis on Ground 4 and address the remaining grounds in Section § V below. Under Ground 4, Petitioner contends that claims 1 and 3–5 are unpatentable under § 103(a) as obvious over Kobayashi in view of Hshieh. Pet. 51–63.

1. Legal Principles

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). When a ground in a petition is based on a combination of references, we consider "whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *Id.* at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). We base our obviousness inquiry on factual

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considerations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) any objective indicia of obviousness or non-obviousness that may be in evidence. *See Graham*, 383 U.S. at 17–18.

We now turn to our analysis of independent claim 1. Considering these factors,[8] we determine that Petitioner has shown a reasonable likelihood that claim 1 is unpatentable as obvious over Kobayashi and Hshieh, for the reasons explained below.

2. Claim 1 Preamble

The preamble of claim 1 recites "[a] trenched semiconductor power device comprising a plurality of trenched gates surrounding a plurality of transistor cells formed in a semiconductor substrate, wherein" the device comprises certain features. Ex. 1001, 5:7–9.

Petitioner argues that Kobayashi discloses the preamble because it describes a trenched semiconductor power device comprising a plurality of trenched gates surrounding a plurality of transistor cells formed in a semiconductor substrate. Pet. 22–25, 51 (citing Ex. 1005, 4:12–19, 6:29–37, 6:51–56, Figs. 4A, 5A). Patent Owner does not specifically contest this. *See* Prelim. Resp.

At this stage, we need not decide whether the preamble is limiting because we are persuaded that Kobayashi discloses the preamble of claim 1, for the reasons given by Petitioner.

[8] At this stage, neither party argues that there are objective indicia of obviousness or non-obviousness, so this factor is not part of our analysis. *See generally* Pet.; Prelim. Resp.

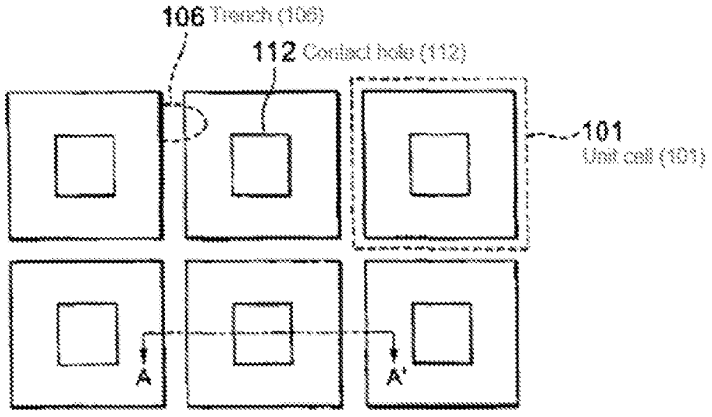
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3. Limitation 1[a]

(a) Petitioner's Contentions

Limitation 1[a] recites "said trenched gates surrounding said transistor cells as closed cells constituting substantially square-shaped cells with rounded corners." Petitioner argues that limitation 1[a] is taught by the combination of Kobayashi and Hshieh. Pet. 52.

In Kobayashi, Petitioner identifies trench gates surrounding transistor cells as closed cells constituting substantially square-shaped cells. Pet. 52 (citing Ex. 1005, 6:26–27, Fig. 3A). Petitioner's annotated version of Kobayashi's Figure 3A is provided below.

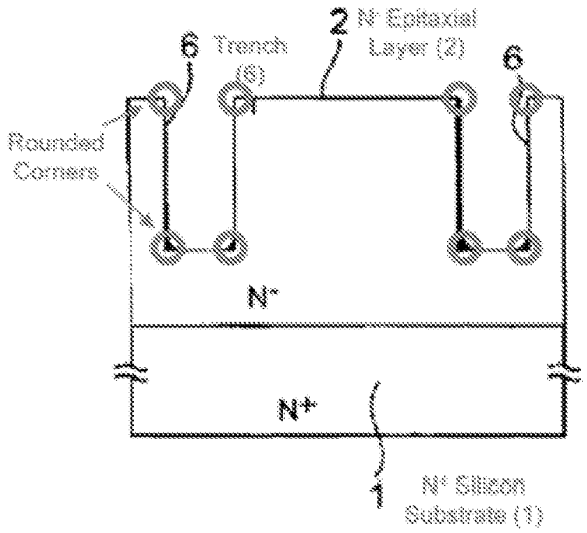


Kobayashi, Figure 3A (annotated)

Petitioner's annotated Figure 3A of Kobayashi identifies, from a top view perspective, square-shaped unit cell 101, trench 106 (which surrounds unit cell 101), and contact hole 112.[9]

[9] Under Ground 4, Petitioner alternatively contends that Kobayashi's hexagonal cells, illustrated in Figure 4A, are "substantially square cells with truncated corners." Pet. 52 (citing Ex. 1005, 6:30; Ex. 1003 ¶ 119). In this Decision, we focus our discussion on Petitioner's reliance on Kobayashi's square cells, illustrated in Figure 3A.

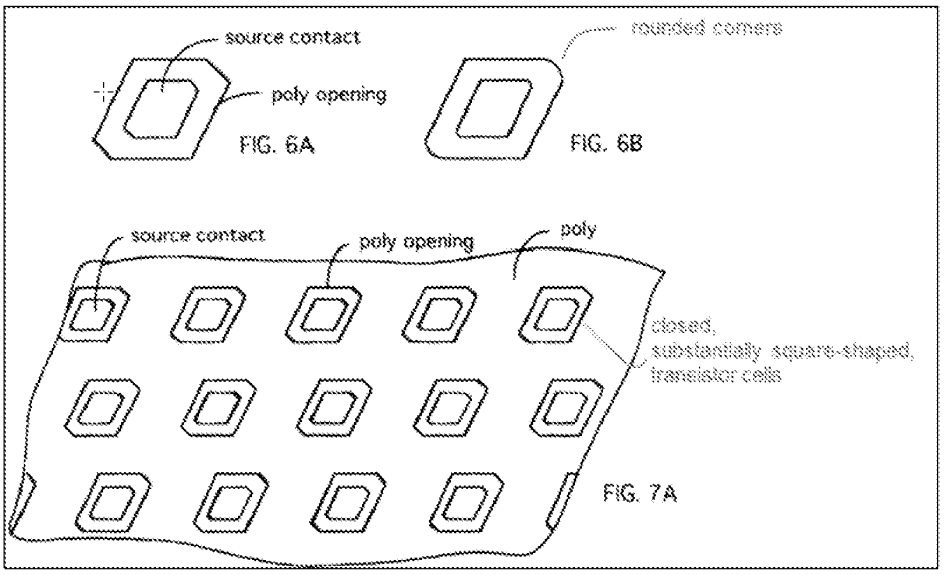
Petitioner further identifies rounded corners at trench opening portions forming the closed cell. Pet. 53 (citing Ex. 1005, 7:57–8:4, Fig. 6C; Ex. 1003 ¶ 120). Petitioner's annotated version of Kobayashi Figure 6C, pointing out the location of the rounded corners, is reproduced below. Pet. 53.



Kobayashi, Figure 6C (annotated)

Petitioner's above annotated version of Kobayashi Figure 6C shows a side view of trench 6 formed with rounded bottom and opening corners at the positions indicted by the circle annotations. Pet. 53. According to Petitioner's declarant, Dr. Liu, Kobayashi's rounding leads to "higher breakdown voltage and lower leakage current—the same benefits discussed in the '409 Patent." Ex. 1003 ¶ 133.

Alternatively, Petitioner also identifies rounded corners in Hshieh, as seen below in Petitioner's annotated versions of Figures 6A–7A. Pet. 54 (citing Ex. 1006, 5:3–28; Ex. 1003 ¶ 121); *id.* at 59 (citing Figs. 6A–8B).



Petitioner annotates Hshieh's Figures 6A–7A with the descriptions "closed, substantially square-shaped, transistor cells" and "rounded corners." As seen above, Figures 6A–7A illustrate, from a top view perspective, non-orthogonal parallelogram-shaped cells, each cell having its two opposing sharper corners being rounded. Of note, Petitioner also cites to Figures 8A and 8B, which illustrate similar cells having all four corners rounded. Pet. 59; Ex. 1003 ¶ 137.

Petitioner points to Hshieh's express teaching that rounding cell corners "discloses the problems of vulnerable punch-through weak points in the corners of square cells, [which is] due to undesirable higher peak electric field being reached at the corners." Pet. 57–58; *see* Ex. 1003 ¶ 133 (citing Ex. 1006, 2:19–39); *see also* Pet. 59 (citing Ex. 1006, 5:3–17, Figs. 6A–8B; Ex. 1003 ¶ 137). For example, Hshieh states, "[i]n order to prevent the corner vulnerability where punch through weak points may be formed at the sharp corners due to a three-dimension diffusion effect . . . , the sharp corners [of the cells] can be either be blunted or rounded." Ex. 1006, 5:3–8.

Based on the teachings in Kobayashi and Hshieh on the benefits of rounding, Petitioner contends it would have been obvious to combine Kobayashi's square-shaped cells with Hshieh's rounded corners. Pet. 54, 59 (citing Ex. 1003 ¶¶ 122, 137).

In support of its contention that it would have been obvious to combine Kobayashi and Hshieh, Petitioner explains that Kobayashi and Hshieh, like the '409 patent, relate to the field of semiconductor devices and address the vulnerabilities at the corners of closed cells in semiconductor devices. Pet. 59–60 (citing Ex. 1003 ¶ 138); *see also* Ex. 1003 ¶¶ 133–134.

In addition, according to Petitioner, Kobayashi and Hshieh both demonstrate that "square-shaped cells, their corners, and methods of truncating, blunting, and rounding the corners, are all known, conventional, familiar elements to a POSITA." Pet. 59 (citing Ex. 1003 ¶ 137); *see also id.* at 61 (citing Ex. 1003 ¶ 140). As such, Petitioner contends that "combining Kobayashi and Hshieh requires nothing more than the use of known techniques to improve similar devices in the same way." *Id.* at 59.

Petitioner further contends that "[a]dding Hshieh's rounding of corners to Kobayashi's truncated corners of a closed cell layout applies a known technique to realize a minor and commonplace modification." Pet. 60. Petitioner also contends adding Hshieh's rounding to Kobayashi's corners applies a known technique to a known device ready for improvement (as expressly taught by Hshieh) to yield a predictable result, i.e., "to improve electro-migration and contact resistance." *Id.* at 61 (citing Ex. 1003 ¶ 139). Petitioner similarly contends that combining Kobayashi and Hshieh requires nothing more than combining familiar elements according to known methods to yield a predictable result. *Id.* at 61–62 (citing Ex. 1003 ¶ 140).

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Lastly, Petitioner contends that design incentives exist for modifying Kobayashi with Hshieh and that "a POSITA designing a semiconductor structure would naturally seek to eliminate known problems at the corners of closed cells, where possible." Pet. 62 (citing Ex. 1003 ¶ 141); *see also* Ex. 1003 ¶¶ 133, 137–140.

(b) Patent Owner Arguments; Analysis

Patent Owner makes several arguments in response to Petitioner's contentions under Ground 4 with respect to claim 1, which we address in turn, along with our preliminary analysis of the parties' arguments.

First, Patent Owner argues that Petitioner fails to articulate a sufficient motivation to combine Kobayashi and Hshieh in the manner claimed by limitation 1[a]. Patent Owner states that each of Petitioner's rationales are "based on the notion that 'rounding' was well-known and conventional" and "nowhere does Petitioner or its expert articulate any motivation to combine the alleged *top view* rounding of Hshieh with Kobayashi." Prelim. Resp. 21–23.

We disagree at this stage. Petitioner's rationale for combining Kobayashi with Hshieh is not solely based on Hshieh's top view rounding being well known. Rather, Petitioner's rationale is clearly based on express teachings in Hshieh about the benefits of top view rounding. *See* Pet. 54, 59 (citing Ex. 1006, 5:3–17, Figs. 6A–8B; Ex. 1003 ¶ 137); Ex. 1003 ¶¶ 122, 133. For example, Petitioner and its declarant refer to Hshieh's teaching at column 5, lines 3–17, which states, "[i]n order to prevent the corner vulnerability where punch through weak points may be formed at the sharp corners due to a three-dimension diffusion effect . . . , the sharp corners of the polysilicon openings can be either blunted or rounded." *See* Pet. 59; *see*

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Ex. 1003 ¶ 137. Accordingly, at this stage, we find that Petitioner has sufficiently articulated a motivation to combine the top view rounding of Hshieh with Kobayashi.

Next, Patent Owner argues that Hshieh teaches non-orthogonal parallelogram-shaped cells to increase cell packing density and "specifically identifies square cell configurations as having disadvantageous packing densities." Prelim. Resp. 23. Patent Owner argues that Hshieh therefore "plainly teach[es] away from combining Hshieh with Kobayashi in the manner claimed." *Id.*

We do not agree at this stage. Although Hshieh teaches that non-orthogonal cells are preferable over square cells, Patent Owner has not pointed out anything in Hshieh that would "criticize, discredit, or otherwise discourage" modifying Kobayashi's square cells to have rounded corners. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004); *see also DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) ("A reference does not teach away . . . if it merely expresses a general preference for an alternative invention . . . ."). Thus, we find nothing in the preliminary record to suggest that Hshieh teaches away from the combination.

Next, Patent Owner argues that Petitioner fails to articulate why a POSITA would have been motivated to combine Kobayashi and Hshieh to arrive at a square-shaped cell with all four corners rounded. Prelim. Resp. 24–25. According to Patent Owner, "the cited portions of Hshieh only involve rounding the *two* sharper corners of each non-orthogonal parallelogram, leaving two corners unrounded." *Id.* at 25.

We do not agree with Patent Owner because the Petition cites Hshieh Figures 8A–8B, which clearly illustrate non-orthogonal parallelograms

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having all four corners rounded. Pet. 54 (citing Ex. 1006, 5:3–28); *id.* at 59 (citing Ex. 1006, Figs. 6A–8B). At this stage, the evidence suggests that it was within the ordinary skill in the art to modify Kobayashi's device with all four rounded corners as described in Hshieh Figures 8A and 8B. Moreover, we do not construe claim 1, at this stage, to necessarily require that all four corners are rounded. *See supra* Section III.B.1.

Next, Patent Owner argues against Petitioner's combination because Hshieh's rounding addresses a different problem than the problem addressed in the '409 patent. Prelim. Resp. 25. Patent Owner explains that the '409 patent addresses the problem of parasitic bipolar latch up due to the non-uniform distance between trench gates and the trenched source contact. *Id.* Patent Owner also explains that Hshieh lacks trenched source contacts and therefore "Hshieh's discussion of 'rounding' is not concerned with problems relating to trenched source contacts." *Id.* at 26. "Rather, Hshieh is concerned with the effect of the 'three dimension diffusion effect' at the two sharper corners of Hshieh's non-orthogonal parallelograms." *Id.*

On this record, contrary to Patent Owner's assertion, Hshieh's rounding is not limited to the two sharper corners. As seen in Hshieh Figures 8A and 8B, Hshieh teaches rounding at all four corners to reduce three-dimension diffusion. Ex. 1006, 2:19–39, 5:3–28. Further, as the Supreme Court made clear in *KSR*, "[i]n determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls." 550 U.S. at 419–420. At this stage, we do not agree that the Kobayashi-Hshieh combination fails because Hshieh's rounding addresses a different problem (the three-dimension diffusion effect) than that of the '409 patent (parasitic bipolar latch up).

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Patent Owner also alleges improper cherry-picking and hindsight analysis. Prelim. Resp. 27. However, the evidence does not suggest that the Petitioner engaged in improper cherry-picking or hindsight reasoning to arrive at the claimed configuration. The evidence suggests that Kobayashi describes all the features of claim 1 except, perhaps, rounded corners, and Hshieh describes a similar device with rounded corners. Ex. 1005, 6:25–39; Ex. 1006, Figs. 8A–8B. Petitioner also provides a sufficiently persuasive rationale, expressly taught by Hshieh, to modify Kobayashi with Hshieh's rounding: to prevent corner vulnerability. *See* Pet. 54, 59 (citing Ex. 1006, 5:3–17). At this juncture, Patent Owner does not contend that this was outside of the knowledge within the level of ordinary skill in the art at the time the claimed invention was made nor that it was gleaned only from the '409 patent. *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) ("Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper."). On this record, therefore, the proposed combination of features is suggested by the intrinsic disclosures of Kobayashi and Hshieh.

4. Undisputed Limitations 1[b]–1[f]

At this stage, Patent Owner does not dispute Petitioner's contentions regarding limitations 1[b]–1[f], which are discussed briefly below.

Limitation 1[b] recites "each of said closed cells further includes a circular trench contact disposed substantially in a central portion of said closed cells, penetrating through a source region surrounding said trenched

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gates and extending into a body region encompassing said source region," which Petitioner identifies in Kobayashi as centrally disposed circular contact hole 12 extending through source layer 10 to base layer 9. Ex. 1001, 5:13–17; Pet. 27–29, 55 (citing Ex. 1005, 6:29–39, 6:46–67, Figs. 4A, 5A).

Limitation 1[c] recites "said circular trench contact comprises a hole opened from a top surface of said semiconductor substrate and is filled with a contact metal plug." Ex. 1001, 5:18–20. Petitioner identifies Kobayashi's contact hole 12 filled with tungsten metal plug 17. Pet. 29–30, 55 (citing Ex. 1005, 6:58–67, Figs. 4A, 5A).

Limitation 1[d] recites "wherein sidewalls of said hole are surrounded by and in contact said source and body regions." Ex. 1001, 5:20–22. Petitioner identifies Kobayashi's contact hole 12 sidewalls in contact with the source and base layers. Pet. 30–31, 55 (citing Ex. 1005, Figs 4A, 5A).

Limitation 1[e] recites "and said circular trench contact is separate from said trenched gates with said source region and body region disposed between a gate oxide lining of said trenched gates and all circumferential points of the circular trench contact." Ex. 1001, 5:22–26. Petitioner identifies Kobayashi's source and base layers 10, 9 disposed between trench gate oxide film 7 and all circumferential points of contact hole 12. Pet. 31–32, 55 (citing Ex. 1005, Figs 4A, 5A).

Limitation 1[f] recites "and said contact metal plug connected to a source metal disposed on top of said circular trench contact." Ex. 1001, 5:27–28. Petitioner identifies Kobayashi's tungsten metal plug 17 connected to source electrode 18. Pet. 32–33, 55 (citing Ex. 1005, 6:64–68, Fig. 5A).

At this stage, Patent Owner does not specifically contest Petitioner's contentions with respect to limitations 1[b]–1[g], and we are persuaded that

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Kobayashi teaches each of these limitations, for the reasons given by Petitioner. *See* Prelim. Resp.

5. Conclusion as to Claim 1

For the above reasons, we determine that Petitioner has shown, sufficiently persuasively at this stage, that Kobayashi in combination with Hshieh teaches all the limitations of claim 1, and that a person of ordinary skill in the art would have had reason to combine the features of each reference as Petitioner argues in the Petition. We therefore determine that Petitioner is reasonably likely to prevail in showing that claim 1 is unpatentable under § 103(a) as obvious over Kobayashi and Hshieh.

6. Claims 3–5

For claims 3–5, which depend from claim 1, Petitioner advances arguments that map with particularity every claim limitation to disclosures in Kobayashi. Pet. 51–56. At this stage in the proceeding, Patent Owner does not contest those arguments except to contend that the combination of Kobayashi and Hshieh does not suggest substantially square-shaped cells with rounded corners, which we addressed above in Section § III.D.3.b. Prelim. Resp. 28.

IV. DISCRETION TO DENY INSTITUTION UNDER § 314(a)

A. BACKGROUND: § 314(a) AND *FINTIV*

Institution of an *inter partes* review is discretionary. *See* 35 U.S.C. § 314(a) (authorizing institution of an *inter partes* review under particular circumstances, but not requiring institution under any circumstances); *Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 273 (2016) ("[T]he

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agency's decision to deny a petition is a matter committed to the Patent Office's discretion."); *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1356 (2018) ("[Section] 314(a) invests the Director with discretion on the question whether to institute review . . . ." (emphasis omitted)).

In light of the parallel district court proceeding challenging the '409 patent, Patent Owner urges the Board to exercise our discretion to deny institution of this *inter partes* review based on the factors established in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*"). Prelim. Resp. 31–35. Petitioner argues that the Board should decline to exercise our discretion. Pet. 71–74. For the reasons below, we decline to exercise our discretion to deny institution in this case.

An advanced state of a parallel district court proceeding is a "factor that weighs in favor of denying the Petition under § 314(a)." *NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 at 20 (PTAB Sept. 12, 2018) (precedential) ("*NHK*"). Specifically, an early trial date is part of a "balanced assessment of all relevant circumstances in the case, including the merits." Consolidated Trial Practice Guide (November 2019) 58.[10]

In *Fintiv*, the Board explained that "cases addressing earlier trial dates as a basis for denial under *NHK* have sought to balance considerations such as system efficiency, fairness, and patent quality." *Fintiv*, Paper 11 at 5 (footnote omitted). *Fintiv* sets forth six nonexclusive factors for determining "whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding." *Id.* at 6. These factors consider the following:

[10] Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

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1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;
4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board's exercise of discretion, including the merits.

Id. at 5–6. In evaluating these factors, we "take[] a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Id.* at 6.

The Director of the U.S. Patent and Trademark Office has issued additional guidance on the application of the *Fintiv* factors. *See* Katherine K. Vidal, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (June 21, 2022) ("*Fintiv* Memo").[11] The *Fintiv* Memo states that "to benefit the patent system and the public good, the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution in view of parallel district court litigation where a petition presents compelling evidence of unpatentability." *Id.* at 2.

[11] Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

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We now address the parties' arguments with respect to the *Fintiv* factors. In the analysis that follows, we first consider whether *Fintiv* factors 1–5 weigh in favor of exercising our discretion to deny institution. For the reasons discussed below, we conclude that *Fintiv* factors 1–5 weigh in favor of denying institution. Nevertheless, we decline to deny institution because the Petition presents compelling evidence of unpatentability under factor 6. *See CommScope Techs. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 4–5 (PTAB Feb. 27, 2023) (precedential) ("In circumstances where . . . the Board's analysis of *Fintiv* factors 1–5 favors denial of institution, the Board shall then assess compelling merits.").

B. *FINTIV* FACTOR 1: WHETHER THE COURT GRANTED A STAY OR EVIDENCE EXISTS THAT ONE MAY BE GRANTED IF A PROCEEDING IS INSTITUTED

A district court stay of parallel litigation pending resolution of an *inter partes* review allays concerns about inefficiency and duplication of efforts, and strongly weighs against exercising our authority to deny institution. *Fintiv*, Paper 11 at 6. Petitioner asserts that "[n]o party has requested a stay of litigation, and so this factor is neutral." Pet. 72. In response, Patent Owner notes that ASUS, a real party in interest in the instant proceeding, filed a motion to stay the parallel district court proceeding. Prelim. Resp. 31 (citing Ex. 2003); Pet. 1. ASUS's motion to stay was denied with prejudice. *See* Paper 7; Ex. 2008. Accordingly, we weigh the first *Fintiv* factor as favoring discretionary denial.

C. *FINTIV* FACTOR 2: PROXIMITY OF THE COURT'S TRIAL DATE TO THE BOARD'S PROJECTED STATUTORY DEADLINE FOR A FINAL WRITTEN DECISION

The *Fintiv* Memo directs the Board to "consider the median time from filing to disposition of the civil trial for the district in which the parallel

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litigation resides." *Fintiv* Memo, 3 (footnote omitted). Based on a median time to trial of 19 months for the U.S. District Court for the Eastern District of Texas as of March 2023, Petitioner estimates that the parallel proceeding would result in a trial occurring in October 2024, which is six months earlier than the Board's expected final written decision, which Petitioner estimates would issue around April 2025. Pet. 72 (citing Ex. 1010). Patent Owner does not dispute this estimate. Prelim. Resp. 32.

As of December 2023, the median time to trial for the Eastern District of Texas is 21.4 months[12], which projects a district court trial date of December 2024, five months prior to the expected May 2025 due date for our final written decision if we were to institute an *inter partes* review on this Petition. Because the district court would address issues relating to the validity of the '409 patent several months before we would issue a final written decision, we weigh the second *Fintiv* factor as favoring discretionary denial.

D. *FINTIV* FACTOR 3: INVESTMENT IN THE PARALLEL PROCEEDING BY THE COURT AND THE PARTIES

The third *Fintiv* factor concerns the amount of investment in the parallel proceeding by the district court and the parties. Petitioner argues that the parallel proceeding "is still in the early stages," and that substantial work remains before trial. Pet. 73 (citing Ex. 1018). Patent Owner argues that the parallel proceeding is no longer in its early stages. Prelim. Resp. 32. According to Patent Owner, (1) the parties in the parallel proceeding have already exchanged infringement and invalidity contentions, (2) claim

[12] The most recent statistics are available at https://www.uscourts.gov/statistics/table/na/federal-court-management-statistics/2023/12/31-1.

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construction discovery is complete, and (3) prior to an expected Board institution decision, the opening claim construction brief will have been submitted, the *Markman* hearing will have been held, and fact discovery will be complete. *Id.* at 32–33; Ex. 1018, 4–5; Ex. 2004, 4.

Because there has been significant investment by the parties and the district court in the parallel proceeding, including the completion of preliminary disclosures and claim construction, and the near-completion of fact discovery, we weigh the third *Fintiv* factor as favoring discretionary denial.

E. *FINTIV* FACTOR 4: OVERLAP BETWEEN ISSUES RAISED IN THE PETITION AND IN THE PARALLEL PROCEEDING

In the *Fintiv* Memo, the Director stated that, "[c]onsistent with *Sotera Wireless, Inc.*, the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB." *Fintiv* Memo, 3 (footnote omitted) (citing *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential) ("*Sotera*")).

Petitioner stipulates "not to pursue invalidity challenges in any district court case based on the same or substantially the same grounds relied upon in this Petition." Pet. 73.

Patent Owner argues that Petitioner's stipulation is too narrow, that Petitioner is not a party in the parallel proceeding, and that the record reflects no *Sotera*-type stipulation from the actual defendant in that proceeding: Petitioner's real party in interest ASUS. Prelim. Resp. 33. Patent Owner further argues that ASUS's invalidity contentions in the

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parallel proceeding include the same Kobayashi and Hshieh grounds as in this Petition. *Id.*; Ex. 2005, 7–8.

Patent Owner has the better position. The instant proceeding and the parallel litigation involve the same or substantially the same claims and grounds. *See* Ex. 2005. We are directed to no argument or evidence sufficient to show that Petitioner's stipulation binds ASUS and, therefore, prevents overlap between this proceeding and the parallel proceeding. Thus, we weigh the fourth *Fintiv* factor as favoring discretionary denial.

F. *FINTIV* FACTOR 5: WHETHER THE PETITIONER AND THE DEFENDANT IN THE PARALLEL PROCEEDING ARE THE SAME PARTY

"If a petitioner is unrelated to a defendant in an earlier court proceeding, the Board has weighed this fact against exercising discretion to deny institution under *NHK*." *Fintiv*, Paper 11 at 13–14 (footnote omitted).

Petitioner contends it is not a defendant in the parallel proceeding nor is it an affiliate or subsidiary thereof. Pet. 74. In response, Patent Owner notes that the defendant in the parallel proceeding, ASUS, is identified as a real party in interest in the Petition. Prelim. Resp. 34; Ex. 1010; Pet. 1.

Given Petitioner's statement that ASUS is a real party in interest, we find that the defendant in the parallel proceeding is not "unrelated" to Petitioner. Accordingly, we weigh the fifth *Fintiv* factor as favoring discretionary denial.

G. *FINTIV* FACTOR 6: OTHER CIRCUMSTANCES THAT IMPACT THE BOARD'S EXERCISE OF DISCRETION, INCLUDING COMPELLING MERITS

We consider whether Petitioner has presented compelling evidence of unpatentability when, as here, our analysis of the first five *Fintiv* factors favors denial of institution. *CommScope Techs.*, Paper 23 at 5. "Compelling, meritorious challenges are those in which the evidence, if

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unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence." *Fintiv* Memo, 4. As further explained in *OpenSky Industries, LLC v. VLSI Technology LLC*, "a compelling-merits challenge is a higher standard than the reasonable likelihood required for the institution of an IPR," and is met when "it is highly likely that the petitioner would prevail with respect to at least one challenged claim." IPR2021-01064, Paper 102 at 49 (PTAB Oct. 4, 2022) (decision on Director review) (precedential).

Petitioner argues that we should not deny institution under *Fintiv* "because the merits are strong." Pet. 74. Conversely, Patent Owner argues that "the merits of the petition are extraordinarily weak." Prelim. Resp. 34.

Here, we find that the evidence, if unrebutted in trial, demonstrates that it is highly likely that Petitioner would prevail under at least Ground 4 with respect to claim 1. At this stage, Patent Owner has not submitted any declaratory evidence or evidence of objective indicia of non-obviousness to rebut Petitioner's seemingly straightforward case for claim 1 being obvious over the combined teachings of Kobayashi and Hshieh. As discussed above, Petitioner identifies most and/or all limitations in Kobayashi, and relies on Hshieh only for what appears to be a minor modification, i.e., rounding of corners. *See supra* Section § III.D. Petitioner's motivation for this modification comes from an express teaching in Hshieh. *See, e.g.*, Ex. 1003 ¶ 137. At this stage of the proceeding, Patent Owner's arguments do not undercut the sufficiency of Petitioner's citations to Hshieh's express teaching and to certain relied-upon embodiments of Hshieh, specifically Figures 8A and 8B, which illustrate all corners being rounded from a top view perspective. *See* Prelim. Resp. 20–28. Even if we were to adopt Patent

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Owner's narrow claim construction (which we decline to do on this preliminary record) requiring all four corners being rounded from a top view perspective, it still appears Petitioner is highly likely to prevail with respect to at least claim 1 under Ground 4. *See supra* Section §§ III.B, III.D.3.b. As such, we determine, based on the evidence of record, that Petitioner presents a compelling, meritorious challenge with respect to at least one claim.

Having identified compelling merits, we decline to exercise discretion to deny institution under § 314(a). *Fintiv* Memo, 5 ("[T]he PTAB will not deny institution based on *Fintiv* if there is compelling evidence of unpatentability."). However, "a determination of 'compelling' merits should not be taken as a signal to the ultimate conclusion after trial" because "all relevant evidence likely will not have been adduced at the point of institution [and] trial should produce additional evidence that may support a determination in the Final Written Decision that unpatentability has not been adequately proven." *OpenSky*, Paper 102 at 49–50.

V. OTHER GROUNDS

Because Petitioner has shown a likelihood of prevailing, and has identified a compelling, meritorious challenge with respect to claim 1 on Ground 4 based on Kobayashi and Hshieh, we will institute on all claims and all grounds raised in the Petition. 37 C.F.R. § 42.108(a) ("When instituting . . . review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim."); *see SAS*, 138 S. Ct. at 1359–60; *AC Techs. S.A. v. Amazon.com, Inc.*, 912 F.3d 1358, 1364 (Fed. Cir. 2019) ("[I]f the Board

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institutes an IPR, it must . . . address all grounds of unpatentability raised by the petitioner.").

At this stage, we decline to provide detailed preliminary findings as to the remaining grounds of unpatentability (i.e., Grounds 1–3 and 5–6). We determine that, under the facts presented on this record, the dispute surrounding these grounds is best suited for resolution on a full trial record and in view of any final determination on claim construction. Refraining from supplying preliminary findings may be the prudent course, moreover, where the District Court in the parallel proceeding (1) denied with prejudice a stay, (2) is poised to presently issue an order on claim construction, and (3) is scheduled to hold a trial about five months before the Board is scheduled to enter its final written decision in the instant proceeding.[13]

However, we provide the following remarks as guidance to the parties in an effort to promote a streamlined trial.

For each additional ground, Petitioner advances arguments that map with particularity every claim limitation to disclosures in the asserted prior art. Pet. 22–67.[14]

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[13] These remarks are based on information presented by the parties in connection with Patent Owner's request for a discretionary denial, which we addressed above in Section § IV. *See* Pet. 71–74; Prelim. Resp. 31–34; Paper 7 (citing Ex. 2008).

[14] Under Grounds 1, 2, 4, and 5, Petitioner provides alternate mappings with respect to Kobayashi and the claimed substantially square-shaped cells. Compare Pet. 26 (annotating Kobayashi, Figure 4A) with *id.* at 27 (annotating Kobayashi, Figure 6C); *id.* at 39, 51–53, 66. We have concerns regarding the reasonableness of Petitioner's mapping of Kobayashi's hexagonal cells, seen in Figure 4A, to the claimed substantially square-shaped cells, for similar reasons as argued by Patent Owner. *See* Prelim. Resp. 13–14 ("a hexagon is not essentially square shaped").

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Regarding Grounds 1–3, Patent Owner's main contention, at this stage of the proceeding, is that Kobayashi does not disclose substantially square-shaped cells with "top view" rounded or truncated corners. Prelim. Resp. 12–20. The parties may wish to explore whether the construction of the claim term "substantially square-shaped cells with rounded corners" properly includes the "top view" requirement proposed by Patent Owner in its Preliminary Response. Prelim. Resp. 4, 9. The parties may also wish to explore whether Kobayashi discloses corner rounding from a top view perspective, i.e., whether Kobayashi's trench corner rounding, seen from a side view perspective in Petitioner's annotated Figure 6C (*see* Pet. 27), inherently meets Patent Owner's proposed claim construction requiring a top view requirement.

Regarding Grounds 5–6, at this stage of the proceeding, Patent Owner does not contest Petitioner's mapping and arguments except to contend that the references do not suggest substantially square-shaped cells with rounded or truncated corners, which was addressed in our above analysis. Prelim. Resp. 28–31.

VI. CONCLUSION

Having identified at least one compelling, meritorious challenge based on alleged obviousness of claim 1 over the combined teachings of Kobayashi and Hshieh, we decline to deny the Petition on a discretionary basis. We determine that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition, and therefore, we institute *inter partes* review.

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Any argument not raised in a Patent Owner Response to the Petition, or as permitted in another manner during trial, shall be deemed waived even if asserted in the Preliminary Response. In addition, nothing in this Decision authorizes Petitioner to supplement information advanced in the Petition in a manner not permitted by the Board's Rules.

VII. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), *inter partes* review of all challenged claims of the '409 patent is instituted on all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(a) and 37 C.F.R. § 42.4, notice is given of institution of trial commencing on the entry date of this Decision.

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EX1002.040

For PETITIONER:

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John Flaim
Ellen Cheong
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For PATENT OWNER:

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	101302-00016	2119

35161 7590 05/24/2023

DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 Eye St. N.W.
SUITE 900
WASHINGTON, DC 20006

EXAMINER	
ARROYO, TERESA M	

ART UNIT	PAPER NUMBER
2826	

NOTIFICATION DATE	DELIVERY MODE
05/24/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dwpatents@dickinsonwright.com

uPI Semiconductor Corp.
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UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No. 7,812,409 Issue Date: 12 Oct 2010 Application No. 11/633,366 Filing or 371(c) Date: 4 Dec 2006 Attorney Docket No. 101302-0005	:	DECISION ON PETITION

This is a decision on the renewed petition pursuant to 37 C.F.R. § 1.378(b) to accept the unintentionally delayed payment of a maintenance fee for the above-identified patent, filed April 28, 2023.

The renewed petition pursuant to 37 C.F.R. § 1.378(b) is **GRANTED.**

Application number 11/633,366 matured into U.S. patent number 7,812,409 on October 12, 2010. The grace period for paying the 7½-year maintenance fee provided in 37 C.F.R. § 1.362(e) expired at midnight on October 12, 2018, with no payment received. Accordingly, the patent expired on October 12, 2018 at midnight.

A grantable petition pursuant to 37 C.F.R. § 1.378(b) must be accompanied by:

(1) The required maintenance fee set forth in § 1.20(e) through (g);
(2) The petition fee as set forth in § 1.17(m); and,
(3) A statement that the delay in payment of the maintenance fee was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

An initial petition pursuant to 37 C.F.R. § 1.378(b) to accept the unintentionally delayed payment of a maintenance fee for this patent was filed on July 12, 2022. The individual who signed the initial petition (former Petitioner) provided an

instruction to charge each of these fees to Deposit Account number 04-1061. The USPTO attempted to charge these fees to this Deposit Account on September 29, 2022 but was unable to do so since former Petitioner was not listed as an authorized user of this Deposit Account. The initial petition pursuant to 37 C.F.R. § 1.378(b) was dismissed via the mailing of a decision on October 12, 2022.

A renewed petition pursuant to 37 C.F.R. § 1.378(b) was received on October 28, 2022, and the individual who signed the renewed petition (current Petitioner) explained the former Petitioner left the law firm after the first petition was filed and his name was removed from the list of authorized users accordingly. Petitioner authorized the charging of two petition fees ($1050 each), the 7½-year maintenance fee ($1880) and the 11½-year maintenance fee ($3850) to Deposit Account number 04-1061. However, the USPTO was unable to charge all required fees to this Deposit Account, since it contained insufficient funds.[1]

With the renewed petition pursuant to 37 C.F.R. § 1.378(b) received on October 28, 2022, Petitioner explained that prior counsel (Bo-In Lin, Reg. No. 33,948) committed "gross misconduct," in that he and the patentee had an agreement where he would track and submit the "3.5, 7.5, and/or 11.5 year Maintenance Fees," however he neither paid the required maintenance fees nor alerted the patentee of either the required fees or the delinquency in their payment.[2] The patentee learned of the expiration of several patents, including this one, on May 25, 2022.[3] The initial petition was filed fewer than two months later.

The renewed petition pursuant to 37 C.F.R. § 1.378(b) received on October 28, 2022 was dismissed via the mailing of a decision on December 14, 2022.

On March 10, 2023, the USPTO was able to charge the 11½-year maintenance fee to Deposit Account number 04-1061.

A renewed petition pursuant to 37 C.F.R. § 1.378(b) was received on February 14, 2023, where Petitioner established that a

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1 These fees total $7830, and the undersigned attempted to charge each of these fees to Deposit Account number 04-1061 on December 7, 2022, however it contained $7728. It follows the undersigned charged both petition fees and the 7½-year maintenance fee, but was unable to charge the 11½-year maintenance fee.
2 Renewed petition received on October 28, 2022, pages 2 and 4-5.
3 *Id.* at 5.

complaint concerning prior counsel has been filed with OED; that she attempted to contact prior counsel on multiple occasions but has not received a response;[4] that on a date that has not been revealed, the patentee engaged current counsel; that on a date that has not been revealed, current counsel discovered this patent had expired; and, on May 25, 2022, current counsel informed the patentee of this discovery, and this was the first patentee had heard of it.

The renewed petition pursuant to 37 C.F.R. § 1.378(b) received on February 14, 2023 was dismissed via the mailing of a decision on March 17, 2023

With this renewed petition pursuant to 37 C.F.R. § 1.378(b) received on April 28, 2023, Petitioner has specified she is alleging Mr. Lin missed both the 7½-year and 11½-year maintenance fees. Moreover, Petitioner has explained the applicant missed the fact that it was not billed for 16 maintenance fees because its employees trusted Mr. Lin.

The record now supports a finding that the extended period of delay has been unintentional.

Petitioner has met each of the requirements of 37 C.F.R. § 1.378(b).

Accordingly, the 7½-year and 11½-year maintenance fees are hereby accepted and the above-identified patent is hereby reinstated as of the mail date of this decision.

Telephone inquiries regarding this decision should be directed to the undersigned at (571) 272-3225.[5] Inquiries pertaining to

4 Petitioner refers to copies of emails that were sent to prior counsel that were supposedly included with the February 14, 2023 renewed petition as attachments. However, these attachments have not been located in the electronic file so the undersigned is not in a position to review their contents.

5 Petitioner will note that all practice before the Office should be in writing, and the action of the Office will be based exclusively on the written record in the Office. *See* 37 C.F.R. § 1.2. As such, Petitioner is reminded that no telephone discussion may be controlling or considered authority for any further action(s) of Petitioner.

the submission of maintenance fees should be directed to the Maintenance Fee branch at 571-272-6500.

/PAUL SHANOSKI/
Attorney Advisor, OPET

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PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

Docket Number (Optional): 101302-00016

Mail to: **Mail Stop Petition**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

NOTE: If information or assistance is needed in completing this form, please contact the Office of Petitions at (571) 272-3282.

Patent No. 7812409 Application Number 11633366

Issue Date October 12, 2010 Filing Date December 4, 2006

CAUTION: Maintenance fee payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

Also complete the following information, if applicable.

The above-identified patent

☐ is a reissue of original Patent No. _____ original issue date _____

original application number _____

original filing date _____.

☐ resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____

filed on _____.

NOTE: A grantable petition requires the following items:

(1) Petition fee;
(2) Maintenance fee; and
(3) Statement that the delay in payment of the maintenance fee was unintentional.

CERTIFICATE OF MAILING OR TRANSMISSION (37 CFR 1.8(a))

I hereby certify that this paper (* along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or being transmitted to the U.S. Patent and Trademark Office by EFS-Web, or by facsimile to (571) 273-8300, on the date shown below.

April 28, 2023
Date

/Laura Moskowitz/
Signature

Laura Moskowitz
Typed or Printed Name of Person Signing Certificate

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0016. Public burden for this form is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

1. SMALL ENTITY

☑ Patentee asserts, or has previously asserted, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MICRO ENTITY

☐ Patentee certifies, or has previously certified, micro entity status. See 37 CFR 1.29
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

4. LOSS OF ENTITLEMENT TO MICRO ENTITY STATUS

☐ Patentee is no longer entitled to micro entity status. See 37 CFR 1.29(i).

5. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

Undiscounted			Small Entity			Micro Entity		
Amount	Fee	(Code)	Amount	Fee	(Code)	Amount	Fee	(Code)
☐ $ _____	3½ yr fee	(1551)	☐ $ _____	3½ yr fee	(2551)	☐ $ _____	3½ yr fee	(3551)
☐ $ _____	7½ yr fee	(1552)	☑ $ 1,880.00	7½ yr fee	(2552)	☐ $ _____	7½ yr fee	(3552)
☐ $ _____	11½ yr fee	(1553)	☑ $ 3,850.00	11½ yr fee	(2553)	☐ $ _____	11½ yr fee	(3553)

MAINTENANCE FEE BEING SUBMITTED $ 5,730.00

6. PETITION FEE

The petition fee required by 37 CFR 1.17(m) of:

$ _____ Undiscounted (Fee Code 1558); or
$ 1,050.00 Small Entity (Fee Code 2558); or
$ _____ Micro Entity (Fee Code 3558)

$1050 X 2 = $2100.00

must be paid as a condition of accepting an unintentionally delayed payment of a maintenance fee.

PETITION FEE BEING SUBMITTED $ 2100.00

7. MANNER OF PAYMENT

☐ Enclosed is a check for the sum of $ _____
☑ Please charge Deposit Account No. 041061 the sum of $ $7,830.00
☐ Payment by credit card. Form PTO-2038 is attached.
☐ Payment made via EFS-Web.

8. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☑ The Director is hereby authorized to charge any maintenance fee or petition deficiency to Deposit Account No. 041061

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PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

9. OVERPAYMENT

As to any overpayment made, please

☑ Credit to Deposit Account No. 041061

OR

☐ Send refund check

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information, such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form (PTO-2038) submitted for payment purposes), is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioner/applicant should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms (PTO-2038) submitted for payment purposes are not retained in the application file and therefore are not publicly available.

10. STATEMENT

The delay in payment of the maintenance fee for this patent was unintentional.

Petitioner is reminded that a delay resulting from a deliberately chosen course of action or a change in circumstance is not an unintentional delay.

Petitioner is further reminded that a person seeking reinstatement of an expired patent should not make a statement that the delay in payment of the maintenance fee was unintentional unless the entire delay was unintentional, including the period from discovery that the maintenance fee was not timely paid until payment of the maintenance fee. For example, a statement that the delay in payment of the maintenance fee was unintentional would not be proper when the patentee becomes aware of an unintentional failure to timely pay the maintenance fee and then intentionally delays filing a petition for reinstatement of the patent under 37 CFR 1.378. See MPEP 2590.

NOTE: Where the petition under 37 CFR 1.378 is filed more than two years after the date the patent expired for nonpayment of the maintenance fee, the United States Patent and Trademark Office requires an additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional. This requirement is in addition to the requirement to provide a statement that the entire delay was unintentional. See *Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications and Patents Based on Unintentional Delay*, 85 FR 12222 (March 2, 2020). See MPEP 711.03(c)(II)(C)-(F) for additional guidance on the information required to establish that the entire delay was unintentional.

☑ Because this petition under 37 CFR 1.378 is being filed more than two years after the date the patent expired for nonpayment of the maintenance fee, additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional is enclosed herewith.

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

11. PETITIONER REQUESTS THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT BE REINSTATED.

April 28, 2023
Date

/Laura Moskowitz/
Signature(s) of Petitioner

55,470
Registration Number, if applicable

Laura Moskowitz
Typed or Printed Name

(202) 659-6941
Telephone Number

1825 Eye St. N.W., Suite 900
Address

Washington, DC 20006
Address

37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with § 1.33(b)."

12. ENCLOSURES

- [x] Maintenance Fee Payment
- [x] Petition fee under 37 CFR 1.17(m) (fee for filing the maintenance fee petition)
- [x] Additional sheet(s) containing statement establishing unintentional delay
- [ ] Other: _____

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects this information under authority of 5 CFR 1.290. The information in this system of records is used to manage all records of applicant including name, citizenship, residence, post office address and other information with respect to inventors and their legal representatives pertaining to the applicant's activities in connection with the invention for which a patent is sought. This information is protected from disclosure to third parties in accordance with the Privacy Act.

However, routine uses of this information may include disclosure to the following: to law enforcement and investigation in the event that the system of records indicates a violation or potential violation of law; to a Federal, state, local, or international agency, in response to its request; to an agency, organization, or individual for the purpose of performing audit or oversight operations as authorized by law; to non-federal personnel under contract to the agency; to a court for adjudication and litigation; to the Department of Justice for Freedom of Information Act (FOIA) assistance; to members of congress working on behalf of an individual; to the Office of Personnel Management (OPM) for personnel research purposes; to National Archives and Records Administration for inspection of records; and to the Office of Management and Budget (OMB)for legislative coordination and clearance. Failure to provide any part of the requested information may result in an inability to process requests for access and information. The applicable Privacy Act System of Records Notice for this information is COMMERCE/PAT-TM-7 Patent Application Files, available at Federal Register / Vol. 78, No. 61 / Friday, March 29, 2013 /Notices 19243. https://www.govinfo.gov/content/pkg/FR-2013-03-29pdf/2013-07341.pdf

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Docket No: 101032-00016

Fwa-Iuan Hshieh, et al.

Patent No.: 7,812,409 Confirmation No.: 2119

Issued: October 12, 2010

For: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

PETITION FOR RECONSIDERATION, UNDER 37 C.F.R. § 1.378(d), OF DISMISSAL OF PETITION FOR ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEES UNDER 37 C.F.R. § 1.378(b) FOR AN UNINTENTIONAL DELAY

MAIL STOP PETITION
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

I. **Introduction**: As provided for in the below remarks, and as supported by the information in the attached Exhibit A, Patentee (Force-MOS Technology Corporation (*see* **Exhibit D**)) respectfully requests reconsideration of the Decision on Petition ("the March 17 Decision"), dated March 17, 2023, dismissing the previous petition for reconsideration ("the February 14 petition"), filed February 14, 2023. As such, revival and reinstatement of U.S. Patent 7,812,409 (the "subject patent") is respectfully requested for at least the following reasons.

II. **Governing Law**: Under 37 C.F.R. § 1.378(b), any petition to accept an unintentionally delayed payment of a Maintenance Fee must include: (1) The required Maintenance Fee set forth in §1.20(e) through (g); (2) the petition fee as set forth in §1.17(m); and (3) A statement that the delay in payment of the Maintenance Fee was unintentional."

PETITION FOR RECONSIDERATION, UNDER 37 C.F.R. § 1.378(d)

It is noted that, under 37 C.F.R. § 1.378(b), "The director may require additional information where there is a question whether the delay was unintentional." In the present case, the Patentee provides the additional information herein.

As noted in MPEP §2590, "If multiple Maintenance Fees due on a single patent have not been paid, a separate petition fee is required for each delayed Maintenance Fee payment. A statement that the delay in payment of the Maintenance Fee was unintentional is also required with respect to each delayed Maintenance Fee payment. While the Patentee can include the statements of unintentional delay in a single petition (if desired), a separate petition fee is required for each delayed Maintenance Fee payment."

As discussed in MPEP §711.03(c), the "unintentional delay" standard, "[w]hile the Office reserves the authority to require further information concerning the cause of abandonment and delay in filing a petition to revive, the Office relies upon the applicant's duty of candor and good faith and accepts the statement that 'the entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition pursuant to 37 CFR 1.137(a) was unintentional' without requiring further information in the vast majority of petitions under 37 CFR 1.137(a). This is because the applicant is obligated under 37 CFR 11.18 to inquire into the underlying facts and circumstances when a practitioner provides this statement to the Office. In addition, providing an inappropriate statement in a petition under 37 CFR 1.137(a) to revive an abandoned application may have an adverse effect when attempting to enforce any patent resulting from the application. *See Lumenyte Int'l Corp. v. Cable Lite Corp.*, Nos. 96-1011, 96-1077, 1996 U.S. App. LEXIS 16400, 1996 WL 383927 (Fed. Cir. July 9, 1996) (unpublished) (patents held unenforceable due to a finding of inequitable conduct in submitting an inappropriate statement that the abandonment was unintentional). The Office is almost always

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satisfied as to whether 'the entire delay…was unintentional' on the basis of statement(s) by the applicant or representative explaining the cause of the delay (accompanied at most by copies of correspondence relevant to the period of delay)."

III. Remarks: The March 17 Decision indicates that "To date, the first and second requirements of 37 C.F.R. § 1.378(b) have been satisfied and the third has not." More specifically the March 17 Decision alleges that two deficiencies remain (March 17 Decision page 4):

First:

> … **Petitioner has not specified which maintenance fee(s) she is alleging Mr. Lin to have missed** (emphasis included), since the 7½-year maintenance fee was missed and then the window for submitting the 11½-year maintenance fee opened on October 12, 2021, which is prior to patentee's discovery on May 25, 2022.

and **Second**:

> … Petitioner has stated that this expired patent is one of 16 patents that expired as a result of Mr. Lin's failure to make required maintenance fee payments on behalf of the patentee. Since the payment of 16 maintenance fees constitute a significant financial expenditure, it seems the patentee would have noticed as time when on that no bills from Mr. Lin for this significant financial expenditure were received.
>
> Still further, the timeline of when these bills would have been received had the maintenance fees been paid, as well as how this factors into the May 25, 2022 discovery, is not clear.
>
> Emphasis included.

Petitioner discusses these two issues below.

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PETITION FOR RECONSIDERATION, UNDER 37 C.F.R. § 1.378(d)

III(a). With respect to the first alleged deficiency, the Patentee reasonably relied on Mr. Lin for the payment of *all* appropriate fees and for informing the Patentee of the same, including *both* the 7½-year maintenance fee and the 11½-year maintenance fee for the subject patent.

The window for submitting the 11½-year maintenance fee for the subject patent opened on October 12, 2021 and closed on April 12, 2022.

Dickinson Wright was engaged by the Patentee in March 2022, specifically for "assistance with regard to a patent enforcement regarding inergy Technology Inc.," as shown by the March 14, 2022 Engagement letter (attached hereto as "Exhibit A"), and payment by the Patentee of the retainer fee of $10,000.00 on March 24, 2022. Between March 24, 2022 and May 25, 2022, when expiration of the commonly-owned patents was discovered by Dickinson Wright, the Patentee was not aware of the expiration of the commonly-owned patents and continued to rely on Mr. Lin to make the maintenance fee payments as required.

During this time, between March 24, 2022 and May 25, 2022, Dickinson Wright attorneys were engaged in obtaining and analyzing potentially infringing products, among other matters, with the understanding that any maintenance of the commonly-owned patents continued to be handled by the Patentee and Mr. Lin.

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EX1002.055

III(b). With respect to the second alleged deficiency, the Patentee was not alerted to the failure of payment of the 7½-year and the 11½-year maintenance fees of the subject patent by the absence of bills from Mr. Lin. The timeline of bills from Mr. Lin did not factor into the May 25, 2022 discovery of expiration of the subject patent.

As discussed in the February 14 petition, and as evidenced by Exhibits A and B thereof, Mr. Lin properly and timely paid the Issue Fees for each the subject patent and each of the commonly-owned patents[1] during a time period beginning on March 31, 2009 and up to and including June 11, 2013. Additionally, having paid the Issue fees for each of the commonly-owned patents, Mr. Lin then timely paid the 3.5 year Maintenance Fees for the '729 patent, the '121 patent, the '357 patent, the '409 patent, the '185 patent, the '058 patent, and the '021 patent (*see* Exhibits A and C of the February 14 petition). These payments spanned the time period beginning on April 1, 2013 to and including April 6, 2016. This concluded the Maintenance Fee payments by Mr. Lin.

In view of Mr. Lin's consistent work managing the subject patent, at least until after payment of the Issue Fees and issuance of the same, the Patentee reasonably relied on Mr. Lin to continue to manage the subject patent, to pay any fees as due, and to keep the Patentee informed of all relevant matters.

The failure of receipt of bills from Mr. Lin, related to maintenance fee payments after April 6, 2016 was not noted by the Patentee.

While the Patentee's lack of attention to ongoing work performed or not performed by Mr. Lin, and to bills from Mr. Lin was most certainly unadvisable in retrospect, it was due to a

[1] U.S. Patent No. 8,389,354; U.S. Patent No. 8,461,001; U.S. Patent No. 8,159,021; U.S. Patent No. 7,960,787; U.S. Patent No. 8,022,471; U.S. Patent No. 7,863,685; U.S. Patent No. 8,058,670; U.S. Patent No. 7,800,185; U.S. Patent No. 7,929,321; U.S. Patent No. 7,646,058; U.S. Patent No. 7,812,409; U.S. Patent No. 7,511,357; U.S. Patent No. 7,612,407; U.S. Patent No. 7,816,729; U.S. Patent No. 7,633,121; and U.S. Patent No. 8,252,645.

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EX1002.056

naïve placement of too much trust in Mr. Lin and a lack of foresight regarding the potential importance of the commonly-owned patents, and not to any intentional lack of attention.

In the time since learning of the expiration of the commonly-owned patents, on May 25, 2022, the Patentee has implemented internal measures to track and maintain currently-held patents.

IV. Conclusion: In view of at least the above, the Patentee respectfully submits that the failure to pay the Maintenance Fees up until this time was unintentional with respect to the subject patent.

The USPTO is directed and authorized to charge all required fees to Deposit Account No. 04-1061. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,
/Laura Moskowitz /

_____
Laura Moskowitz, reg. no. 55,470

Dickinson Wright PLLC
1825 Eye St. N.W. Suite 900
Washington, D.C. 20006
202-457-0160

Date: April 28, 2023

uPI Semiconductor Corp.
EX1002.057

EXHIBIT A

DICKINSON WRIGHT PLLC

607 W. 3RD STREET, SUITE 2300
AUSTIN, TX 78701-4743
TELEPHONE: (512) 770-4205
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CHRISTOPHER E. HANBA
CHanba@dickinsonwright.com
(512) 282-6889

March 14, 2022

Force MOS Technology Co., Ltd.
Attn: Mr. Kaoway Tu
9F.-1, No.10, Sec. 1, Zhongxing Rd.
Wugu Dist.
New Taipei City 248
Taiwan (ROC)

RE: CONFIDENTIAL Terms of Engagement for Force MOS Technology Co., Ltd.

Dear Mr. Tu:

We are pleased that you have selected us to represent Force MOS Technology Co., Ltd. ("Force MOS"). We will do our best to ensure that you are provided with timely legal and business advice in connection with this matter and your business endeavors. This letter will confirm the terms of our agreement to represent you in this matter. To commence our legal representation, we are asking that you review this letter, which confirms the terms and conditions of our engagement.

Scope of engagement. Our services will include assistance with regard to a patent enforcement regarding inergy Technology Inc. We will do our best to ensure that we provide Force MOS with timely legal advice in connection with this matter.

Client liaison and Firm liaison. We understand that you will be our primary contact at Force MOS in furtherance of this engagement, and Christopher E. Hanba will be the Firm attorney responsible for this engagement.

Staffing and hourly rates. Our time and expenses will be charged, as described in this letter, at the normal and customary hourly rates applicable to each attorney or paralegal assigned to work on this matter as established by our Firm from time to time. The current discounted hourly rates for the attorney(s) and paralegals who, at this time, have been identified as likely to work on this engagement is $590 USD for Christopher Hanba; $440 USD for Joshua Jones; $375 USD for Nicholas P. Coleman; $335 USD for Kevin D. Everage.

We may also assign other attorneys and paralegals within the Firm to work on certain aspects of this matter as needed and the range of hourly rates for other attorneys and paralegals

will vary based on their levels of education and work experience.

Our hourly rates are subject to periodic reviews and adjustments, and we reserve the right to revise our hourly rates in accordance with such general Firm reviews. The hourly rates noted above for this engagement will not be adjusted prior to January 1, 2023.

Retainer. It is the policy of our Firm to require a retainer payment from new clients and, therefore, we are requesting an initial retainer in the amount of $10,000.00 USD for our services and anticipated costs. This amount will be applied and credited against any unpaid invoices generated on this matter.

Frequency of billing. We will bill you monthly for time and disbursements. Remittance within thirty (30) days is expected. We reserve the right to impose a charge of 1% per month on accounts which are not paid within such thirty (30) day period.

Conflict. Our firm represents a broad base of clients on a variety of legal matters. Accordingly, absent an effective conflicts waiver, conflicts of interest may arise that could adversely affect your ability and the ability of other clients of our firm to choose us as their counsel, thereby precluding us from representing you or them in pending or future matters. It is possible that, during the time we are representing you, some of our current or future clients will have disputes or transactions with you. You agree that we may continue to represent or undertake in the future to represent existing or new clients in any matter, including litigation, even if the interests of such other clients in such other matters are directly adverse to yours, so long as those matters are not substantially related to our work for you, and our representation of the other clients would not involve our use of any confidential information you have provided us and would otherwise be permitted by the Texas Rules of Professional Conduct as well as in accordance with Dickinson Wright's Standard Terms of Engagement.

Records Retention. Any materials belonging to Force MOS will be returned to you at the conclusion of this engagement. Following this engagement, in accordance with Firm policies and the Rules of Professional Conduct regarding ownership of files and file retention, we will retain our files relating to this matter for a period of seven (7) years, after which time the files may be destroyed. A reasonable charge may be imposed for any special requests pertaining to disposition or handling of our files.

Right to withdraw from representation. The Firm reserves the right to withdraw from this representation in the event that invoices are not paid on a timely basis or if Force MOS fails otherwise to fulfill its obligations to us.

Responsibilities. We will provide strictly legal services to Force MOS in connection with this engagement. You are not relying on us for, and we are not providing, any business, investment, insurance or accounting decisions or any investigation of the character or credit of persons with whom you may be dealing.

uPI Semiconductor Corp.
EX1002.059

In order for us to assist Force MOS effectively and efficiently, we expect that you will provide us with the factual information you have which relates to the matter of our engagement, and that you will make any appropriate business or technical decisions. In addition, we encourage Force MOS to share with us at all times your expectations and any concerns regarding our services at any time during the course of our representation. We believe that Force MOS should be actively involved in the strategy and management of your legal affairs and our goal is to encourage candid and frequent communication between us. We will keep you informed of developments regarding your matters and will consult with you as necessary to ensure the timely, effective and efficient completion of our work.

Permission to Use Information in Marketing of the Law Firm. By signing this Agreement, you agree that your name, logo, and a general description of this matter may be used by Dickinson Wright in its business development efforts and materials. If you do not wish for this information to be used in the manner specified, please draw a line through and initial this paragraph.

Cooperation. In order to enable us to effectively render the services contemplated, Force MOS agrees to disclose fully and accurately all facts and to keep us apprised of all developments relating to the matter. You agree to cooperate fully with us and to make yourselves or your firm representatives available when necessary.

Choice of Law. All of the rights and obligations of Dickinson Wright and Force MOS arising under or related to this agreement shall be governed by the laws, of the State of Texas.

Notice of State Bar of Texas Grievance Process. The State Bar of Texas investigates and prosecutes professional misconduct committed by Texas attorneys. Although not every complaint against or dispute with a lawyer involves professional misconduct, the State Bar's Office of General counsel will provide you with information about how to file a complaint. Please call 1-800-932-1900 toll-free for more information.

Confirmation of Agreement. We encourage Force MOS to consult with other counsel or advisors of the choice regarding these matters, and to consider fully the possible implications of our representation on the basis described. If the foregoing is agreeable, please acknowledge your understanding and agreement by signing and returning a copy of this letter, which shall control all obligations set forth herein except, as may subsequently be agreed upon in writing. Our engagement will commence upon our receipt of the signed copy of this letter.

Dickinson Wright's Standard Terms of Engagement are attached hereto and made a part hereof. Thank you for selecting our firm to represent you. We appreciate the confidence you have in us and look forward to working with you on this matter.

uPI Semiconductor Corp.
EX1002.060

We appreciate the confidence you have placed in us and look forward to working with you.

Very truly yours,

Christopher E. Hanba

I HAVE READ THE FOREGOING ENGAGEMENT AGREEMENT, AND MY SIGNATURE INDICATES THAT I AGREE TO ALL OF ITS TERMS AND FULLY UNDERSTAND ITS PROVISIONS. THE TERMS OF THE ENGAGEMENT OF THE FIRM AS STATED ABOVE ARE ACCEPTED AND APPROVED BY:

Force MOS Technology Co., Ltd.

Date

uPI Semiconductor Corp.
EX1002.061

Electronic Acknowledgement Receipt

EFS ID:	47922767
Application Number:	11633366
International Application Number:	
Confirmation Number:	2119
Title of Invention:	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS
First Named Inventor/Applicant Name:	Fwu-luan Hshieh
Customer Number:	35161
Filer:	Laura Moskowitz/Beatrice Zepeda
Filer Authorized By:	Laura Moskowitz
Attorney Docket Number:	101302-00016
Receipt Date:	28-APR-2023
Filing Date:	04-DEC-2006
Time Stamp:	17:07:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review by the Office of Petitions	101302-16-7812409_renewed_petition.pdf	350187 b771754e4bff81a66bb4ce6dcb616d69e2c711d0	no	5

Warnings:

Information:					
2	Petition for review by the Office of Petitions	101302-16_2dRENEWEDsupportingdocuments_reduced_flat.pdf	5332310 7bf0857e0324dc82e6d979e2fc5f5cad1bc4d560	no	10
Warnings:					
Information:					
			Total Files Size (in bytes):	5682497	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	101302-00016	2119

35161 7590 03/17/2023

DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 Eye St. N.W.
SUITE 900
WASHINGTON, DC 20006

EXAMINER	
ARROYO, TERESA M	

ART UNIT	PAPER NUMBER
2826	

NOTIFICATION DATE	DELIVERY MODE
03/17/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dwpatents@dickinsonwright.com

uPI Semiconductor Corp.
EX1002.064

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No. 7,812,409 Issue Date: 12 Oct 2010 Application No. 11/633,366 Filing or 371(c) Date: 4 Dec 2006 Attorney Docket No. 101302-0005	:	DECISION ON PETITION

This is a decision on the renewed petition pursuant to 37 C.F.R. § 1.378(b) to accept the unintentionally delayed payment of a maintenance fee for the above-identified patent, filed February 14, 2023.

The petition pursuant to 37 C.F.R. § 1.378(b) is **DISMISSED.**

Application number 11/633,366 matured into U.S. patent number 7,812,409 on October 12, 2010. The grace period for paying the 7½-year maintenance fee provided in 37 C.F.R. § 1.362(e) expired at midnight on October 12, 2018, with no payment received. Accordingly, the patent expired on October 12, 2018 at midnight.

A grantable petition pursuant to 37 C.F.R. § 1.378(b) must be accompanied by:

(1) The required maintenance fee set forth in § 1.20(e) through (g);
(2) The petition fee as set forth in § 1.17(m); and,
(3) A statement that the delay in payment of the maintenance fee was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

The USPTO requires additional information concerning whether a delay in seeking acceptance of a delayed maintenance fee payment. See *Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications*

and Patents Based on Unintentional Delay, 85 FR 12222 (March 2, 2020).

In this instance, a petition under 37 C.F.R. § 1.378 was filed more than two years after the date of expiration for nonpayment of a maintenance fee. Therefore, petitioner must provide sufficient information of the facts and circumstances surrounding the entire delay to support a conclusion that the entire delay was unintentional. *Id.* at 12223. Details regarding the cause of petitioner's nonpayment of a maintenance fee that resulted in expiration of the patent, when the expiration of the patent was discovered, and the delay between discovery of the expiration of the patent and filing of the petition under 37 C.F.R. § 1.378 are of particular relevance. Petitioner should provide relevant dates and identify responsible parties where appropriate.

The first period of delay petitioner must address on renewed petition is the delay in payment of the maintenance fee that resulted in the expiration of this patent.

The second period of delay petitioner must address on renewed petition is the delay in filing the initial petition pursuant to 37 C.F.R. § 1.378(b) on July 12, 2022.

If the renewed petition is filed outside the time period specified in 37 C.F.R. § 1.378(d), then the third period of delay petitioner must address on renewed petition is the delay in filing a grantable petition pursuant to 37 C.F.R. § 1.378(b).

An initial petition pursuant to 37 C.F.R. § 1.378(b) to accept the unintentionally delayed payment of a maintenance fee for this patent was filed on July 12, 2022. The individual who signed the initial petition (former Petitioner) provided an instruction to charge each of these fees to Deposit Account number 04-1061. The USPTO attempted to charge these fees to this Deposit Account on September 29, 2022 but was unable to do so since former Petitioner was not listed as an authorized user of this Deposit Account. The initial petition pursuant to 37 C.F.R. § 1.378(b) was dismissed via the mailing of a decision on October 12, 2022.

A renewed petition pursuant to 37 C.F.R. § 1.378(b) was received on October 28, 2022, the individual who signed the renewed petition (current Petitioner) has explained the former Petitioner left the law firm after the first petition was filed

and his name was removed from the list of authorized users accordingly. Petitioner authorized the charging of two petition fees ($1050 each), the 7½-year maintenance fee ($1880) and the 11½-year maintenance fee ($3850) to Deposit Account number 04-1061. However, the USPTO was unable to charge all required fees to this Deposit Account, since it contained insufficient funds.[1] The renewed petition pursuant to 37 C.F.R. § 1.378(b) received on October 28, 2022 was dismissed via the mailing of a decision on December 14, 2022.

On March 10, 2023, the USPTO was able to charge the 11½-year maintenance fee to Deposit Account number 04-1061.

To date, two petition fees, the 7½-year and 11½-year maintenance fees, a statement of unintentional delay, and an explanation concerning the extended period of delay in submitting the 7½-year maintenance fee have been received.

To date, the first and second requirements of 37 C.F.R. § 1.378(b) have been satisfied and the third has not.

With the renewed petition pursuant to 37 C.F.R. § 1.378(b) received on October 28, 2022, Petitioner explained that prior counsel (Bo-In Lin, Reg. No. 33,948) committed "gross misconduct," in that he and the patentee had an agreement where he would track and submit the "3.5, 7.5, and/or 11.5 year Maintenance Fees," however he neither paid the required maintenance fees nor alerted the patentee of either the required fees or the delinquency in their payment.[2] The patentee learned of the expiration of several patents, including this one, on May 25, 2022.[3] The initial petition was filed fewer than two months later.

With the renewed petition pursuant to 37 C.F.R. § 1.378(b) received on February 14, 2023, Petitioner has established that a complaint concerning prior counsel has been filed with OED; that she attempted to contact prior counsel on multiple occasions but has not received a response;[4] that on a date that has not been

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1 These fees total $7830, and the undersigned attempted to charge each of these fees to Deposit Account number 04-1061 on December 7, 2022, however it contained $7728. It follows the undersigned charged both petition fees and the 7½-year maintenance fee, but was unable to charge the 11½-year maintenance fee.

2 Renewed petition received on October 28, 2022, pages 2 and 4-5.

3 *Id.* at 5.

4 Petitioner refers to copies of emails that were sent to prior counsel that were supposedly included with the February 14, 2023 renewed petition as attachments. However, these attachments have not been located in the

revealed, the patentee engaged current counsel; that on a date that has not been revealed, current counsel discovered this patent had expired; and, on May 25, 2022, current counsel informed the patentee of this discovery, and this was the first patentee had heard of it.

To date, two deficiencies remain.

First, the decision mailed on December 14, 2022 set forth on the fifth page:

> … **Petitioner has not specified which maintenance fee(s) she is alleging Mr. Lin to have missed** (emphasis included), since the 7½-year maintenance fee was missed and then the window for submitting the 11½-year maintenance fee opened on October 12, 2021, which is prior to patentee's discovery on May 25, 2022.

With the renewed petition pursuant to 37 C.F.R. § 1.378(b) received on February 14, 2023, this issue has not been addressed. Since it is not clear when current counsel was engaged by the patentee, it is not clear whether it was Mr. Lin or current counsel who missed the 11½-year maintenance fee.

Second, the decision mailed on December 14, 2022 set forth on the sixth page:

> … Petitioner has stated this expired patent is one of 16 patents that expired as a result of Mr. Lin's failure to make required maintenance fee payments on behalf of the patentee. Since the payment of 16 maintenance fees constitutes a significant financial expenditure, **it seems the patentee would have noticed as time went on that no bills from Mr. Lin for this significant financial expenditure were received.**
>
> Still further, **the timeline of when these bills would have been received had the maintenance fees been paid, as well as how this factors into the May 25, 2022 discovery, is not clear.**
>
> Emphases included.

With the renewed petition pursuant to 37 C.F.R. § 1.378(b) received on February 14, 2023, these issues have not been

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electronic file so the undersigned is not in a position to review their contents.

addressed. It remains unclear why the patentee failed to notice no bills for this significant financial expenditure had been received, and when these bills would have been expected to have been received.

Any request for reconsideration of this decision must be filed within **TWO MONTHS** of the mailing date of this decision. Extensions of time under 37 C.F.R. § 1.136(a) are not permitted.

The reply should include a cover letter entitled "Renewed Petition pursuant to 37 C.F.R. § 1.378(b)". This is not a final agency action within the meaning of 5 U.S.C § 704.

The two petition fees and the 7½-year and 11½-year maintenance fee have been received and need not be resubmitted.

How to respond to this decision:

The response to this decision should indicate in a prominent manner that the attorney handling this matter is Paul Shanoski, and may be submitted by mail, hand delivery, facsimile, or via EFS-Web.

- Mail: Mail Stop Petition, Commissioner for Patents, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA, 22313-1450.

  If responding by mail, Petitioner is advised not to place the undersigned's name on the envelope. Only the information that appears in the footnote should be included – adding anything else to the address will delay the delivery of the response to the deciding official.

- Hand delivery: Customer Window, Randolph Building, 401 Dulany Street, Alexandria, VA, 22314.

- Facsimile: (571) 273-8300: please note this is a central facsimile number.

- EFS-Web: Registered users of EFS-Web may alternatively submit a response to this decision via EFS-Web. When filing via EFS-Web the user must select from the list of document descriptions to specify the files being submitted via EFS-Web. Based on the document description selected by the user, a document code is assigned, and a message regarding the document submitted to the USPTO will be forwarded to the appropriate organization for processing

> and to the appropriate official for consideration: therefore, accurate document indexing is important to facilitate efficient processing and proper consideration of the document by the USPTO. It is important for users to select the correct document description and check the application file via PAIR after the submission is completed.

Any questions concerning this matter may be directed to Attorney Advisor Paul Shanoski at (571) 272-3225.[5]

/Paul Shanoski/
Paul Shanoski
Attorney Advisor
Office of Petitions

5 Petitioner will note that all practice before the Office should be in writing, and the action of the Office will be based exclusively on the written record in the Office. *See* 37 C.F.R. § 1.2. As such, Petitioner is reminded that no telephone discussion may be controlling or considered authority for any further action(s) of Petitioner.

Electronic Acknowledgement Receipt

EFS ID:	47530461
Application Number:	11633366
International Application Number:	
Confirmation Number:	2119
Title of Invention:	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS
First Named Inventor/Applicant Name:	Fwu-luan Hshieh
Customer Number:	35161
Filer:	Laura Moskowitz/Beatrice Zepeda
Filer Authorized By:	Laura Moskowitz
Attorney Docket Number:	101302-00016
Receipt Date:	14-FEB-2023
Filing Date:	04-DEC-2006
Time Stamp:	16:03:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		101302-16_RENEWED_PETITIONsb0066_REQUESTFORRECONSIDERATION_EXHIBITS_TBF_2_RFS.pdf	23167956 3b16f89dcdfb8fe0b415b4f5cf51b3102b373adf	yes	81

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Petition for review by the Office of Petitions	1	5
	Petition for review by the Office of Petitions	6	14
	Petition for review by the Office of Petitions	15	81
Warnings:			
Information:			
	Total Files Size (in bytes):	23167956	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

EXHIBIT A

Country	Patent No.	Application No.	Status	Title	Inventor	Assignee	Reason for Non-Acceptance	Filing Date	Issue Date	Prior MF Paid	Patent Bib. Info/Correspondence Address
US	8389354	12383247	*Expired - Fee Related*	TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)	Patent expired on 03/05/2017 due to non-payment of maintenance fee	3/19/2009	3/5/2013	n/a	Bo-In Lin (13445 Mandoll Dr)
US	8461001	12653131	*Expired - Fee Related*	METHODS FOR MANUFACTURING TRENCH MOSFET WITH IMPLANTED DRIFT REGION	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (TW)	Patent expired on 06/11/2017 due to non-payment of maintenance fee	12/2/2009	6/11/2013	n/a	Bo-In Lin (13445 Mandoll Dr)
US	8159021	12070853	*Expired - Fee Related*	TRENCH MOSFET WITH DOUBLE EXPITAXIAL STRUCTURE	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (TW)	Patent expired on 04/17/2020 due to non-payment of maintenance fee	2/20/2008	4/17/2012	4/8/2016, 3.5 Y	Bo-In Lin (13445 Mandoll Dr)
US	7960787	12291365	*Expired - Fee Related*	CONFIGURATION OF TRENCHED SEMICONDUCTOR POWER DEVICE TO REDUCE MASKED PROCESS	Fwa-Iuan Hshieh	Force-MOS Technology Corporation	Patent expired on 06/14/2015 due to non-payment of maintenance fee	11/7/2008	6/14/2011	n/a	Bo-In Lin (13445 Mandoll Dr)
US	8022471	12319188	*Expired - Fee Related*	TRENCH METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET) WITH LOW GATE TO DRAIN COUPLED CHARGES (Qgd) STRUCTURES	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)	Patent expired on 09/20/2015 due to non-payment of maintenance fee	12/31/2008	9/20/2011	n/a	Bo-In Lin (13445 Mandoll Dr)
US	7863685	12156070	*Expired - Fee Related*	TRENCH MOSFET WITH EMBEDDED JUNCTION BARRIER SHOTTKY DIODE	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (TW)	Patent expired on 01/04/2015 due to non-payment of maintenance fee	5/28/2008	1/4/2011	n/a	Bo-In Lin (13445 Mandoll Dr)
US	7929321	12229470	*Expired - Fee Related*	DEPLETION MODE TRENCH MOSFET FOR IMPROVED EFFICIENCY OF DC/DC CONVERTER APPLICATIONS	Fwu-Iuan Hshieh	Force-Mos Technology Corp (KY)	Patent expired on 04/19/2015 due to non-payment of maintenance fee	8/22/2008	4/19/2011	n/a	Bo-In Lin (13445 Mandoll Dr)
US	7646058	11810327	*Expired - Fee Related*	DEVICE CONFIGURATION AND METHOD TO MANUFACTURE TRENCH MOSFET WITH SOLDERABLE FRONT METAL	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)	Patent expired on 01/12/2018 due to non-payment of maintenance fee	6/5/2007	1/12/2010	1/13/2014, 3.5 Y	Bo-In Lin (13445 Mandoll Dr)
US	8058670	12455744	*Expired - Fee Related*	INSULATED GATE BIPOLAR TRANSISTOR (IGBT) WITH MONOLITHIC DEEP BODY CLAMP DIODE TO PREVENT LATCH-UP	Fwu-Iuan Hshieh	Force-MOS Technology Corporation	Patent expired on 12/14/2015 due to non-payment of maintenance fee	6/4/2009	12/9/2010	n/a	Bo-In Lin (13445 Mandoll Dr)
US	7800185	11699256	*Expired - Fee Related*	CLOSED TRENCH MOSFET WITH FLOATING TRENCH RINGS AS TERMINATION	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)	Patent expired on 09/21/2018 due to non-payment of maintenance fee	1/28/2007	9/21/2010	9/22/2014, 3.5 Y	Bo-In Lin (13445 Mandoll Dr)
US	7812409	11633366	*Expired - Fee Related*	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)	Patent expired on 10/12/2018 due to non-payment of maintenance fee	12/4/2006	10/12/2010	10/14/2014, 3.5 Y	Bo-In Lin (13445 Mandoll Dr)
US	8252645	12462748	*Expired - Fee Related*	METHOD OF MANUFACTURING TRENCHED MOSFETS WITH EMBEDDED SCHOTTKY IN THE SAME CELL	Fwu-ruan Hshieh	Force-MOS Technology Corporation	Patent expired on 09/26/2016 due to non-payment of maintenance fee	8/7/2009	12/10/2009	n/a	Bo-In Lin (13445 Mandoll Dr)
US	7511357	11788497	*Expired - Fee Related*	TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)	Patent expired on 03/31/2017 due to non-payment of maintenance fee	4/20/2007	3/31/2009	4/1/2013, 3.5 Y	Bo-In Lin (13445 Mandoll Dr)
US	7612407	11519754	*Expired - Fee Related*	TRENCHED MOSFET DEVICE CONFIGURATION WITH REDUCED MASK PROCESSES	Fwu-Iuan Hshieh	Force-MOS Technology Corp. Ltd. (KY)	Patent expired on 11/03/2013 due to non-payment of maintenance fee	9/11/2006	10/3/2009	n/a	Bo-In Lin (13445 Mandoll Dr)
US	7633121	11981072	*Expired - Fee Related*	TRENCH MOSFET WITH IMPLANTED DRIFT REGION	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (TW)	Patent expired on 12/15/2017 due to non-payment of maintenance fee	10/31/2007	12/15/2009	12/16/2013, 3.5 Y	Bo-In Lin (13445 Mandoll Dr)
US	7816729	11518729	*Expired - Fee Related*	TRENCHED MOSFET DEVICE WITH TRENCHED CONTACTS	Fwu-Iuan Hshieh	Force-MOS Technolocy Corp., LTD.	Patent expired on 11/26/2018 due to non-payment of maintenance fee	9/10/2006	10/19/2010	10/20/2014, 3.5 y	Bo-In Lin (13445 Mandoll Dr)

EXHIBIT B

Issue Fee Payment documentation for each subject patent.

Patent No.	Application No.
8389354	12383247
8461001	12653131
8159021	12070853
7960787	12291365
8022471	12319188
7863685	12156070
7929321	12229470
7646058	11810327
8058670	12455744
7800185	11699256
7812409	11633366
8252645	12462748
7511357	11788497
7612407	11519754
7633121	11981072
7816729	11518729

PART B - FEE(S) TRANSMITTAL

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Alexandria, Virginia 22313-1450
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64481 7590 03/16/2012

BO-IN LIN
13445 MANDOLI DRIVE
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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO
12/383,247	03/19/2009	Fwu-Iuan Hshieh	FMOS-07002D	4418

TITLE OF INVENTION: TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$885	$300	$0	$1185	02/19/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
THOMAS, TONIAE M	2822	257-551000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Cayman Island, British West Indies

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
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5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature
Typed or printed name: Bo-In Lin
Date: February 6, 2013
Registration No.: 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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7590 02/21/2013

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/653,131	12/09/2009	Fwu-Iuan Hshieh	FMOS-0707D	5445

TITLE OF INVENTION: METHODS FOR MANUFACTURING TRENCH MOSFET WITH IMPLANTED DRIFT REGION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$885	$300	$0	$1185	05/21/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
TRINH, MICHAEL MANH	2822	438-268000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
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1 Bo-In Lin
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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Hsinchu, TAIWAN R.O.C.

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
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Authorized Signature _____ Date May 15, 2013

Typed or printed name Bo-In Lin Registration No. 33,948

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7590 01/06/2012

Bo-In Lin
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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
March 15, 2012	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/070,853	02/20/2008	Fwu-Iuan Hshieh	FMOS-0709	2666

TITLE OF INVENTION: TRENCH MOSFET WITH DOUBLE EPITAXIAL STRUCTURE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$870	$300	$0	$1170	04/06/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
KLEIN, JORDAN M	2829	257-328000

03/19/2012 MBLANC01 00000031 12070853
01 FC:2501 870.00 OP
02 FC:1504 300.00 OP

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

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1 Bo-In Lin
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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Taiwan, R.O.C.

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Authorized Signature _____ Date March 15, 2012

Typed or printed name Bo-In Lin Registration No. 33,948

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LOS ALTOS HILLS, CA 94022

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Yii-Shyun Lin	(Depositor's name)
	(Signature)
May 5, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/291,365	11/07/2008	Fwa-Iuan Hshieh	FMOS-0803	3987

TITLE OF INVENTION: CONFIGURATION OF TRENCHED SEMICONDUCTOR POWER DEVICE TO REDUCE MASKED PROCESS

05/09/2011 EHAILU1 00000007 12291365
01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	05/25/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
DICKEY, THOMAS L	2826	257-330000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
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1 Bo-In Lin
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(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Force-MOS Technology Corporation British West Indies

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
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Authorized Signature _____ Date May 5, 2011

Typed or printed name Bo-In Lin Registration No. 33,948

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69481 7590 06/09/2011
BO-IN LIN
13445 MANDOLI DRIVE
LOS ALTOS HILLS, CA 94022

OPAP IAP8 AUG 11 2011 PATENT & TRADEMARK OFFICE

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Yii-Shyun Lin	(Depositor's name)
	(Signature)
August 11, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/319,188	12/31/2008	Fwu-Iuan Hshieh	FMOS-0804	8489

TITLE OF INVENTION: TRENCH METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET) WITH LOW GATE TO DRAIN COUPLED CHARGES (QGD) STRUCTURES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	09/09/2011

08/15/2011 SDENBG34 00000313 12319188
01 FC:8534 [illegible]
02 FC:1504 [illegible]

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, THANH T	2893	257-329000

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(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☑ Corporation or other private group entity ☐ Government

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☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date August 11, 2011

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EX1002.079

11-24-10

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NOV 23 2010
PATENT AND TRADEMARK OFFICE

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Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

69481 7590 10/04/2010

BO-IN LIN
13445 MANDOLI DRIVE
LOS ALTOS HILLS, CA 94022

11/24/2010 HVUONG2 00000067 12156070

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Yi-Shyun Lin	(Depositor's name)
Yi-Shyun Lin	(Signature)
November 23, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/156,070	05/28/2008	Fwu-Iuan Hshieh	FMOS-0801	2064

TITLE OF INVENTION: TRENCH MOSFET WITH EMBEDDED JUNCTION BARRIER SCHOTTKY DIODE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	01/04/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
LE, DUNG ANH	2818	257-368000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): TAIWAN R.O.C.

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
- ☒ Issue Fee
- ☒ Publication Fee (No small entity discount permitted)
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- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Authorized Signature _____ Date November 23, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

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Alexandria, Virginia 22313-1450
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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 08/19/2011

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

09/27/2011 EEKUBAY2 00000033 12455744

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

OPAP SEP 23 2011 IAP11 PATENT & TRADEMARK OFFICE

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
September 23, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/455,744	06/04/2009	Fwu-Iuan Hshieh	FMOS-0902	3117

TITLE OF INVENTION: INSULATED GATE BIPOLAR TRANSISTOR (IGBT) WITH MONOLITHIC DEEP BODY CLAMP DIODE TO PREVENT LATCH-UP

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/21/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
MOORE, WHITNEY	2826	257-136000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 Bo-In Lin
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(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

FORCE_MOS TECHNOLOGY CORPORATION TAIWAN

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
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4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
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☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Authorized Signature _____ Date September 23, 2011

Typed or printed name Bo-In Lin Registration No. 33,948

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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7590 07/22/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

OPAP IAP4 AUG 06 2010 PATENT & TRADEMARK OFFICE

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
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Yii-Shyun Lin	(Depositor's name)
	(Signature)
August 6, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/699,256	01/28/2007	Fwu-luan Hshieh	FMOS-0701	6938

TITLE OF INVENTION: CLOSED TRENCH MOSFET WITH FLOATING TRENCH RINGS AS TERMINATION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	10/22/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
KIM, SU C	2823	438-242000

08/10/2010 MBELETE2 00000020 11699256
01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 Bo-In Lin
2
3

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
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☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Authorized Signature _____ Date August 6, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

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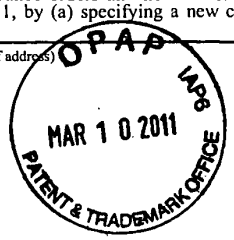
03-11-11

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Alexandria, Virginia 22313-1450
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69481 7590 01/06/2011

BO-IN LIN
13445 MANDOLI DRIVE
LOS ALTOS HILLS, CA 94022

03/11/2011 CCHAU2 00000069 12229470

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02 FC:1504 300.00 OP

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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
March 10, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/229,470	08/22/2008	Fwu-Iuan Hshieh	FMOS-0802	8882

TITLE OF INVENTION: DEPLETION MODE TRENCH MOSFET FOR IMPROVED EFFICIENCY OF DC/DC CONVERTER APPLICATIONS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	04/06/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
GUPTA, RAJ R	2814	257-365000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
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1 Bo-In Lin
2
3

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(A) NAME OF ASSIGNEE: FORCE-MOS TECHNOLOGY CORP

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Cayman Island, British West Indies

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

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☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
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Authorized Signature _____ Date March 10, 2011

Typed or printed name Bo-In Lin Registration No. 33,948

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 11/16/2009

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

11/30/2009 CCHAU2 00000045 11810327

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02 FC:1504 300.00 OP



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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
November 24, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/810,327	06/05/2007	Fwu-Iuan Hshieh	FMOS-0704	2587

TITLE OF INVENTION: DEVICE CONFIGURATION AND METHOD TO MANUFACTURE TRENCH MOSFET WITH SOLDERABLE FRONT METAL

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	02/16/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
LIU, BENJAMIN T	2893	257-328000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation
(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date November 24, 2009

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 08/05/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

08/30/2010 CCHAU2 00000041 11633366

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

OPAP IAP6 AUG 26 2010 PATENT & TRADEMARK OFFICE

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Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
August 26, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

TITLE OF INVENTION: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/05/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARROYO, TERESA M	2826	257-401000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bo-In Lin
2
3

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(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

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Authorized Signature _____ Date August 26, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

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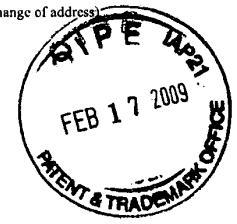
CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 02/10/2009

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

02/19/2009 CCHAU2 00000007 11788497

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP



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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
February 17, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/788,497	04/20/2007	Fwu-Iuan Hshieh	FMOS-0702	5816

TITLE OF INVENTION: TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	05/11/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
SOWARD, IDA M	2822	257-551000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 Bo-In Lin
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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Grand Cayman, Cayman Island British West Indies

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☒ Publication Fee (No small entity discount permitted)
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☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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PTO/SB/21
FEB 17 2009
PATENT & TRADEMARK OFFICE

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh :Date: February 17, 2009
Serial No.: 11/788,497 :Group No.: 2822
Filed: April 20, 2007 :Examiner: Soward, Ida M.
Attorney Docket No.: FMOS-0702
Title: TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

To the Commissioner for Patents:

PAYMENT OF ISSUE FEE AND PUBLICATION FEE

In response to the examiner's Notice of Allowance and Fees Due mailed on February 10, 2009, a form PTO-2038 is enclosed for the amount of $1055.00, which includes $755.00 for the issuance fee (claiming small entity status) and $300.00 for the publication fee.

Respectfully submitted,
Fwu-Iuan Hshieh

By _____
Bo-In Lin, Attorney, Registration No. 33,948
13445 Mandoli Drive, Los Altos Hills, CA 94022
(650)949-0418(phone), (650)949-4118(fax)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Office Response Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on **February 17, 2009** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EH268665715US"** addressed to: Commissioner for Patents, P.O.Box 1450, Arlington, VA 22313-1450.

Yii-Shyun Lin
(Type or print name of person mailing papers)

_____
(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon to mailing. 37 CFR 1.10(b).

PART B - FEE(S) TRANSMITTAL



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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
September 22, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/519,754	09/11/2006	Fwu-Juan Hshieh	HSHIEH-0602	7502

TITLE OF INVENTION: TRENCHED MOSFET DEVICE CONFIGURATION WITH REDUCED MASK PROCESSES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	12/17/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
AHMED, SELIM U	2826	257-330000

09/23/2009 CNGUYEN3 00000068 11519754
01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
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(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 Bo-In Lin
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3

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp. LTD
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Grand Cayman, Cayman Island

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
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Authorized Signature _____ Date September 22, 2009

Typed or printed name Bo-In Lin Registration No. 33,948

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7590 08/19/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

08/30/2010 CCHAU2 00000042 11518729

01 FC:2501 755.00 OP
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OPAP IAP6 AUG 2 6 2010 PATENT & TRADEMARK OFFICE

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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
August 26, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/518,729	09/10/2006	Fwu-Iuan Hshich	HSHIEH-0601	4153

TITLE OF INVENTION: TRENCHED MOSFET DEVICE WITH TRENCHED CONTACTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/19/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
GUMEDZOE, PENIEL M	2891	257-330000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 Bo-In Lin
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Authorized Signature _____ Date August 26, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

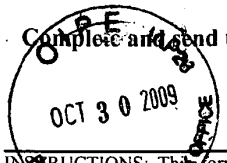
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11/02/2009 HDESTA2 00000086 11981072

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Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Yii-Shyun Lin	(Depositor's name)
	(Signature)
October 30, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/981,072	10/31/2007	Fwu-Iuan Hshieh	FMOS-0707	8738

TITLE OF INVENTION: TRENCH MOSFET WITH IMPLANTED DRIFT REGION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	01/20/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
DANG, PHUC T	2892	257-330000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): TAIWAN R.O.C.

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
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☒ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date October 30, 2009

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 04/25/2012

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

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Certificate of Mailing or Transmission

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/462,748	08/07/2009	Fwu-nan Hshieh	FMOS-0703D	1413

TITLE OF INVENTION: METHOD OF MANUFACTURING TRENCHED MOSFETS WITH EMBEDDED SCHOTTKY IN THE SAME CELL

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$870	$300	$0	$1170	07/25/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
PICARDAT, KEVIN M	2822	438-259000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47, Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: FORCE_MOS TECHNOLOGY COPORATION

(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies: _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date July 24, 2012

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EXHIBIT C

Maintenance Fee payments for particular subject patents.

Patent No.	Application No.
8389354	12383247
8461001	12653131
8159021	12070853
7960787	12291365
8022471	12319188
7863685	12156070
7929321	12229470
7646058	11810327
8058670	12455744
7800185	11699256
7812409	11633366
8252645	12462748
7511357	11788497
7612407	11519754
7633121	11981072
7816729	11518729

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Office of the Commissioner for Patents

TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8389354	12383247	03/19/2009	03/05/2013

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	03/05/2016	09/07/2016	03/06/2017	Closed	Unpaid
7.5 Year	03/05/2020	09/09/2020	03/05/2021	Not Open	Not Due
11.5 Year	03/05/2024	09/06/2024	03/05/2025	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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WASHINGTON, DC 20006
UNITED STATES

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Office of the Commissioner for Patents

METHODS FOR MANUFACTURING TRENCH MOSFET WITH IMPLANTED DRIFT REGION

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8461001	12653131	12/09/2009	06/11/2013

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 06/11/2017 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	06/11/2016	12/13/2016	06/12/2017	Closed	Unpaid
7.5 Year	06/11/2020	12/12/2020	06/11/2021	Not Open	Not Due
11.5 Year	06/11/2024	12/12/2024	06/11/2025	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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WASHINGTON, DC 20006
UNITED STATES

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Office of the Commissioner for Patents

TRENCH MOSFET WITH DOUBLE EPITAXIAL STRUCTURE

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8159021	12070853	02/20/2008	04/17/2012

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	04/17/2015	10/20/2015	04/18/2016	Closed	Paid
7.5 Year	04/17/2019	10/18/2019	04/17/2020	Closed	Unpaid
11.5 Year	04/17/2023	10/18/2023	04/17/2024	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

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WASHINGTON, DC 20006
UNITED STATES

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Office of the Commissioner for Patents

CONFIGURATION OF TRENCHED SEMICONDUCTOR POWER DEVICE TO REDUCE MASKED PROCESS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7960787	12291365	11/07/2008	06/14/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	06/14/2014	12/16/2014	06/15/2015	Closed	Unpaid
7.5 Year	06/14/2018	12/15/2018	06/14/2019	Not Open	Not Due
11.5 Year	06/14/2022	12/15/2022	06/14/2023	Not Open	Not Due

Patent Holder Information

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Entity Status SMALL

Phone Number 2024570160

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Office of the Commissioner for Patents

TRENCH METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET) WITH LOW GATE TO DRAIN COUPLED CHARGES (QGD) STRUCTURES

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8022471	12319188	12/31/2008	09/20/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 09/20/2015 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	09/20/2014	03/21/2015	09/21/2015	Closed	Unpaid
7.5 Year	09/20/2018	03/21/2019	09/20/2019	Not Open	Not Due
11.5 Year	09/20/2022	03/21/2023	09/20/2023	Not Open	Not Due

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TRENCH MOSFET WITH EMBEDDED JUNCTION BARRIER SCHOTTKY DIODE

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7863685	12156070	05/28/2008	01/04/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 01/04/2015 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	01/04/2014	07/08/2014	01/05/2015	Closed	Unpaid
7.5 Year	01/04/2018	07/06/2018	01/04/2019	Not Open	Not Due
11.5 Year	01/04/2022	07/06/2022	01/04/2023	Not Open	Not Due

Patent Holder Information

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Entity Status SMALL

Phone Number 2024570160

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UNITED STATES

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EX1002.098

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Office of the Commissioner for Patents

INSULATED GATE BIPOLAR TRANSISTOR (IGBT) WITH MONOLITHIC DEEP BODY CLAMP DIODE TO PREVENT LATCH-UP

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8058670	12455744	06/04/2009	11/15/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 11/15/2015 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	11/15/2014	05/16/2015	11/16/2015	Closed	Unpaid
7.5 Year	11/15/2018	05/16/2019	11/15/2019	Not Open	Not Due
11.5 Year	11/15/2022	05/16/2023	11/15/2023	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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1825 EYE ST., NW
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WASHINGTON, DC 20006
UNITED STATES

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United States Patent and Trademark Office
Office of the Commissioner for Patents

CLOSED TRENCH MOSFET WITH FLOATING TRENCH RINGS AS TERMINATION

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7800185	11699256	01/28/2007	09/21/2010

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	09/21/2013	03/22/2014	09/22/2014	Closed	Paid
7.5 Year	09/21/2017	03/23/2018	09/21/2018	Closed	Unpaid
11.5 Year	09/21/2021	03/22/2022	09/21/2022	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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WASHINGTON, DC 20006
UNITED STATES

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Office of the Commissioner for Patents

DEPLETION MODE TRENCH MOSFET FOR IMPROVED EFFICIENCY OF DC/DC CONVERTER APPLICATIONS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7929321	12229470	08/22/2008	04/19/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 04/19/2015 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	04/19/2014	10/21/2014	04/20/2015	Closed	Unpaid
7.5 Year	04/19/2018	10/20/2018	04/19/2019	Not Open	Not Due
11.5 Year	04/19/2022	10/20/2022	04/19/2023	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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DEVICE CONFIGURATION AND METHOD TO MANUFACTURE TRENCH MOSFET WITH SOLDERABLE FRONT METAL

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7646058	11810327	06/05/2007	01/12/2010

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	01/12/2013	07/13/2013	01/13/2014	Closed	Paid
7.5 Year	01/12/2017	07/13/2017	01/12/2018	Closed	Unpaid
11.5 Year	01/12/2021	07/13/2021	01/12/2022	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

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Entity Status SMALL

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United States Patent and Trademark Office
Office of the Commissioner for Patents

TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7812409	11633366	12/04/2006	10/12/2010

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Patent expired on 10/12/2018 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	10/12/2013	04/15/2014	10/14/2014	Closed	Paid
7.5 Year	10/12/2017	04/13/2018	10/12/2018	Closed	Unpaid
11.5 Year	10/12/2021	04/13/2022	10/12/2022	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

Address DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
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WASHINGTON, DC 20006
UNITED STATES

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Office of the Commissioner for Patents

TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7511357	11788497	04/20/2007	03/31/2009

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	03/31/2012	10/02/2012	04/01/2013	Closed	Paid
7.5 Year	03/31/2016	10/01/2016	03/31/2017	Closed	Unpaid
11.5 Year	03/31/2020	10/01/2020	03/31/2021	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

Address DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006
UNITED STATES

uPI Semiconductor Corp.
EX1002.104

United States Patent and Trademark Office
Office of the Commissioner for Patents

TRENCHED MOSFET DEVICE CONFIGURATION WITH REDUCED MASK PROCESSES

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7612407	11519754	09/11/2006	11/03/2009

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	11/03/2012	05/04/2013	11/04/2013	Closed	Unpaid
7.5 Year	11/03/2016	05/04/2017	11/03/2017	Not Open	Not Due
11.5 Year	11/03/2020	05/04/2021	11/03/2021	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

Address DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006
UNITED STATES

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United States Patent and Trademark Office
Office of the Commissioner for Patents

TRENCHED MOSFET DEVICE WITH TRENCHED CONTACTS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7816729	11518729	09/10/2006	10/19/2010

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	10/19/2013	04/22/2014	10/20/2014	Closed	Paid
7.5 Year	10/19/2017	04/20/2018	10/19/2018	Closed	Unpaid
11.5 Year	10/19/2021	04/20/2022	10/19/2022	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

Address DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
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WASHINGTON, DC 20006
UNITED STATES

uPI Semiconductor Corp.
EX1002.106

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Office of the Commissioner for Patents

TRENCH MOSFET WITH IMPLANTED DRIFT REGION

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7633121	11981072	10/31/2007	12/15/2009

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	12/15/2012	06/18/2013	12/16/2013	Closed	Paid
7.5 Year	12/15/2016	06/16/2017	12/15/2017	Closed	Unpaid
11.5 Year	12/15/2020	06/16/2021	12/15/2021	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

Address DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006
UNITED STATES

uPI Semiconductor Corp.
EX1002.107

United States Patent and Trademark Office
Office of the Commissioner for Patents

METHOD OF MANUFACTURING TRENCHED MOSFETS WITH EMBEDDED SCHOTTKY IN THE SAME CELL

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8252645	12462748	08/07/2009	08/28/2012

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 08/28/2016 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	08/28/2015	03/01/2016	08/29/2016	Closed	Unpaid
7.5 Year	08/28/2019	02/29/2020	08/28/2020	Not Open	Not Due
11.5 Year	08/28/2023	02/29/2024	08/28/2024	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

Address DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006
UNITED STATES

EXHIBIT D

Assignment Data for each of the subject patents

Patent No.	**Application No.**	**Assignment Recordation Date**	**Reel/Frame**
8,389,354	12/383,247	Jul 14, 2022	060508/0867
8,461,001	12/653,131	Dec 9, 2009	023671/0511
8,159,021	12/070,853	Feb 20, 2008	020598/0604
7,960,787	12/291,365	Nov 7, 2008	012880/0903
8,022,471	12/319,188	Dec 31, 2008	022115/0119
7,863,685	12/156,070	May 28, 2008	021072/0282
8,058,670	12/455,744	Jun 4, 2009	022845/0902
7,800,185	11/699,256	Jan 28, 2007	018858/0947
7,929,321	12/229,470	Aug 22, 2008	021482/0773
7,646,058	11/810,327	Jun 5, 2007	019438/0898
7,812,409	11/633,366	Dec 4, 2006	018666/0118
7,511,357	11/788,497	Apr 20, 2007	019273/0651
7,612,407	11/519,754	Sep 11, 2006	018308/0892
7,816,729	11/518,729	Sep 10, 2006	018288/0790
7,633,121	11/981,072	Oct 31, 2007	020129/0966
8,252,645	12/462,748	Aug 7, 2009	023112/0422

EXHIBIT E

DICKINSON WRIGHT PLLC

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LAURA MOSKOWITZ
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January 6, 2022

Via Mail and E-mail

MAIL STOP OED
Office of Enrollment and Discipline (OED)
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450
OED@uspto.gov

Re: **Professional Misconduct Report Regarding Mr. Bo-In Lin**

Dear Members of the Office of Enrollment and Discipline at the United States Patent and Trademark Office:

This firm, on behalf of its client, Force MOS Technology Co., Ltd. ("Force MOS"), submits this grievance along with the accompanying exhibits as a report of alleged professional misconduct against registered patent attorney Mr. Bo-In Lin ("Mr. Lin"), who practices before the United States Patent and Trademark Office ("USPTO") under registration number 33,948. This report is for consideration for discipline based on Mr. Lin's violations of the ethical standards set forth in USPTO Rules of Professional Conduct, 37 C.F.R. § 11.101 *et seq*.

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I. Reporting Attorney

The reporting attorney ("undersigned") is a member at the law firm of Dickinson Wright, practicing out of the Austin Office, at 607 W. 3rd Street, Suite 2500, Austin, TX 78701, and can also be reached at the phone number and e-mail address above.

II. Registered Attorney Mr. Bo-In Lin

Mr. Bo-In Lin has been registered to practice as an agent in front of the USPTO with registration number 33,948 since December 22, 1989. Additionally, Mr. Lin is an attorney licensed to practice law in the State of California (Bar Number 152105) with an office in Los Altos Hills, California 94022-1925.

Mr. Lin's reported residential address is 13445 Mandoli Dr., Los Altos Hills, California 94022-1925. His phone number is (650) 949-0418 and the e-mail address from which he has conducted his patent prosecution business is boinlin@gmail.com.

III. Grievances Filed with Other Agencies, Associations, and Courts

At the moment, there are no other grievances relating to this misconduct by Mr. Lin filed with any other agencies, organizations, or bar associations. Such a grievance nonetheless may be filed as a complaint with the State Bar of California in the future, as Mr. Lin's conduct also constitutes a violation of the California Rules of Professional Conduct, in respect to Rules §§ 1.1(a) (Competence),[1] 1.3(a)-(b) (Diligence),[2] and 1.4(a)(1)-(3) (Communications with Clients).[3]

[1] CALIFORNIA RULES OF PROFESSIONAL CONDUCT R. 1.1(a) ("A lawyer shall not intentionally, recklessly, with gross negligence, or repeatedly fail to perform legal services with competence.").

[2] CALIFORNIA RULES OF PROFESSIONAL CONDUCT R. 1.3(a)-(b) ("A lawyer shall not intentionally, repeatedly,

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Force MOS has brought action against Mr. Lin for this conduct in a District Court for the Northern District of California. In this action, brought on December 16, 2022, Force MOS has alleged Legal Malpractice in violation of California common law. *See* Exhibit A, Complaint for Legal Malpractice, No. 5:22-cv-8938 (N.D. Cal. Dec. 16, 2022).

IV. Subject Patents at issue and Pending Matters Before the USPTO

Mr. Lin prosecuted the inventions that issued as the following U.S. Patents ("subject patents"):

(1) United States Patent No. 7,511,357;
(2) United States Patent No. 7,612,407;
(3) United States Patent No. 7,633,121;
(4) United States Patent No. 7,646,058;
(5) United States Patent No. 7,800,185;
(6) United States Patent No. 7,812,409;
(7) United States Patent No. 7,816,729;
(8) United States Patent No. 7,863,685;
(9) United States Patent No. 7,929,321;
(10) United States Patent No. 7,960,787;
(11) United States Patent No. 8,022,471;
(12) United States Patent No. 8,058,670;
(13) United States Patent No. 8,159,021;
(14) United States Patent No. 8,252,645;
(15) United States Patent No. 8,389,354; and
(16) United States Patent No. 8,461,001.

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recklessly or with gross negligence fail to act with reasonable diligence in representing a client. [] For purposes of this rule, 'reasonable diligence' shall mean that a lawyer acts with commitment and dedication to the interests of the client and does not neglect or disregard, or unduly delay a legal matter entrusted to the lawyer.").

[3] CALIFORNIA RULES OF PROFESSIONAL CONDUCT R. 1.4(a)(1)-(3) ("A lawyer shall: (1) promptly inform the client of any decision or circumstance with respect to which disclosure or the client's informed consent* is required by these rules or the State Bar Act; (2) reasonably* consult with the client about the means by which to accomplish the client's objectives in the representation; (3) keep the client reasonably* informed about significant developments relating to the representation, including promptly complying with reasonable* requests for information and copies of significant documents when necessary to keep the client so informed").

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Each of the subject patents are described below in more detail, in the chronological order that each application was filed.

This grievance involves patent matters that are currently pending in front of the USPTO.

There are currently five (5) petitions pending (Petitions to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) to revive specific ones of the subject patents that are expired. These pending petitions are for the '357 Patent, the '185 Patent, the '787 Patent, the '670 Patent, and the '645 Patent.

Four (4) petitions (Petitions to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) filed to revive specific ones of the subject patents have been granted. These granted petitions are for the '354 Patent, the '021 Patent, the '058 Patent, and the '407 Patent.

Additionally, seven (4) petition decisions for specific ones of the subject patents have resulted in dismissals and are soon to become pending once more, as Force MOS plans to file requests for reconsideration of the petitions with respect to the '001 Patent, the '471 Patent, the '685 Patent, the '321 Patent, the '409 Patent, the '729 Patent, and the '121 Patent.

1. The '357 Patent

United States Patent No. 7,511,357 (the "'357 Patent") titled "Trenched MOSFETs with Improved Gate-Drain (GD) Clamp Diodes," issued from U.S. Patent Application No. 11/788,497 filed on April 20, 2007. The '357 Patent issued on March 9, 2009. *See* Exhibit B, '357 Patent.

In September, 2012, Mr. Lin communicated with Force MOS regarding the corresponding 3.5-year maintenance, received payment from Force MOS for the fee, and

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submitted payment of the 3.5-year maintenance fee to the USPTO.

There was no communication from Mr. Lin to Force MOS regarding the 7.5-year maintenance fee, due in 2016. Mr. Lin did submit payment of the 7.5-year maintenance fee. As a result of the failure to pay the 7.5-year maintenance fee, the '357 Patent expired.

In May 25, 2022, Force MOS learned of the abandonment of the '357 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) to revive the '357 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit B-1, Original Petition of July 12, 2022 and Supplemental Petition filed October 28, 2022.

2. The '407 Patent

United States Patent No. 7,612,407 (the "'407 Patent"), titled "Trenched MOSFET Device with Reduced Mask Processes," issued from U.S. Patent Application No. 11/519,754 filed on September 11, 2006. The '407 Patent issued on November 3, 2009. *See* Exhibit C, '407 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee due in March 2013. Mr. Lin did not submit payment of the 3.5-year maintenance fee. As a result of the failure to pay the 3.5-year maintenance fee, the '407 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '407 Patent when seeking to assert intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed

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Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) to revive the '407 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit B-1, Original Petition of July 12, 2022 and Supplemental Petition filed October 28, 2022. On November 23, 2022, the USPTO granted the petition to revive the '407 Patent. *See* Exhibit C-2, Petition Decision on the '407 Patent.

3. The '121 Patent

United States Patent No. 7,633,121 (the "'121 Patent") titled "Trenched MOSFET with Implanted Drift Region," issued from U.S. Patent Application No. 11/981,072 filed on October 31, 2007. The '121 Patent issued on December 15, 2009. *See* Exhibit D, '121 Patent.

In June, 2013, Mr. Lin communicated with Force MOS regarding the 3.5-year maintenance, received payment from Force MOS for the fee, and submitted payment of the 3.5-year maintenance fee to the USPTO.

There was no communication from Mr. Lin to Force MOS regarding the 7.5-year maintenance fee due in 2017. Mr. Lin did not communicate any information relating to this maintenance fee to Force MOS. Mr. Lin did not submit payment of the 7.5-year maintenance fee. As a result of the failure to pay the 7.5-year maintenance fee, the '121 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '121 Patent when seeking to assert intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the '121 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit D-1, Original Petition to Revive the '121 Patent of July 12, 2022 and Supplemental Petition filed October 28, 2022 for

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the '121 Patent. The October 28, 2022 petition was dismissed on December 7, 2023.

4. The '058 Patent

United States Patent No. 7,646,058 (the "'058 Patent"), titled "Device Configuration and Method to Manufacture Trench MOSFET with Solderable Front Metal," issued from U.S. Patent Application No. 11/810,327 filed on June 5, 2007. The '058 Patent issued on January 12, 2010. See Exhibit E, '058 Patent.

In July, 2013, Mr. Lin communicated the corresponding 3.5-year maintenance fee with Force MOS, received payment for the fee, and provided payment of the 3.5-year maintenance fee to the USPTO.

There was no communication from Mr. Lin to Force MOS regarding the 7.5-year maintenance fee due in 2017. Mr. Lin did not submit payment of the 7.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '058 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '058 Patent when seeking to assert intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) to revive the '058 Patent and filed a supplemental Petition on October 28, 2022, *See* Exhibit E-1, Petition to Revive the '058 Patent. On November 23, 2022, the USPTO granted the petition to revive the '058 Patent. *See* Exhibit E-2, Petition Decision on the '058 Patent.

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5. The '185 Patent

United States Patent No. 7,800,185 (the "'185 Patent") titled "Closed Trench MOSFET with Floating Trench Rings as Termination," issued from U.S. Patent Application No. 11/699,256 filed on January 28, 2007. The '185 Patent issued on September 21, 2010. See Exhibit F, '185 Patent.

In March, 2014, Mr. Lin communicated the corresponding 3.5-year maintenance fee with Force MOS, received payment for the fee, and provided payment of the 3.5-year maintenance fee to the USPTO.

There was no communication from Mr. Lin to Force MOS regarding the 7.5-year maintenance fee due in 2018. Mr. Lin did not submit payment of the 7.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '185 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '185 Patent when seeking to assert intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) to revive the '185 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit F-1, Petition to Revive the '185 Patent.

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6. The '409 Patent

United States Patent No. 7,812,409 (the "'409 Patent") titled "Trench MOSFET with Cell Layout, Ruggedness, Truncated Corners," issued from U.S. Patent Application No. 11/633,366 filed on December 4, 2006. The '409 Patent issued on October 12, 2010. See Exhibit G, '409 Patent.

In April, 2014, Mr. Lin communicated the corresponding 3.5-year maintenance fee with Force MOS, received payment for the fee, and provided payment of the 3.5-year maintenance fee to the USPTO.

There was no communication from Mr. Lin to Force MOS regarding the 7.5-year maintenance fee due in 2018. Mr. Lin did not submit payment of the 7.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '409 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '409 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) to revive the'409 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit G-1, Petition to Revive the '409 Patent. On December 14, 2022, the USPTO dismissed the petition to revive the '409 Patent. *See* Exhibit G-2, Petition Decision on the '409 Patent.

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7. The '729 Patent

United States Patent No. 7,816,729 (the "'729 Patent") titled "Trenched MOSFET Device with Trenched Contacts," issued from U.S. Patent Application No. 11/518,729 filed on September 10, 2006. The '729 Patent issued on October 19, 2010. *See* Exhibit H, '729 Patent.

In April, 2014, Mr. Lin communicated regarding the corresponding 3.5-year maintenance fee with Force MOS, received payment for the fee, and provided payment of the 3.5-year maintenance fee to the USPTO.

There was no communication from Mr. Lin to Force MOS regarding the 7.5-year maintenance fee due in 2018. Mr. Lin did not submit payment of the 7.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '729 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '729 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) to revive the'729 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit H-1, Petition to Revive the '729 Patent. On December 7, 2022, the USPTO dismissed the petition to revive the '729 Patent. See Exhibit H-2, Petition Decision on the '729 Patent.

8. The '685 Patent

United States Patent No. 7,863,685 (the "'685 Patent") titled "Trenched MOSFET with Embedded Junction Barrier Schottky Diode," issued from U.S. Patent Application No. 12/156,070 filed on May 28, 2008. The '685 Patent issued on January 4, 2011. See Exhibit I,

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'685 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee due in July 2014. Mr. Lin did not pay the 3.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '685 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '685 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the'685 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit I-1, Petition to Revive the '685 Patent. On November 8, 2022, the USPTO dismissed the petition to revive the '685 Patent. *See* Exhibit I-2, Petition Decision on the '685 Patent.

9. The '321 Patent

United States Patent No. 7,929,321 (the "'321 Patent") titled "Depletion Mode Trench MOSFET for Improved Efficiency of DC/DC Converter Applications," issued from U.S. Patent Application No. 12/229,470 filed on August 22, 2008. The '321 Patent issued on April 19, 2011. See Exhibit J, '321 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee due in October 2014. Mr. Lin did not submit payment of the 3.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '321 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '321 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed

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Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the'321, and filed a supplemental Petition on October 28, 2022. See Exhibit J-1, Petition to Revive the '321 Patent. The October 28, 2022 petition was discussed on December 27, 2023.

10. The '787 Patent

United States Patent No. 7,960,787 (the "'787 Patent") titled "Configuration of Trenched Semiconductor Power Device to Reduce Masked Process," issued from U.S. Patent Application No. 12/291,365 filed on November 11, 2008. The '787 Patent issued on June 14, 2011. See Exhibit K, '787 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee due in December 2014. Mr. Lin did not submit payment of the 3.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '787 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '787 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the'787 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit K-1, Petition to Revive the '787 Patent.

11. The '471 Patent

United States Patent No. 8,022,471 (the "'471 Patent") titled "Trench Metal Oxide Semiconductor Field Effect Transistor (MOSFET) with Low Gate to Drain (Qgd) Coupled Charges," issued from U.S. Patent Application No. 12/319,188 filed on December 31, 2008. The

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'471 Patent issued on September 20, 2011. See Exhibit L, '471 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee due in March 2015. Mr. Lin did not pay the 3.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '471 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '471 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the'471 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit L-1, Petition to Revive the '471 Patent. The October 28, 2022 petition was dismissed on December 12, 2022

12. The '670 Patent

United States Patent No. 8,058,670 (the "'670 Patent") titled "Insulated Gate Bipolar Transistor (IGBT) with Monolithic Deep Body Clamp Diode to Prevent Latch-Up," issued from U.S. Patent Application No. 12/455,744 filed on June 4, 2009. The '670 Patent issued on November 15, 2011. See Exhibit M, '670 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee due in May 2015. Mr. Lin did not submit payment of the 3.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '670 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '670 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive

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the'670 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit M-1, Petition to Revive the '670 Patent.

13. The '021 Patent

United States Patent No. 8,159,021 (the "'021 Patent") titled "Trenched MOSFET with Double Epitaxial Structure," issued from U.S. Patent Application No. 12/070,853 filed on February 20, 2008. The '021 Patent issued on April 17, 2012. See Exhibit N, '021 Patent.

In October, 2015, Mr. Lin communicated the corresponding 3.5-year maintenance fee with Force MOS, received payment for the fee, and provided payment of the 3.5-year maintenance fee to the USPTO.

There was no communication from Mr. Lin to Force MOS regarding the 7.5-year maintenance fee due in 2019. Mr. Lin did not pay the 7.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '021 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '021 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the'021 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit N-1, Petition to Revive the '021 Patent. On November 23, 2022, the USPTO granted the petition to revive the '021 Patent. *See* Exhibit N-2, Petition Decision on the '021 Patent.

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14. The '645 Patent

United States Patent No. 8,252,645 (the "'645 Patent") titled "Method of Manufacturing Trenched MOSFETs with Embedded Schottky in the Same Cell," issued from U.S. Patent Application No. 12/462,748 filed on August 7, 2009. The '645 Patent issued on August 28, 2012. See Exhibit O, '645 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee became due in February 2016. Mr. Lin did not pay the 3.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '645 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '645 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the'645 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit O-1, Petition to Revive the '645 Patent.

15. The '354 Patent

United States Patent No. 8,389,354 (the "'354 Patent") titled "Trenched MOSFETs with Improved Gate-Drain (GD) Clamp Diodes," issued from U.S. Patent Application No. 12/383,247 filed on March 19, 2009. The '354 Patent issued on March 5, 2013. See Exhibit P, '354 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee due in October 2016. Mr. Lin did not pay the 3.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '354 Patent expired.

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In May, 2022, Force MOS learned of the abandonment of the '354 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the'354 Patent, and filed a supplemental Petition on October 28, 2022. *See* Exhibit P-1, Petition to Revive the '354 Patent. On November 23, 2022, the USPTO granted the petition to revive the '354 Patent. *See* Exhibit P-2, Petition Decision on the '354 Patent.

16. The '001 Patent

United States Patent No. 8,461,001 (the "'001 Patent") titled "Methods for Manufacturing Trenched MOSFET with Implanted Drift Region," issued from U.S. Patent Application No. 12/653,131 filed on December 9, 2009. The '001 Patent issued on June 11, 2013. See Exhibit Q, '001 Patent.

There was no communication from Mr. Lin to Force MOS regarding the 3.5-year maintenance fee due in December 2016. Mr. Lin did not submit payment of the 3.5-year maintenance fee. As a result of the failure to pay maintenance fees, the '001 Patent expired.

In May, 2022, Force MOS learned of the abandonment of the '001 Patent when seeking to assert its exclusive intellectual property rights against would-be infringers.

On July 12, 2022, Force MOS filed a Petition under to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) petition to revive the'001 Patent, and a supplemental Petition was filed on October 28, 2022. *See* Exhibit Q-1, Petition to Revive the '001 Patent. On November 21, 2022, the USPTO dismissed the petition to revive the '001 Patent. *See* Exhibit Q-2, Petition Decision on the '001 Patent.

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V. Witnesses who can provide information, if necessary

Force MOS is a publicly traded, limited company organized and existing under the laws of Taiwan and located at 24F, No. 555, Siyuan Road, Xinzhuang District, New Taipei City 242, Taiwan (R.O.C.). A corporate representative may serve as a witness for Force MOS:

Rafael 鍾秉家
Force MOS Corporate Representative
rafael@force-mos.com

The corporate representative of Force MOS may serve as a witness to the communications (and lack thereof) Force MOS received from Mr. Lin, the fees charged by Mr. Lin, and the objectives of Force MOS as the rightful assignee and owner of the Subject patents.

VI. Summary of the Professional Misconduct and Explanation of Facts

Summary

Mr. Lin was hired to serve as a patent prosecutor by Force MOS to prosecute patents related to valuable trench metal-oxide-semiconductor field-effect transistor ("MOSFET") technology. Force MOS is the rightful owner by assignment of dozens of patents, of which there are sixteen patents (the "Subject patents") concerning improvements to trench MOSFETs for the semiconductor market that were conceived by inventor Fu-Yuan Hsieh ("Mr. Hsieh").

Mr. Lin was responsible for the drafting of multiple patent applications, serving as counsel of record with the USPTO, and communicating as an intermediary between the USPTO and the rightful owner regarding the patent applications (and subsequent issued patents) prosecuted by Mr. Lin.

In violation of his duties under the USPTO Rules of Professional Conduct, Mr. Lin failed

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to communicate with Force MOS. Particularly, Mr. Lin did not inform Force MOS of due dates for required maintenance fees corresponding to the Subject patents prosecuted by Mr. Lin. As a result, the Subject patents expired.

During and after Mr. Lin's failure to communicate regarding patent maintenance fees, failure to pay the maintenance fees, and expiration of the Subject patents, Mr. Lin continued to charge Force MOS for patent prosecution work. Force MOS did not learn of the abandonment until it sought to enforce its patents against would-be infringers.

Accordingly, Mr. Lin has committed at least the following violations in relation to each one of the sixteen Subject patents: (1) a violation of 37 C.F.R. § 11.101 by failing to provide competent representation to a client; (2) a violation of 37 C.F.R. § 11.103 by failing to act with reasonable diligence and promptness in representing a client; (3) a violation of 37 C.F.R. § 11.104(a)(3) by failing to keep the client reasonably informed about the status of the matter; (4) a violation of 37 C.F.R. § 11.804(d) by engaging in conduct that is prejudicial to the administration of justice; and (5) a violation of 37 C.F.R. § 11.804(i) by engaging in any other conduct that adversely reflects on the practitioner's fitness to practice before the USPTO.

Explanation of Facts

On or before Sept. 10, 2006: Mr. Lin is hired to serve as the patent prosecutor for applications relating to the trench MOSFET technology assigned to Force MOS.

Sept. 10, 2006: U.S. Patent Application No. 11/518,729 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Sept. 11, 2006: U.S. Patent Application No. 11/519,754 is filed with the USPTO, with Mr.

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Lin as the counsel of record with whom the USPTO is to communicate.

Dec. 4, 2006: U.S. Patent Application No. 11/633,366 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Jan. 28, 2007: U.S. Patent Application No. 11/699,256 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Apr. 20, 2007: U.S. Patent Application No. 11/788,497 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

June 5, 2007: U.S. Patent Application No. 11/810,327 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Oct. 31, 2007: U.S. Patent Application No. 11/981,072 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

May 28, 2008: U.S. Patent Application No. 12/156,070 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Aug. 22, 2008: U.S. Patent Application No. 12/229,470 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Feb. 20, 2008: U.S. Patent Application No. 12/070,853 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Nov. 11, 2008: U.S. Patent Application No. 12/291,365 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Dec. 31, 2008: U.S. Patent Application No. 12/319,188 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Mar. 9, 2009: The '357 Patent issues from U.S. Patent Application No. 11/788,497, with Force

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MOS as the assignee by virtue of an assignment recorded at reel 019273, frame 0651.

Mar. 19, 2009: U.S. Patent Application No. 12/383,247 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

June 4, 2009: U.S. Patent Application No. 12/455,744 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Aug. 7, 2009: U.S. Patent Application No. 12/462,748 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Nov. 3, 2009: The '407 Patent issues from U.S. Patent Application No. 11/519,754, with Force MOS as the assignee by virtue of an assignment recorded at reel 018308, frame 0892.

Dec. 9, 2009: U.S. Patent Application No. 12/653,131 is filed with the USPTO, with Mr. Lin as the counsel of record with whom the USPTO is to communicate.

Dec. 15, 2009: The '121 Patent issues from U.S. Patent Application No. 11/981,072, with Force MOS as the assignee by virtue of an assignment recorded at reel 020129, frame 0966.

Jan. 10, 2010: The '058 Patent issues from U.S. Patent Application No. 11/810,327, with Force MOS as the assignee by virtue of an assignment recorded at reel 019438, frame 0898.

Sept. 21, 2010: The '185 Patent issues from U.S. Patent Application No. 11/699,256, with Force MOS as the assignee by virtue of an assignment recorded at reel 018858, frame 0947.

Oct. 12, 2010: The '409 Patent issues from U.S. Patent Application No. 11/633,366, with Force MOS as the assignee by virtue of an assignment recorded at reel 018666, frame

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0118.

Oct. 19, 2010: The '729 Patent issues from U.S. Patent Application No. 11/518,729, with Force MOS as the assignee by virtue of an assignment recorded at reel 018288, frame 0790.

Jan. 4, 2011: The '685 Patent issues from U.S. Patent Application No. 12/156,070, with Force MOS as the assignee by virtue of an assignment recorded at reel 021072, frame 0282.

Apr. 19, 2011: The '321 Patent issues from U.S. Patent Application No. 12/229,470, with Force MOS as the assignee by virtue of an assignment recorded at reel 021482, frame 0773.

June 14, 2011: The '787 Patent issues from U.S. Patent Application No. 12/291,365, with Force MOS as the assignee by virtue of an assignment recorded at reel 021880, frame 0903.

Sept. 20, 2011: The '471 Patent issues from U.S. Patent Application No. 12/319,188, with Force MOS as the assignee by virtue of an assignment recorded at reel 022115, frame 0119.

Nov. 15, 2011: The '670 Patent issues from U.S. Patent Application No. 12/455,744, with Force MOS as the assignee by virtue of an assignment recorded at reel 022845, frame 0902.

Apr. 17, 2012: The '021 Patent issues from U.S. Patent Application No. 12/070,853, with Force MOS as the assignee by virtue of an assignment recorded at reel 020598, frame 0604.

Aug. 28, 2012: The '645 Patent issues from U.S. Patent Application No. 12/462,748, with Force MOS as the assignee by virtue of an assignment recorded at reel 023112,

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frame 0422.

Sept. 9, 2012: Mr. Lin submits the 3.5-year maintenance fee for the '357 Patent.

Mar. 3, 2013: The 3.5-year maintenance fee for the '407 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '407 Patent expires.

Mar. 5, 2013: The '354 Patent issues from U.S. Patent Application No. 12/383,247, with Force MOS as the assignee by virtue of an assignment recorded at reel 060508, frame 0867.

June 11, 2013: The '001 Patent issues from U.S. Patent Application No. 12/653,131, with Force MOS as the assignee by virtue of an assignment recorded at reel 023671, frame 0511.

July 12, 2013: Mr. Lin submits the 3.5-year maintenance fee for the '058 Patent.

June 15, 2013: Mr. Lin submits the 3.5-year maintenance fee for the '121 Patent.

Mar. 21, 2014: Mr. Lin submits the 3.5-year maintenance fee for the '185 Patent.

Apr. 12, 2014: Mr. Lin submits the 3.5-year maintenance fee for the '409 Patent.

Apr. 19, 2014: Mr. Lin submits the 3.5-year maintenance fee for the '729 Patent.

July 4, 2014: The 3.5-year maintenance fee for the '685 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '685 Patent expires.

Oct. 19, 2014: The 3.5-year maintenance fee for the '321 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '321 Patent expires.

Dec. 14, 2014: The 3.5-year maintenance fee for the '787 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '787 Patent expires.

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Mar. 20, 2015: The 3.5-year maintenance fee for the '471 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '471 Patent expires.

May 15, 2015: The 3.5-year maintenance fee for the '670 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '670 Patent expires.

Oct. 17, 2015: Mr. Lin submits the 3.5-year maintenance fee for the '021 Patent.

Feb. 28, 2016: The 3.5-year maintenance fee for the '645 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '645 Patent expires.

Sept. 9, 2016: The 7.5-year maintenance fee for the '357 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '357 Patent expires.

Oct. 5, 2016: The 3.5-year maintenance fee for the '354 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '354 Patent expires.

Dec. 11, 2016: The 3.5-year maintenance fee for the '001 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '001 Patent expires.

Jan. 12, 2017: The 7.5-year maintenance fee for the '058 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '058 Patent expires.

June 15, 2017: The 7.5-year maintenance fee for the '121 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '121 Patent expires.

Mar. 21, 2018: The 7.5-year maintenance fee for the '185 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '185 Patent expires.

Apr. 12, 2018: The 7.5-year maintenance fee for the '409 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '409 Patent expires.

Apr. 19, 2018: The 7.5-year maintenance fee for the '729 Patent is not paid by Mr. Lin,

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and Force MOS is not notified. As a result, the '729 Patent expires.

Oct. 17, 2019: The 7.5-year maintenance fee for the '021 Patent is not paid by Mr. Lin, and Force MOS is not notified. As a result, the '021 Patent expires.

May 25, 2022: Force MOS learns of the abandonment of the Subject patents.

June 2, 2022: Force MOS's counsel, Mr. Christopher Hanba, attempts to contact Mr. Lin to discuss and inquire as to why Mr. Lin failed to make maintenance fees on the Subject patents. Mr. Lin does not respond.

June 7, 2022: Force MOS's counsel, Mr. Hanba, attempted to contact Mr. Lin to discuss why Mr. Lin failed to make maintenance fee payments on the Subject patents. In this e-mail communication, Force MOS's counsel asked Mr. Lin to provide information as to why the payments were not completed and any communications discussing maintenance fees for the Subject patents between Mr. Lin, Mr. Hsieh, or any representative of Force MOS. Mr. Lin does not respond.

July 12, 2022: Force MOS files Petitions to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) with respect to each of the Subject patents.

Oct. 28, 2022: Force MOS files Supplemental Petitions to Accept Unintentionally Delayed Payment of Maintenance Fee in an Expired Patent (37 C.F.R. § 1.378(b)) with respect to each of the Subject patents.

Dec. 16, 2022: A complaint is filed by Force MOS against Bo-In Lin in the District Court for the Northern District of California. The complaint alleges legal malpractice.

Dec. 20, 2022: An amended complaint is filed by Force MOS against Bo-In Lin in the District Court for the Northern District of California. The amended complaint alleges legal malpractice, negligence, breach of fiduciary duty, and breach of

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implied contract.

VII. Description of Conduct of Mr. Lin

As early as September 10, 2006, Mr. Lin served as the patent prosecutor for at least one of the Subject patents. By acting under Power of Attorney, Mr. Lin agreed to take on the responsibility of prosecuting the subject patents and acting in the interest of the Patentee. Further, as counsel of record, Mr. Lin was responsible for handling communications with the USPTO.

Mr. Lin properly and timely paid the Issue Fees for each of the subject patents. This established the precedent that Mr. Lin was responsible for, and would properly and timely handle the post-grant fees for each of the Subject patents.

Specifically, Mr. Lin timely paid the required Issue Fees for the Subject patents during a time period beginning on March 31, 2009 and up to and including June 11, 2013. Having paid the Issue fees for each of the subject patents, Mr. Lin then timely paid the 3.5-year Maintenance Fees for the '729 patent, the '121 patent, the '357 patent, the '409 patent, the '185 patent, the '058 patent, and the '021 patent. *See* Exhibit R, Issue Fee Payment Documentation.

It is noted that Mr. Lin never contacted Force MOS regarding the expiration of any of the subject patents. Force MOS had no reason to think, believe, or suspect that any of the subject patents for which the Issue Fees were paid were delinquent, expired, or about to be expired, or that any required Maintenance Fees were not paid. Force MOS and Mr. Lin, as is standard with patent agent-client relationships, had agreed that Mr. Lin would handle all required payments, and would alert Force MOS of any issue that arose during the life of each of the subject patents. No such alert, indication, or communication otherwise was provided to Force MOS.

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Mr. Lin did not notify Force MOS of the maintenance fees that were not paid before the expiration of the Subject patents. Mr. Lin did not notify Force MOS of the expiration of the Subject patents. In fact, as some of the Subject patents were expiring for failure to pay maintenance fees, Mr. Lin continued to charge Force MOS for patent prosecution services, as evidenced at least by the payment of fees on some of the Subject patents after others had already been abandoned.

The failure to pay the required maintenance fees to the USPTO was the direct cause of the expiration of the Subject patents. On May 25, 2022, Force MOS learned of the expiration of the Subject patents after retaining other counsel to pursue enforcement and licensing of the Subject patents.

On June 2, 2022, Force MOS's counsel, Mr. Hanba, attempted to contact Mr. Lin to discuss and inquire as to why Mr. Lin failed to make maintenance fee payments on the Subject patents. *See* Exhibit S, E-Mail Communications to Bo-In Lin. Again, on June 7, 2022, Force MOS's counsel attempted to contact Mr. Lin to discuss why Mr. Lin failed to make maintenance fee payments on the Subject patents. *See id.* In this e-mail communication, Force MOS's counsel asked Mr. Lin to provide information as to why the payments were not completed and any communications discussing maintenance fees for the Subject patents between Mr. Lin, Mr. Hsieh, or any member of Force MOS.

Mr. Lin has not responded to the any of the attempted communications regarding the abandoned Subject patents.

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VIII. Violations of the USPTO Rules of Professional Conduct

Mr. Lin has committed at least the following violations in relation to each one of the sixteen Subject patents: (1) a violation of 37 C.F.R. § 11.101 by failing to provide competent representation to a client; (2) a violation of 37 C.F.R. § 11.103 by failing to act with reasonable diligence and promptness in representing a client; (3) a violation of 37 C.F.R. § 11.104(a)(3) by failing to keep the client reasonably informed about the status of the matter; (4) a violation of 37 C.F.R. § 11.804(d) by engaging in conduct that is prejudicial to the administration of justice; and (5) a violation of 37 C.F.R. § 11.804(i) by engaging in any other conduct that adversely reflects on the practitioner's fitness to practice before the USPTO.

1. Violation of 37 C.F.R. § 11.101

The USPTO Rules of Professional Conduct, in Rule 11.101, require that a practitioner practicing in front of the USPTO "shall provide competent representation to a client." 37 C.F.R. § 11.101. To provide competent representation, a practitioner must use "the legal, scientific, and technical knowledge, skill, and thoroughness and preparation reasonably necessary for the representation." *Id.*

Mr. Lin's failure to pay the required Maintenance Fees on the Subject patents is contrary to the actions that a practitioner using legal knowledge, skill, thoroughness, and preparation would take. The fact that the Subject patents expired for failure to pay maintenance fees, despite the wishes of Force MOS, the owner of the intellectual property, evidences that Mr. Lin was not competently representing his client. Further, Mr. Lin's subsequent lack of any attempt to revive

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the Subject patents evidences that Mr. Lin was not conducting business with the thoroughness and preparation necessary for representation as counsel of record for the Subject patents.

2. Violation of 37 C.F.R. § 11.103

The USPTO Rules of Professional Conduct, in Rule 11.103, require that "[a] practitioner shall act with reasonable diligence and promptness in representing a client." 37 C.F.R. § 11.103.

The Subject patents expired for failure to pay at least one of the required 3.5-year and 7.5-year Maintenance Fees. A practitioner acting with reasonably diligence and promptness would not fail to meet strict time-sensitive requirements that are vital to maintaining a patent. Mr. Lin's lack of promptness was a direct cause of the premature expiration of the Subject patents. Additionally, Mr. Lin did not act with reasonable diligence in informing his client, Force MOS, or the USPTO of the failure of payment of the maintenance fees.

3. Violation of 37 C.F.R. § 11.104(a)(3)

The USPTO Rules of Professional Conduct, in Rule 11.104(a)(3), require that a practitioner must "keep the client reasonably informed about the status of the matter." 37 C.F.R. § 11.104(a)(3).

Mr. Lin did not notify his client, Force MOS, of the abandonment of the Subject patents. Since Mr. Lin was still acting as the patent prosecutor for the inventions involving Force MOS's trenched MOSFET technology and charging Force MOS for some of the USPTO-related fees, Force MOS was unaware of and no reason to suspect that some of the Subject patents were abandoned based on a failure to pay maintenance fees.

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Mr. Lin did not inform of Force MOS of a single one of the Subject patents becoming abandoned. Rather, it was not until Force MOS sought to enforce its patent rights against would-be infringers that Force MOS discovered the abandonment.

Accordingly, Mr. Lin failed repeatedly to keep his client reasonably informed about the status of the Subject patents.

4. Violation of 37 C.F.R. § 11.804(d)

As mentioned above, the USPTO Rules of Professional Conduct, in Rule 11.804, outline acts that constitute professional misconduct for patent practitioners. Another recognized act of misconduct is when a practitioner "engage[s] in conduct that is prejudicial to the administration of justice." 37 C.F.R. § 11.804(d).

Mr. Lin's repeated failure to timely submit payment of required filing fees to the USPTO, which ultimately resulted in his client's Subject patents' premature expiration is a recognized violation of this USPTO Rule of Professional Conduct. *In the Matter of Joseph Stecewycz*, No. D2014-15 (OED Decision Apr. 27, 2015) (holding a practitioner violated 37 C.F.R. § 10.23(b)(5) [now 37 C.F.R. § 11.804(d)] for "repeatedly failing to timely submit proper payment of required filing fees to the USPTO, which ultimately resulted in his client's patent application going abandoned.").

5. Violation of 37 C.F.R. § 11.804(i)

As mentioned above, the USPTO Rules of Professional Conduct, in Rule 11.804, outline acts that constitute professional misconduct for patent practitioners. An additional recognized act

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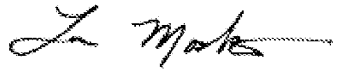
of misconduct is when a practitioner "engage[s] in other conduct that adversely reflects on the practitioner's fitness to practice before the Office." 37 C.F.R. § 11.804(i).

Mr. Lin's failure to respond to any of the attempts by Force MOS and Force MOS's counsel to communicate about the reason that the Subject patents' premature expiration evidences conduct that adversely reflects on Mr. Lin's fitness to practice before the Office.

If the Members of the Office of Enrollment and Discipline have any questions, please do not hesitate to contact us. Thank you in advance for your thoughtful consideration of this report and the accompanying exhibits.

Very truly yours,

Dickinson Wright PLLC



Laura Moskowitz

LEM/

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PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

Docket Number (Optional): 101302-00016

Mail to: **Mail Stop Petition**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

NOTE: If information or assistance is needed in completing this form, please contact the Office of Petitions at (571) 272-3282.

Patent No. 7812409 Application Number 11633366

Issue Date October 12, 2010 Filing Date December 4, 2006

CAUTION: Maintenance fee payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

Also complete the following information, if applicable.

The above-identified patent

☐ is a reissue of original Patent No. _____ original issue date _____

original application number _____

original filing date _____.

☐ resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____

filed on _____.

NOTE: A grantable petition requires the following items:

(1) Petition fee;
(2) Maintenance fee; and
(3) Statement that the delay in payment of the maintenance fee was unintentional.

CERTIFICATE OF MAILING OR TRANSMISSION (37 CFR 1.8(a))

I hereby certify that this paper (* along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or being transmitted to the U.S. Patent and Trademark Office by EFS-Web, or by facsimile to (571) 273-8300, on the date shown below.

February 14, 2023
Date

/Laura Moskowitz/
Signature

Laura Moskowitz
Typed or Printed Name of Person Signing Certificate

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0016. Public burden for this form is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

1. SMALL ENTITY

☑ Patentee asserts, or has previously asserted, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MICRO ENTITY

☐ Patentee certifies, or has previously certified, micro entity status. See 37 CFR 1.29
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

4. LOSS OF ENTITLEMENT TO MICRO ENTITY STATUS

☐ Patentee is no longer entitled to micro entity status. See 37 CFR 1.29(i).

5. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

Undiscounted			Small Entity			Micro Entity		
Amount	Fee	(Code)	Amount	Fee	(Code)	Amount	Fee	(Code)
☐ $	3½ yr fee	(1551)	☐ $	3½ yr fee	(2551)	☐ $	3½ yr fee	(3551)
☐ $	7½ yr fee	(1552)	☑ $ 1,880.00	7½ yr fee	(2552)	☐ $	7½ yr fee	(3552)
☐ $	11½ yr fee	(1553)	☑ $ 3,850.00	11½ yr fee	(2553)	☐ $	11½ yr fee	(3553)

MAINTENANCE FEE BEING SUBMITTED $ 5,730.00

6. PETITION FEE

The petition fee required by 37 CFR 1.17(m) of:

$ _____ Undiscounted (Fee Code 1558); or
$ 1,050.00 Small Entity (Fee Code 2558); or
$ _____ Micro Entity (Fee Code 3558)

$1050 X 2 = $2100.00

must be paid as a condition of accepting an unintentionally delayed payment of a maintenance fee.

PETITION FEE BEING SUBMITTED $ 2100.00

7. MANNER OF PAYMENT

☐ Enclosed is a check for the sum of $ _____
☑ Please charge Deposit Account No. 041061 the sum of $ $7,830.00
☐ Payment by credit card. Form PTO-2038 is attached.
☐ Payment made via EFS-Web.

8. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☑ The Director is hereby authorized to charge any maintenance fee or petition deficiency to Deposit Account No. 041061

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PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

9. OVERPAYMENT

As to any overpayment made, please

☑ Credit to Deposit Account No. 041061

OR

☐ Send refund check

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information, such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form (PTO-2038) submitted for payment purposes), is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioner/applicant should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms (PTO-2038) submitted for payment purposes are not retained in the application file and therefore are not publicly available.

10. STATEMENT

The delay in payment of the maintenance fee for this patent was unintentional.

Petitioner is reminded that a delay resulting from a deliberately chosen course of action or a change in circumstance is not an unintentional delay.

Petitioner is further reminded that a person seeking reinstatement of an expired patent should not make a statement that the delay in payment of the maintenance fee was unintentional unless the entire delay was unintentional, including the period from discovery that the maintenance fee was not timely paid until payment of the maintenance fee. For example, a statement that the delay in payment of the maintenance fee was unintentional would not be proper when the patentee becomes aware of an unintentional failure to timely pay the maintenance fee and then intentionally delays filing a petition for reinstatement of the patent under 37 CFR 1.378. See MPEP 2590.

NOTE: Where the petition under 37 CFR 1.378 is filed more than two years after the date the patent expired for nonpayment of the maintenance fee, the United States Patent and Trademark Office requires an additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional. This requirement is in addition to the requirement to provide a statement that the entire delay was unintentional. See *Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications and Patents Based on Unintentional Delay*, 85 FR 12222 (March 2, 2020). See MPEP 711.03(c)(II)(C)-(F) for additional guidance on the information required to establish that the entire delay was unintentional.

☑ Because this petition under 37 CFR 1.378 is being filed more than two years after the date the patent expired for nonpayment of the maintenance fee, additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional is enclosed herewith.

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PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

11. PETITIONER REQUESTS THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT BE REINSTATED.

February 14, 2023
Date

/Laura Moskowitz/
Signature(s) of Petitioner

55,470
Registration Number, if applicable

Laura Moskowitz
Typed or Printed Name

(202) 659-6941
Telephone Number

1825 Eye St. N.W., Suite 900
Address

Washington, DC 20006
Address

37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with § 1.33(b)."

12. ENCLOSURES

- [x] Maintenance Fee Payment
- [x] Petition fee under 37 CFR 1.17(m) (fee for filing the maintenance fee petition)
- [x] Additional sheet(s) containing statement establishing unintentional delay
- [ ] Other: _____

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects this information under authority of 5 CFR 1.290. The information in this system of records is used to manage all records of applicant including name, citizenship, residence, post office address and other information with respect to inventors and their legal representatives pertaining to the applicant's activities in connection with the invention for which a patent is sought. This information is protected from disclosure to third parties in accordance with the Privacy Act.

However, routine uses of this information may include disclosure to the following: to law enforcement and investigation in the event that the system of records indicates a violation or potential violation of law; to a Federal, state, local, or international agency, in response to its request; to an agency, organization, or individual for the purpose of performing audit or oversight operations as authorized by law; to non-federal personnel under contract to the agency; to a court for adjudication and litigation; to the Department of Justice for Freedom of Information Act (FOIA) assistance; to members of congress working on behalf of an individual; to the Office of Personnel Management (OPM) for personnel research purposes; to National Archives and Records Administration for inspection of records; and to the Office of Management and Budget (OMB)for legislative coordination and clearance. Failure to provide any part of the requested information may result in an inability to process requests for access and information. The applicable Privacy Act System of Records Notice for this information is COMMERCE/PAT-TM-7 Patent Application Files, available at Federal Register / Vol. 78, No. 61 / Friday, March 29, 2013 /Notices 19243. https://www.govinfo.gov/content/pkg/FR-2013-03-29pdf/2013-07341.pdf

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Docket No: 101032-00016

Fwa-Iuan Hshieh, et al.

Patent No.: 7,812,409 Confirmation No.: 2119

Issued: October 12, 2010

For: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

PETITION FOR RECONSIDERATION, UNDER 37 C.F.R. § 1.378(d), OF DISMISSAL OF PETITION FOR ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEES UNDER 37 C.F.R. § 1.378(b) FOR AN UNINTENTIONAL DELAY

MAIL STOP PETITION
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

I. Introduction: As provided for in the below remarks, and as supported by the information in the attached Exhibits A-E, Patentee (Force-MOS Technology Corporation (*see* **Exhibit D**)) respectfully requests reconsideration of the Decision on Petition, dated December 14, 2022, dismissing the previously petition ("the October 28 petition"), filed October 28, 2022. As such, revival and reinstatement of U.S. Patent 7,812,409 (the "subject patent") is respectfully requested for at least the following reasons.

A group of commonly-owned patents, including the subject patent, include sixteen U.S. Patents: U.S. Patent No. 8,389,354; U.S. Patent No. 8,461,001; U.S. Patent No. 8,159,021; U.S. Patent No. 7,960,787; U.S. Patent No. 8,022,471; U.S. Patent No. 7,863,685; U.S. Patent No. 8,058,670; U.S. Patent No. 7,800,185; U.S. Patent No. 7,929,321; U.S. Patent No. 7,646,058; U.S. Patent No. 7,812,409; U.S. Patent No. 7,511,357; U.S. Patent No. 7,612,407; U.S. Patent No. 7,816,729; U.S. Patent No. 7,633,121; and U.S. Patent No. 8,252,645 (*see* **Exhibit A**).

PETITION FOR RECONSIDERATION, UNDER 37 C.F.R. § 1.378(d)

The Exhibits include:

Exhibit A: Application and patent information for each of the commonly-owned patents;

Exhibit B: Issue Fee payment documentation for each of the commonly-owned patents;

Exhibit C: Maintenance Fee payments for particular ones of the commonly-owned patents;

Exhibit D: Assignment data for each of the commonly-owned patents; and

Exhibit E: Professional Misconduct Report Regarding Mr. Bo-In Lin.

The Patentee, and as a result, each of the commonly-owned patents, including the subject patent, suffered an unintentional delay in the payment of the 3.5, 7.5, and/or 11.5 year Maintenance Fees due to the gross misconduct of the patent agent of record at the time the fees were due. That is, each of the commonly-owned patents suffered from the previous practitioner's error in 1) not properly paying the fees; and 2) not alerting the Patentee as to the requirement and delinquency of the fee payments. As a result, as evidenced by the information in **Exhibit B**, each of the commonly-owned patents issued pursuant to a properly and timely-paid Issue Fee payment. However, each of the commonly-owned patents subsequently expired due to nonpayment of the Maintenance Fees under 37 C.F.R. § 1.362 (*see* **Exhibit A**).

At the time the non-paid fees were due in each of the commonly-owned patents, the Patentee had retained and relied upon the following patent agent to prosecute the commonly-owned patents:

Bo-In Lin (Reg. no. 33,948)
13445 Mandoli Drive
Los Altos Hills, CA 94022

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PETITION FOR RECONSIDERATION, UNDER 37 C.F.R. § 1.378(d)

New Powers of Attorney have been filed in each of the subject patents, and in each of the subject patents have been granted to the following attorneys, which include the undersigned:

35161 - DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006
UNITED STATES

II. Governing Law: Under 37 C.F.R. § 1.378(b), any petition to accept an unintentionally delayed payment of a Maintenance Fee must include: (1) The required Maintenance Fee set forth in §1.20(e) through (g); (2) the petition fee as set forth in §1.17(m); and (3) A statement that the delay in payment of the Maintenance Fee was unintentional."

It is noted that, under 37 C.F.R. § 1.378(b), "The director may require additional information where there is a question whether the delay was unintentional." In the present case, the Patentee provides the additional information herein.

As noted in MPEP §2590, "If multiple Maintenance Fees due on a single patent have not been paid, a separate petition fee is required for each delayed Maintenance Fee payment. A statement that the delay in payment of the Maintenance Fee was unintentional is also required with respect to each delayed Maintenance Fee payment. While the Patentee can include the statements of unintentional delay in a single petition (if desired), a separate petition fee is required for each delayed Maintenance Fee payment."

As discussed in MPEP §711.03(c), the "unintentional delay" standard, "[w]hile the Office reserves the authority to require further information concerning the cause of abandonment and delay in filing a petition to revive, the Office relies upon the applicant's duty of candor and good faith and accepts the statement that 'the entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition pursuant to 37 CFR 1.137(a) was

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unintentional' without requiring further information in the vast majority of petitions under 37 CFR 1.137(a). This is because the applicant is obligated under 37 CFR 11.18 to inquire into the underlying facts and circumstances when a practitioner provides this statement to the Office. In addition, providing an inappropriate statement in a petition under 37 CFR 1.137(a) to revive an abandoned application may have an adverse effect when attempting to enforce any patent resulting from the application. *See* Lumenyte Int'l Corp. v. Cable Lite Corp., Nos. 96-1011, 96-1077, 1996 U.S. App. LEXIS 16400, 1996 WL 383927 (Fed. Cir. July 9, 1996) (unpublished) (patents held unenforceable due to a finding of inequitable conduct in submitting an inappropriate statement that the abandonment was unintentional). The Office is almost always satisfied as to whether 'the entire delay…was unintentional' on the basis of statement(s) by the applicant or representative explaining the cause of the delay (accompanied at most by copies of correspondence relevant to the period of delay)."

III. Remarks: The Patentee respectfully submits that the Patentee suffered unintentional delays in the payments of the required Maintenance Fees for the subject patents due to the hidden, and potentially concealed failures of Mr. Lin.

III(a). The Patentee reasonably relied on Mr. Lin for payment of all appropriate fees and for informing the Patentee of the same: As evidenced in Exhibits A and B, Mr. Lin properly and timely paid the Issue Fees for each of the commonly-owned patents. This established and evidences the precedent that Mr. Lin was responsible for, and would properly and timely handle the post grant fees for each of the commonly-owned patents.

Specifically, Mr. Lin timely paid the required Issue Fees for the commonly-owned patents during a time period beginning on March 31, 2009 and up to and including June 11, 2013. Having paid the Issue fees for each of the commonly-owned patents, Mr. Lin then timely

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paid the 3.5 year Maintenance Fees for the '729 patent, the '121 patent, the '357 patent, the '409 patent, the '185 patent, the '058 patent, and the '021 patent (*see* **Exhibits A and C**). These payments spanned the time period beginning on April 1, 2013 to and including April 6, 2016. This concluded the Maintenance Fee payments by Mr. Lin.

III(b). The delay in payment of the maintenance fees, resulting in the expiration of the commonly-owned patents, was unintentional on the part of the Patentee, due to reasonable reliance on Mr. Lin. In view of Mr. Lin's consistent work managing the subject patent, at least until after payment of the Issue Fees and issuance of the same, the Patentee reasonably relied on Mr. Lin to continue to manage the subject patent, to pay any fees as due, and to keep the Patentee informed of all relevant matters. It is noted that Mr. Lin never contacted the Patentee regarding the expiration of the subject patent of any of the other commonly-owned patents. The Patentee has no reason to think, believe, or suspect that any of the commonly-owned patents for which the Issue Fees were paid were delinquent, expired, or about to be expired, or that any required Maintenance Fees were not paid. The Patentee and Mr. Lin, as is standard with patent agent-client relationships, had agreed that Mr. Lin would handle all required payments, and would alert the Patentee of any issue that arose during the life of each of the commonly-owned patents. No such alert, indication, or communication otherwise was provided to the Patentee.

In view of Mr. Lin's failure to pay the Maintenance fees for the commonly-owned patents, as well as his failure to communicate with the Patentee, a Professional Misconduct Report Regarding Bo-In Lin has been filed with the Office of Enrollment and Discipline (OED). A copy of this report is attached hereto as Exhibit E.

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PETITION FOR RECONSIDERATION, UNDER 37 C.F.R. § 1.378(d)

On May 25, 2022, having engaged the law firm of Dickinson Wright, PLLC to potentially instigate infringement law suits against a number of competitors, the Patentee discovered that the commonly-owned patents were expired. Attorneys of Dickinson Wright discovered that the commonly-owned patents were expired during the course of due diligence, and immediately informed the Patentee of the same. The Patentee then immediately instructed Dickinson Wright, PLLC to investigate the expiration of the commonly-owned patents and to prepare and file petitions under 37 C.F.R. § 1.378.

III(c). Any delay between Patentee discovering, on May 25, 2022, that the commonly-owned patents were expired and the filing of the initial Petition under 37 C.F.R. § 1.378(b), filed July 12, 2022 was unintentional. This time, between May 25, 2022 and July 12, 2022 (a period of 48 days) was spent in internal discussions of the Patentee and discussions with attorneys from Dickinson Wright to determine responsibility for the failure to pay the maintenance fees, the steps to be taken to reinstate the patent, and to prepare and review relevant documents. The initial Petition under 37 C.F.R. § 1.378(b), filed July 12, 2022, is of public record in the prosecution history of the subject patent.

III(d). Any delay between the filing of the initial Petition on July 12, 2022 and the filing of the subsequent Petition under 37 C.F.R. § 1.378(b) on October 28, 2022 was unintentional. The initial Petition, filed July 12, 2022, was dismissed without consideration of the merits with the decision on petition issued October 12, 2022. At the time the Petition was filed on July 12, 2022, it was reasonably believed by attorneys at Dickinson Wright that the Petition was appropriate.

Prior to the filing of the initial Petition on July 12, 2022, a Power of Attorney to Dickinson Wright was filed on July 11, 2022, and was accepted, as evidenced by the Notice of

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Acceptance of Power of Attorney issued July 13, 2022, which is of public record in the prosecution history of the subject patent.

Notably, the July 12, 2022 Petition was filed with, a petition under 37 C.F.R. § 1.378(b), and an authorization to charge deposit account 04-1061 (of Dickinson Wright), for each of the overdue Maintenance Fees as well as any petition fees. This is of record in the public record of the prosecution history of the subject patent.

At the time of filing the petition on July 12, 2022, it was not known by the Patentee or the attorneys of Dickinson Wright that the attorney who signed the authorizations to charge the deposit account, Mr. Nicholas Martin, would resign his position at Dickinson Wright prior to the USPTO Petitions Department attempting to charge the deposit account. At the time of signing and filing the authorizations to charge the deposit account, Mr. Martin was duly listed as an authorized user of the deposit account. However, upon leaving Dickinson Wright, Mr. Martin was removed from the deposit account, as is common practice when an attorney leaves a law firm associated with a USPTO deposit account. Unfortunately, at the time Mr. Martin was removed from the deposit account, the USPTO Petitions Department had not yet attempted to charge the deposit account for the fees due.

Upon receipt of a number of Decisions on Petition for various of the commonly-owned patents, attorneys at Dickinson Wright worked diligently to augment the petitions filed in all of the commonly-owned patents and thus prepare a new petition, for each of the sixteen commonly-owned patents. The augmented petitions, including that for the subject patent, were filed on October 28, 2022.

III(d). Any delay, between the October 28, 2022 filing of the Petition for the subject patent and the filing of the instant Petition for Reconsideration, was unintentional. At the

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time of the filing of the Petition on October 28, 2022, it was reasonably believed that the October 28, 2022 Petition satisfied 37 C.F.R. § 1.378(b)(3). This reasonable belief is supported by the issuance, on November 23, 2022, of Decisions on Petition *granting* the Petitions filed October 28, 2022 for patents 8,389,354; 8,159,021; 7,646,058; and 7,612,407. These patents are among the commonly-owned patents, and the Petition under 37 C.F.R. § 1.378(b), filed on October 28, 2022, for each of these patents was identical to that filed on October 28, 2022 for the subject patent. This shows that the belief of the Patentee and of the attorneys of Dickinson Wright, that the October 28, 2022 Petition filed in the subject patent satisfied 37 C.F.R. § 1.378(b) and would be granted, was reasonable.

Between the December 14, 2022 issuance of the Decision on Petition for the subject patent, and the present filing of the instant Petition for Reconsideration, attorneys at Dickinson Wright worked to clarify the reasons for the dismissal, to obtain additional information, and to prepare and review the instant Petition for Reconsideration.

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IV. Conclusion: In view of at least the above, the Patentee respectfully submits that the failure to pay the Maintenance Fees up until this time was unintentional with respect to the subject patent.

The USPTO is directed and authorized to charge all required fees to Deposit Account No. 04-1061. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,
/Laura Moskowitz /

_____
Laura Moskowitz, reg. no. 55,470

Dickinson Wright PLLC
1825 Eye St. N.W. Suite 900
Washington, D.C. 20006
202-457-0160

Date: February 14, 2023

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	101302-00016	2119

35161 7590 12/14/2022

DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 Eye St. N.W.
SUITE 900
WASHINGTON, DC 20006

EXAMINER	
ARROYO, TERESA M	

ART UNIT	PAPER NUMBER
2826	

NOTIFICATION DATE	DELIVERY MODE
12/14/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dwpatents@dickinsonwright.com

uPI Semiconductor Corp.
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UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No. 7,812,409 Issue Date: 12 Oct 2010 Application No. 11/633,366 Filing or 371(c) Date: 4 Dec 2006 Attorney Docket No. 101302-0005	:	DECISION ON PETITION

This is a decision on the renewed petition pursuant to 37 C.F.R. § 1.378(b) to accept the unintentionally delayed payment of a maintenance fee for the above-identified patent, filed October 28, 2022.

The petition pursuant to 37 C.F.R. § 1.378(b) is **DISMISSED.**

Application number 11/633,366 matured into U.S. patent number 7,812,409 on October 12, 2010. The grace period for paying the 7½-year maintenance fee provided in 37 C.F.R. § 1.362(e) expired at midnight on October 12, 2018, with no payment received. Accordingly, the patent expired on October 12, 2018 at midnight.

A grantable petition pursuant to 37 C.F.R. § 1.378(b) must be accompanied by:

(1) The required maintenance fee set forth in § 1.20(e) through (g);
(2) The petition fee as set forth in § 1.17(m); and,
(3) A statement that the delay in payment of the maintenance fee was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

The USPTO requires additional information concerning whether a delay in seeking acceptance of a delayed maintenance fee payment. See *Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications*

and Patents Based on Unintentional Delay, 85 FR 12222 (March 2, 2020).

In this instance, a petition under 37 C.F.R. § 1.378 was filed more than two years after the date of expiration for nonpayment of a maintenance fee. Therefore, petitioner must provide sufficient information of the facts and circumstances surrounding the entire delay to support a conclusion that the entire delay was unintentional. *Id.* at 12223. Details regarding the cause of petitioner's nonpayment of a maintenance fee that resulted in expiration of the patent, when the expiration of the patent was discovered, and the delay between discovery of the expiration of the patent and filing of the petition under 37 C.F.R. § 1.378 are of particular relevance. Petitioner should provide relevant dates and identify responsible parties where appropriate.

See M.P.E.P. §§ 711.03(c)(II)(C)-(H) and 2590(I) for additional guidance on the information required to establish that the entire delay was unintentional.

When addressing the delay, petitioner is reminded that an intentional course of action is not rendered unintentional when, upon reconsideration, the petitioner changes his or her mind as to the course of action that should have been taken. *See In re Maldague*, 10 USPQ2d 1477, 1478 (Comm'r Pat. 1988). Petitioner's failure to carry the burden of proof to establish that the "entire" delay was "unintentional" may lead to the denial of a petition under 37 C.F.R. § 1.378, regardless of the circumstances that originally resulted in the failure to timely pay the maintenance fee.

Petitioner should note that the party whose delay is relevant is the party having the right or authority to make the timely maintenance fee payment in the above-identified patent. When the entire right, title, and interest in patent have been assigned to a third party (and thus does not retain any legal or equitable interest in the invention), the delay of the patentee to whom the patent was issued is irrelevant in evaluating whether the delay was unintentional. *See Kim v. Quigg*, 718 F. Supp. 1280, 1284, 12 USPQ2d 1604, 1607-08 (E.D. Va. 1989).

If the delay occurred while a prior assignee or applicant was responsible for maintenance of this patent (*i.e.*, ownership of the patent has transferred), or while a prior practitioner was handling maintenance of the patent, petitioner is expected to make an inquiry reasonable under the circumstances to determine

that the relevant party's delay was unintentional. Petitioner should provide an explanation setting forth facts that support a conclusion of unintentional delay.

The USPTO is concerned with three periods of delay. Petitioner is reminded the burden of proof to establish that the delay from the due date for the payment of the maintenance fee until the filing of a grantable petition was unintentional within the meaning of 35 U.S.C. § 41(c)(1) and 37 C.F.R. § 1.378 rests with the petitioner.

The first period of delay petitioner must address on renewed petition is the delay in payment of the maintenance fee that resulted in the expiration of this patent.

The second period of delay petitioner must address on renewed petition is the delay in filing the initial petition pursuant to 37 C.F.R. § 1.378(b) on July 12, 2022.

If the renewed petition is filed outside the time period specified in 37 C.F.R. § 1.378(d), then the third period of delay petitioner must address on renewed petition is the delay in filing a grantable petition pursuant to 37 C.F.R. § 1.378(b).

An initial petition pursuant to 37 C.F.R. § 1.378(b) to accept the unintentionally delayed payment of a maintenance fee for this patent was filed on July 12, 2022. The individual who signed the initial petition (former Petitioner) provided an instruction to charge each of these fees to Deposit Account number 04-1061. The USPTO attempted to charge these fees to this Deposit Account on September 29, 2022 but was unable to do so since former Petitioner was not listed as an authorized user of this Deposit Account. The initial petition pursuant to 37 C.F.R. § 1.378(b) was dismissed via the mailing of a decision on October 12, 2022.

With this renewed petition pursuant to 37 C.F.R. § 1.378(b) received on October 28, 2022, the individual who signed the renewed petition (current Petitioner) has explained the former Petitioner left the law firm after the first petition was filed and his name was removed from the list of authorized users accordingly. Petitioner has authorized the charging of two petition fees ($1050 each), the 7½-year maintenance fee ($1880) and the 11½-year maintenance fee ($3850) to Deposit Account number 04-1061. **However, the USPTO remains unable to charge all required fees to this Deposit Account, since it contains**

insufficient funds. These fees total $7830, and the undersigned attempted to charge each of these fees to Deposit Account number 04-1061 on December 7, 2022, however it contained $7728. It follows the undersigned charged both petition fees and the 7½-year maintenance fee, but **the 11½-year maintenance fee has not been received.**

Petitioner is reminded that it is the entire period of delay in submitting the required maintenance fees that must be shown be unintentional, and the 11½-year maintenance fee remains due.

To date, two petition fees, the 7½-year maintenance fee, a statement of unintentional delay, and an explanation concerning the extended period of delay in submitting the 7½-year maintenance fee have been received.

The first requirement of 37 C.F.R. § 1.378(b) has not been satisfied, since the 11½-year maintenance fee has not been received.

The second requirement of 37 C.F.R. § 1.378(b) has been satisfied.

The third requirement of 37 C.F.R. § 1.378(b) has not been satisfied.

With this renewed petition pursuant to 37 C.F.R. § 1.378(b) received on October 28, 2022, Petitioner has explained that prior counsel (Bo-In Lin, Reg. No. 33,948) committed "gross misconduct," in that he and the patentee had an agreement where he would track and submit the "3.5, 7.5, and/or 11.5 year Maintenance Fees," however he neither paid the required maintenance fees nor alerted the patentee of either the required fees or the delinquency in their payment.[1] The patentee learned of the expiration of several patents, including this one, on May 25, 2022.[2] The initial petition was filed fewer than two months later.

First, this is a rather serious allegation. Petitioner has accused a registered agent of committing "gross misconduct," yet it is not apparent that any action has been taken with the Office of Enrollment and Disciple (OED). **On renewed petition, if Petitioner wishes to continue these allegations concerning Bo-In Lin, no attention will be paid to any such allegations unless the allegation is also set forth in a letter of complaint**

1 Renewed petition received on October 28, 2022, pages 2 and 4-5.
2 *Id.* at 5.

which is filed with OED.[3] If such action is taken with OED, a copy of the action should be included with the renewed petition.

Petitioner is reminded that 37 C.F.R § 11.803(a) sets forth, *in toto*:

> Reporting professional misconduct.
>
> (a) A practitioner who knows that another practitioner has committed a violation of the USPTO Rules of Professional Conduct that raises a substantial question as to that practitioner's honesty, trustworthiness or fitness as a practitioner in other respects, shall inform the OED Director and any other appropriate professional authority.

Second, **Petitioner has not specified which maintenance fee(s) she is alleging Mr. Lin to have missed**, since the 7½-year maintenance fee was missed and then the window for submitting the 11½-year maintenance fee opened on October 12, 2021, which is prior to patentee's discovery on May 25, 2022.

Third, **the record lacks an explanation of why Mr. Lin did not submit the 7½-year maintenance fee.**

Moreover, the window for paying the 11½-year maintenance fee opened on October 12, 2021, prior to the filing of the initial petition pursuant to 37 C.F.R. § 1.378(b) on July 12, 2022, and the window closed on October 12, 2022, on the same day the decision dismissing the initial petition issued. As such, **it seems that the patentee and/or Petitioner's law firm would have been aware that the 11½-year maintenance fee was coming due, so it is unclear why the initial petition pursuant to 37 C.F.R. § 1.378(b) contains no mention of the 11½-year maintenance fee, and why no supplement to the initial petition was received as the closure of the window approached.** It is noted were the initial petition found to satisfy every requirement of 37 C.F.R. § 1.378(b) in regards to the 7½-year maintenance fee, the patent would have remained expired for failure to have timely submitted the 11½-year maintenance fee.

Fourth, **the record lacks an explanation of the circumstances surrounding the patentee's discovery on May 25, 2022 that this patent has expired.**

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3 The telephone number for OED is 571-272-4097. The fax number is 571-273-0074, and the mailing address is Mail Stop OED, U.S. Patent and Trademark Office, PO Box 1450, Alexandria, Virginia 22313-1450.

Moreover, Petitioner has stated this expired patent is one of 16 patents that expired as a result of Mr. Lin's failure to make required maintenance fee payments on behalf of the patentee. Since the payment of 16 maintenance fees constitutes a significant financial expenditure, **it seems the patentee would have noticed as time went on that no bills from Mr. Lin for this significant financial expenditure were received.**

Still further, **the timeline of when these bills would have been received had the maintenance fees been paid, as well as how this factors into the May 25, 2022 discovery, is not clear.**

Any request for reconsideration of this decision must be filed within **TWO MONTHS** of the mailing date of this decision. Extensions of time under 37 C.F.R. § 1.136(a) are not permitted.

The reply should include a cover letter entitled "Renewed Petition pursuant to 37 C.F.R. § 1.378(b)". This is not a final agency action within the meaning of 5 U.S.C § 704.

The two petition fees and the 7½-year maintenance fee have been received and need not be resubmitted.

How to respond to this decision:

The response to this decision should indicate in a prominent manner that the attorney handling this matter is Paul Shanoski, and may be submitted by mail, hand delivery, facsimile, or via EFS-Web.

- Mail: Mail Stop Petition, Commissioner for Patents, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA, 22313-1450.

  If responding by mail, Petitioner is advised not to place the undersigned's name on the envelope. Only the information that appears in the footnote should be included – adding anything else to the address will delay the delivery of the response to the deciding official.

- Hand delivery: Customer Window, Randolph Building, 401 Dulany Street, Alexandria, VA, 22314.

- Facsimile: (571) 273-8300: please note this is a central facsimile number.

- EFS-Web: Registered users of EFS-Web may alternatively submit a response to this decision via EFS-Web. When filing via EFS-Web the user must select from the list of document descriptions to specify the files being submitted via EFS-Web. Based on the document description selected by the user, a document code is assigned, and a message regarding the document submitted to the USPTO will be forwarded to the appropriate organization for processing and to the appropriate official for consideration: therefore, accurate document indexing is important to facilitate efficient processing and proper consideration of the document by the USPTO. It is important for users to select the correct document description and check the application file via PAIR after the submission is completed.

Any questions concerning this matter may be directed to Attorney Advisor Paul Shanoski at (571) 272-3225.[4]

/Paul Shanoski/
Paul Shanoski
Attorney Advisor
Office of Petitions

4 Petitioner will note that all practice before the Office should be in writing, and the action of the Office will be based exclusively on the written record in the Office. *See* 37 C.F.R. § 1.2. As such, Petitioner is reminded that no telephone discussion may be controlling or considered authority for any further action(s) of Petitioner.

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

Docket Number (Optional): 101302-00016

Mail to: **Mail Stop Petition**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

NOTE: If information or assistance is needed in completing this form, please contact the Office of Petitions at (571) 272-3282.

Patent No. 7812409 Application Number 11633366

Issue Date October 12, 2010 Filing Date December 4, 2006

CAUTION: Maintenance fee payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

Also complete the following information, if applicable.

The above-identified patent

☐ is a reissue of original Patent No. _____ original issue date _____

original application number _____

original filing date _____.

☐ resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____

filed on _____.

NOTE: A grantable petition requires the following items:

(1) Petition fee;
(2) Maintenance fee; and
(3) Statement that the delay in payment of the maintenance fee was unintentional.

CERTIFICATE OF MAILING OR TRANSMISSION (37 CFR 1.8(a))

I hereby certify that this paper (* along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or being transmitted to the U.S. Patent and Trademark Office by EFS-Web, or by facsimile to (571) 273-8300, on the date shown below.

October 28, 2022
Date

/Laura Moskowitz/
Signature

Laura Moskowitz
Typed or Printed Name of Person Signing Certificate

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0016. Public burden for this form is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

1. SMALL ENTITY

☑ Patentee asserts, or has previously asserted, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MICRO ENTITY

☐ Patentee certifies, or has previously certified, micro entity status. See 37 CFR 1.29
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

4. LOSS OF ENTITLEMENT TO MICRO ENTITY STATUS

☐ Patentee is no longer entitled to micro entity status. See 37 CFR 1.29(i).

5. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

Undiscounted			Small Entity			Micro Entity		
Amount	Fee	(Code)	Amount	Fee	(Code)	Amount	Fee	(Code)
☐ $	3½ yr fee	(1551)	☐ $	3½ yr fee	(2551)	☐ $	3½ yr fee	(3551)
☐ $	7½ yr fee	(1552)	☑ $ 1,880.00	7½ yr fee	(2552)	☐ $	7½ yr fee	(3552)
☐ $	11½ yr fee	(1553)	☑ $ 3,850.00	11½ yr fee	(2553)	☐ $	11½ yr fee	(3553)

MAINTENANCE FEE BEING SUBMITTED $ 5,730.00

6. PETITION FEE

The petition fee required by 37 CFR 1.17(m) of:

$ _____ Undiscounted (Fee Code 1558); or
$ 1,050.00 Small Entity (Fee Code 2558); or
$ _____ Micro Entity (Fee Code 3558)

$1050 X 2 = $2100.00

must be paid as a condition of accepting an unintentionally delayed payment of a maintenance fee.

PETITION FEE BEING SUBMITTED $ 2100.00

7. MANNER OF PAYMENT

☐ Enclosed is a check for the sum of $ _____
☑ Please charge Deposit Account No. 041061 the sum of $ $7,830.00
☐ Payment by credit card. Form PTO-2038 is attached.
☐ Payment made via EFS-Web.

8. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☑ The Director is hereby authorized to charge any maintenance fee or petition deficiency to Deposit Account No. 041061

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

9. OVERPAYMENT

As to any overpayment made, please

☑ Credit to Deposit Account No. 041061

OR

☐ Send refund check

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information, such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form (PTO-2038) submitted for payment purposes), is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioner/applicant should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms (PTO-2038) submitted for payment purposes are not retained in the application file and therefore are not publicly available.

10. STATEMENT

The delay in payment of the maintenance fee for this patent was unintentional.

Petitioner is reminded that a delay resulting from a deliberately chosen course of action or a change in circumstance is not an unintentional delay.

Petitioner is further reminded that a person seeking reinstatement of an expired patent should not make a statement that the delay in payment of the maintenance fee was unintentional unless the entire delay was unintentional, including the period from discovery that the maintenance fee was not timely paid until payment of the maintenance fee. For example, a statement that the delay in payment of the maintenance fee was unintentional would not be proper when the patentee becomes aware of an unintentional failure to timely pay the maintenance fee and then intentionally delays filing a petition for reinstatement of the patent under 37 CFR 1.378. See MPEP 2590.

NOTE: Where the petition under 37 CFR 1.378 is filed more than two years after the date the patent expired for nonpayment of the maintenance fee, the United States Patent and Trademark Office requires an additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional. This requirement is in addition to the requirement to provide a statement that the entire delay was unintentional. See *Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications and Patents Based on Unintentional Delay*, 85 FR 12222 (March 2, 2020). See MPEP 711.03(c)(II)(C)-(F) for additional guidance on the information required to establish that the entire delay was unintentional.

☑ Because this petition under 37 CFR 1.378 is being filed more than two years after the date the patent expired for nonpayment of the maintenance fee, additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional is enclosed herewith.

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

11. PETITIONER REQUESTS THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT BE REINSTATED.

October 28, 2022
Date

/Laura Moskowitz/
Signature(s) of Petitioner

55,470
Registration Number, if applicable

Laura Moskowitz
Typed or Printed Name

(202) 659-6941
Telephone Number

1825 Eye St. N.W., Suite 900
Address

Washington, DC 20006
Address

37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with § 1.33(b)."

12. ENCLOSURES

- [x] Maintenance Fee Payment
- [x] Petition fee under 37 CFR 1.17(m) (fee for filing the maintenance fee petition)
- [x] Additional sheet(s) containing statement establishing unintentional delay
- [ ] Other: _____

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects this information under authority of 5 CFR 1.290. The information in this system of records is used to manage all records of applicant including name, citizenship, residence, post office address and other information with respect to inventors and their legal representatives pertaining to the applicant's activities in connection with the invention for which a patent is sought. This information is protected from disclosure to third parties in accordance with the Privacy Act.

However, routine uses of this information may include disclosure to the following: to law enforcement and investigation in the event that the system of records indicates a violation or potential violation of law; to a Federal, state, local, or international agency, in response to its request; to an agency, organization, or individual for the purpose of performing audit or oversight operations as authorized by law; to non-federal personnel under contract to the agency; to a court for adjudication and litigation; to the Department of Justice for Freedom of Information Act (FOIA) assistance; to members of congress working on behalf of an individual; to the Office of Personnel Management (OPM) for personnel research purposes; to National Archives and Records Administration for inspection of records; and to the Office of Management and Budget (OMB)for legislative coordination and clearance. Failure to provide any part of the requested information may result in an inability to process requests for access and information. The applicable Privacy Act System of Records Notice for this information is COMMERCE/PAT-TM-7 Patent Application Files, available at Federal Register / Vol. 78, No. 61 / Friday, March 29, 2013 /Notices 19243. https://www.govinfo.gov/content/pkg/FR-2013-03-29pdf/2013-07341.pdf

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Docket No: 101032-00016

Fwa-Iuan Hshieh, et al.

Patent No.: 7,812,409 Confirmation No.: 2119

Issued: October 12, 2010

For: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

PETITION FOR ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEES UNDER 37 C.F.R. § 1.378(b) FOR AN UNINTENTIONAL DELAY

MAIL STOP PETITION
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

I. Introduction: As provided for in the below remarks, and as supported by the information in the attached Exhibits A-E, Patentee (Force-MOS Technology Corporation (*see* **Exhibit D**)) respectfully requests revival and reinstatement of each of the "subject patents" for at least the following reasons.

The subject patents include sixteen U.S. Patents: U.S. Patent No. 8,389,354; U.S. Patent No. 8,461,001; U.S. Patent No. 8,159,021; U.S. Patent No. 7,960,787; U.S. Patent No. 8,022,471; U.S. Patent No. 7,863,685; U.S. Patent No. 8,058,670; U.S. Patent No. 7,800,185; U.S. Patent No. 7,929,321; U.S. Patent No. 7,646,058; U.S. Patent No. 7,812,409; U.S. Patent No. 7,511,357; U.S. Patent No. 7,612,407; U.S. Patent No. 7,816,729; U.S. Patent No. 7,633,121; and U.S. Patent No. 8,252,645 (*see* **Exhibit A**).

The Exhibits include:

Exhibit A: Application and patent information for each of the subject patents;

Exhibit B: Issue Fee payment documentation for each of the subject patents;

Exhibit C: Maintenance Fee payments for particular ones of the subject patents; and

Exhibit D: Assignment data for each of the subject patents.

The Patentee, and as a result, each of the subject patents, suffered an unintentional delay in the payment of the 3.5, 7.5, and/or 11.5 year Maintenance Fees due to the gross misconduct of the patent agent of record at the time the fees were due. That is, each of the subject patents suffered from the previous practitioner's error in 1) not properly paying the fees; and 2) not alerting the Patentee as to the requirement and delinquency of the fee payments. As a result, as evidenced by the information in **Exhibit B**, each of the subject patents issued pursuant to a properly and timely-paid Issue Fee payment. However, each of the subject patents subsequently expired due to nonpayment of the Maintenance Fees under 37 C.F.R. § 1.362 (*see* **Exhibit A**).

At the time the non-paid fees were due in each of the subject patents, the Patentee had retained and relied upon the following patent agent to prosecute the subject patents:

Bo-In Lin (Reg. no. 33,948)
13445 Mandoli Drive
Los Altos Hills, CA 94022

New Powers of Attorney have been filed in each of the subject patents, and in each of the subject patents have been granted to the following attorneys, which include the undersigned:

35161 - DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006
UNITED STATES

II. Governing Law: Under 37 C.F.R. § 1.378(b), any petition to accept an unintentionally delayed payment of a Maintenance Fee must include: (1) The required Maintenance Fee set forth in §1.20(e) through (g); (2) the petition fee as set forth in §1.17(m); and (3) A statement that the delay in payment of the Maintenance Fee was unintentional."

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EX1002.168

PETITION FOR ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEES UNDER 37 C.F.R. § 1.378(b) FOR AN UNINTENTIONAL DELAY

It is noted that, under 37 C.F.R. § 1.378(b), "The director may require additional information where there is a question whether the delay was unintentional." In the present case, the Patentee provides the additional information herein.

As noted in MPEP §2590, "If multiple Maintenance Fees due on a single patent have not been paid, a separate petition fee is required for each delayed Maintenance Fee payment. A statement that the delay in payment of the Maintenance Fee was unintentional is also required with respect to each delayed Maintenance Fee payment. While the Patentee can include the statements of unintentional delay in a single petition (if desired), a separate petition fee is required for each delayed Maintenance Fee payment."

As discussed in MPEP §711.03(c), the "unintentional delay" standard, "[w]hile the Office reserves the authority to require further information concerning the cause of abandonment and delay in filing a petition to revive, the Office relies upon the applicant's duty of candor and good faith and accepts the statement that 'the entire delay in filing the required reply from the due date for the reply until the filing of a grantable petition pursuant to 37 CFR 1.137(a) was unintentional' without requiring further information in the vast majority of petitions under 37 CFR 1.137(a). This is because the applicant is obligated under 37 CFR 11.18 to inquire into the underlying facts and circumstances when a practitioner provides this statement to the Office. In addition, providing an inappropriate statement in a petition under 37 CFR 1.137(a) to revive an abandoned application may have an adverse effect when attempting to enforce any patent resulting from the application. *See* Lumenyte Int'l Corp. v. Cable Lite Corp., Nos. 96-1011, 96-1077, 1996 U.S. App. LEXIS 16400, 1996 WL 383927 (Fed. Cir. July 9, 1996) (unpublished) (patents held unenforceable due to a finding of inequitable conduct in submitting an inappropriate statement that the abandonment was unintentional). The Office is almost always

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EX1002.169

satisfied as to whether 'the entire delay…was unintentional' on the basis of statement(s) by the applicant or representative explaining the cause of the delay (accompanied at most by copies of correspondence relevant to the period of delay)."

III. Remarks: The Patentee respectfully submits that the Patentee suffered unintentional delays in the payments of the required Maintenance Fees for the subject patents due to the hidden, and potentially concealed failures of Mr. Lin.

As evidenced in Exhibits A and B, Mr. Lin properly and timely paid the Issue Fees for each of the subject patents. This established and evidences the precedent that Mr. Lin was responsible for, and would properly and timely handle the post grant fees for each of the subject patents.

Specifically, Mr. Lin timely paid the required Issue Fees for the subject patents during a time period beginning on March 31, 2009 and up to and including June 11, 2013. Having paid the Issue fees for each of the subject patents, Mr. Lin then timely paid the 3.5 year Maintenance Fees for the '729 patent, the '121 patent, the '357 patent, the '409 patent, the '185 patent, the '058 patent, and the '021 patent (*see* **Exhibits A and C**). These payments spanned the time period beginning on April 1, 2013 to and including April 6, 2016. This concluded the Maintenance Fee payments by Mr. Lin.

It is noted that Mr. Lin never contacted the Patentee regarding the expiration of any of the subject patents. The Patentee has no reason to think, believe, or suspect that any of the subject patents for which the Issue Fees were paid were delinquent, expired, or about to be expired, or that any required Maintenance Fees were not paid. The Patentee and Mr. Lin, as is standard with patent agent-client relationships, had agreed that Mr. Lin would handle all required payments,

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EX1002.170

and would alert the Patentee of any issue that arose during the life of each of the subject patents. No such alert, indication, or communication otherwise was provided to the Patentee.

On May 25, 2022, the Patentee discovered that the subject patents were expired. At that time, the Patentee immediately engaged an attorney from the law firm Dickinson Wright, PLLC to investigate the file history of each of the subject patents and to prepare this petition.

A Power of Attorney to Dickinson Wright, a petition under 37 C.F.R. § 1.378(b), and an authorization to charge deposit account 04-1061 (of Dickinson Wright), for each of the overdue Maintenance Fees as well as all petition fees, were filed in each of the subject patents in July, 2022. These are of record in the file history of each of the subject patents. However, the attorney who signed the authorizations to charge the deposit account, Mr. Nicholas Martin, left Dickinson Wright prior to the USPTO Petitions Department attempting to charge the deposit account. At the time of signing and filing the authorizations to charge the deposit account, Mr. Martin was duly listed as an authorized user of the deposit account. However, upon leaving Dickinson Wright, Mr. Martin was removed from the deposit account, as is common practice when an attorney leaves a law firm associated with a USPTO deposit account. Unfortunately, at the time Mr. Martin was removed from the deposit account, the USPTO Petitions Department had not yet attempted to charge the deposit account for the fees due.

For this reason, this petition is being re-submitted and executed, along with the requisite authorization to charge the deposit account, by the undersigned, who is duly authorized on the deposit account.

IV. Conclusion: In view of at least the above, the Patentee respectfully submits that the failure to pay the Maintenance Fees up until this time was unintentional with respect to each of the subject patents.

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EX1002.171

PETITION FOR ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEES UNDER 37 C.F.R. § 1.378(b) FOR AN UNINTENTIONAL DELAY

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 04-1061. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/Laura Moskowitz /

_____

Laura Moskowitz, reg. no. 55,470

Dickinson Wright PLLC
1825 Eye St. N.W. Suite 900
Washington, D.C. 20006
202-457-0160

Date: October 28, 2022

uPI Semiconductor Corp.
EX1002.172

EXHIBIT A

Country	Patent No.	Application No.	Status	Title	Inventor	Assignee	Reason for Non-Acceptance	Filing Date	Issue Date	Prior MF Paid	Patent Bib. Info/Correspondence Address
US	**8389354**	12383247	*Expired - Fee Related*	TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)	Patent expired on 03/05/2017 due to non-payment of maintenance fee	3/19/2009	3/5/2013	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**8461001**	12653131	*Expired - Fee Related*	METHODS FOR MANUFACTURING TRENCH MOSFET WITH IMPLANTED DRIFT REGION	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (TW)	Patent expired on 06/11/2017 due to non-payment of maintenance fee	12/2/2009	6/11/2013	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**8159021**	12070853	*Expired - Fee Related*	TRENCH MOSFET WITH DOUBLE EXPITAXIAL STRUCTURE	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (TW)	Patent expired on 04/17/2020 due to non-payment of maintenance fee	2/20/2008	4/17/2012	4/8/2016, 3.5 Y	Bo-In Lin (13445 Mandoli Dr)
US	**7960787**	12291365	*Expired - Fee Related*	CONFIGURATION OF TRENCHED SEMICONDUCTOR POWER DEVICE TO REDUCE MASKED PROCESS	Fwa-Iuan Hshieh	Force-MOS Technology Corporation	Patent expired on 06/14/2015 due to non-payment of maintenance fee	11/7/2008	6/14/2011	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**8022471**	12319188	*Expired - Fee Related*	TRENCH METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET) WITH LOW GATE TO DRAIN COUPLED CHARGES (Qgd) STRUCTURES	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)	Patent expired on 09/20/2015 due to non-payment of maintenance fee	12/31/2008	9/20/2011	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**7863685**	12156070	*Expired - Fee Related*	TRENCH MOSFET WITH EMBEDDED JUNCTION BARRIER SHOTTKY DIODE	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (TW)	Patent expired on 01/04/2015 due to non-payment of maintenance fee	5/28/2008	1/4/2011	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**7929321**	12229470	*Expired - Fee Related*	DEPLETION MODE TRENCH MOSFET FOR IMPROVED EFFICIENCY OF DC/DC CONVERTER APPLICATIONS	Fwu-Iuan Hshieh	Force-Mos Technology Corp (KY)	Patent expired on 04/19/2015 due to non-payment of maintenance fee	8/22/2008	4/19/2011	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**7646058**	11810327	*Expired - Fee Related*	DEVICE CONFIGURATION AND METHOD TO MANUFACTURE TRENCH MOSFET WITH SOLDERABLE FRONT METAL	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)	Patent expired on 01/12/2018 due to non-payment of maintenance fee	6/5/2007	1/12/2010	1/13/2014, 3.5 Y	Bo-In Lin (13445 Mandoli Dr)
US	**8058670**	12455744	*Expired - Fee Related*	INSULATED GATE BIPOLAR TRANSISTOR (IGBT) WITH MONOLITHIC DEEP BODY CLAMP DIODE TO PREVENT LATCH-UP	Fwu-Iuan Hshieh	Force-MOS Technology Corporation	Patent expired on 12/14/2015 due to non-payment of maintenance fee	6/4/2009	12/9/2010	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**7800185**	11699256	*Expired - Fee Related*	CLOSED TRENCH MOSFET WITH FLOATING TRENCH RINGS AS TERMINATION	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)	Patent expired on 09/21/2018 due to non-payment of maintenance fee	1/28/2007	9/21/2010	9/22/2014, 3.5 Y	Bo-In Lin (13445 Mandoli Dr)
US	**7812409**	11633366	*Expired - Fee Related*	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)	Patent expired on 10/12/2018 due to non-payment of maintenance fee	12/4/2006	10/12/2010	10/14/2014, 3.5 Y	Bo-In Lin (13445 Mandoli Dr)
US	**8252645**	12462748	*Expired - Fee Related*	METHOD OF MANUFACTURING TRENCHED MOSFETS WITH EMBEDDED SCHOTTKY IN THE SAME CELL	Fwu-ruan Hshieh	Force-MOS Technology Corporation	Patent expired on 09/26/2016 due to non-payment of maintenance fee	8/7/2009	12/10/2009	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**7511357**	11788497	*Expired - Fee Related*	TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)	Patent expired on 03/31/2017 due to non-payment of maintenance fee	4/20/2007	3/31/2009	4/1/2013, 3.5 Y	Bo-In Lin (13445 Mandoli Dr)
US	**7612407**	11519754	*Expired - Fee Related*	TRENCHED MOSFET DEVICE CONFIGURATION WITH REDUCED MASK PROCESSES	Fwu-Juan Hshieh	Force-MOS Technology Corp. Ltd. (KY)	Patent expired on 11/03/2013 due to non-payment of maintenance fee	9/11/2006	10/3/2009	n/a	Bo-In Lin (13445 Mandoli Dr)
US	**7633121**	11981072	*Expired - Fee Related*	TRENCH MOSFET WITH IMPLANTED DRIFT REGION	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (TW)	Patent expired on 12/15/2017 due to non-payment of maintenance fee	10/31/2007	12/15/2009	12/16/2013, 3.5 Y	Bo-In Lin (13445 Mandoli Dr)
US	**7816729**	11518729	*Expired - Fee Related*	TRENCHED MOSFET DEVICE WITH TRENCHED CONTACTS	Fwu-Iuan Hshieh	Force-MOS Technolocy Corp., LTD.	Patent expired on 11/26/2018 due to non-payment of maintenance fee	9/10/2006	10/19/2010	10/20/2014, 3.5 y	Bo-In Lin (13445 Mandoli Dr)

EXHIBIT B

Issue Fee Payment documentation for each subject patent.

Patent No.	Application No.
8389354	12383247
8461001	12653131
8159021	12070853
7960787	12291365
8022471	12319188
7863685	12156070
7929321	12229470
7646058	11810327
8058670	12455744
7800185	11699256
7812409	11633366
8252645	12462748
7511357	11788497
7612407	11519754
7633121	11981072
7816729	11518729

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

64381 7590 03/16/2012

BO-IN LIN
13445 MANDOLI DRIVE
LOS ALTOS HILLS, CA 94022

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO
12/383,247	03/19/2009	Fwu-Iuan Hshieh	FMOS-07002D	4418

TITLE OF INVENTION: TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$885	$300	$0	$1185	02/19/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
THOMAS, TONIAE M	2822	257-551000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
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(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Cayman Island, British West Indies

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
- ☒ Issue Fee
- ☒ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies

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- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature
Typed or printed name: Bo-In Lin
Date: February 6, 2013
Registration No.: 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 02/21/2013

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/653,131	12/09/2009	Fwu-Iuan Hshieh	FMOS-0707D	5445

TITLE OF INVENTION: METHODS FOR MANUFACTURING TRENCH MOSFET WITH IMPLANTED DRIFT REGION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$885	$300	$0	$1185	05/21/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
TRINH, MICHAEL MANH	2822	438-268000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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1 Bo-In Lin
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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Hsinchu, TAIWAN R.O.C.

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
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☒ Publication Fee (No small entity discount permitted)
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Authorized Signature _____ Date May 15, 2013

Typed or printed name Bo-In Lin Registration No. 33,948

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 01/06/2012

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022



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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
March 15, 2012	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/070,853	02/20/2008	Fwu-Iuan Hshich	FMOS-0709	2666

TITLE OF INVENTION: TRENCH MOSFET WITH DOUBLE EPITAXIAL STRUCTURE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$870	$300	$0	$1170	04/06/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
KLEIN, JORDAN M	2829	257-328000

03/19/2012 MBLANCO1 00000031 12070853
01 FC:2501 870.00 OP
02 FC:1504 300.00 OP

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

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1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Taiwan, R.O.C.

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

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Authorized Signature _____ Date March 15, 2012

Typed or printed name Bo-In Lin Registration No. 33,948

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05-06-11

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69481 7590 02/25/2011
BO-IN LIN
13445 MANDOLI DRIVE
LOS ALTOS HILLS, CA 94022

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Yii-Shyun Lin	(Depositor's name)
	(Signature)
May 5, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/291,365	11/07/2008	Fwa-Iuan Hshieh	FMOS-0803	3987

TITLE OF INVENTION: CONFIGURATION OF TRENCHED SEMICONDUCTOR POWER DEVICE TO REDUCE MASKED PROCESS

05/09/2011 EHAILU1 00000007 12291365
01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	05/25/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
DICKEY, THOMAS L	2826	257-330000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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Authorized Signature _____ Date May 5, 2011

Typed or printed name Bo-In Lin Registration No. 33,948

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69481 7590 06/09/2011
BO-IN LIN
13445 MANDOLI DRIVE
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Yii-Shyun Lin	(Depositor's name)
	(Signature)
August 11, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/319,188	12/31/2008	Fwu-Iuan Hshieh	FMOS-0804	8489

TITLE OF INVENTION: TRENCH METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET) WITH LOW GATE TO DRAIN COUPLED CHARGES (QGD) STRUCTURES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	09/09/2011

08/15/2011 SDENBG34 00000313 12319188

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, THANH T	2893	257-329000

01 FC:8021 755.00 OP
02 FC:8022 300.00 OP

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

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Authorized Signature _____ Date August 11, 2011

Typed or printed name Bo-In Lin Registration No. 33,948

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69481 7590 10/04/2010

BO-IN LIN
13445 MANDOLI DRIVE
LOS ALTOS HILLS, CA 94022

11/24/2010 HVUONG2 00000067 12156070

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

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Yi-Shyun Lin	(Depositor's name)
Yi-Shyun Li	(Signature)
November 23, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/156,070	05/28/2008	Fwu-Iuan Hshieh	FMOS-0801	2064

TITLE OF INVENTION: TRENCH MOSFET WITH EMBEDDED JUNCTION BARRIER SCHOTTKY DIODE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	01/04/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
LE, DUNG ANH	2818	257-368000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): TAIWAN R.O.C.

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
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☒ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date November 23, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

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P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 08/19/2011

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

09/27/2011 EEKUBAY2 00000033 12455744

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

OPAP IAP11 SEP 23 2011 PATENT & TRADEMARK OFFICE

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
September 23, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/455,744	06/04/2009	Fwu-Iuan Hshieh	FMOS-0902	3117

TITLE OF INVENTION: INSULATED GATE BIPOLAR TRANSISTOR (IGBT) WITH MONOLITHIC DEEP BODY CLAMP DIODE TO PREVENT LATCH-UP

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/21/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
MOORE, WHITNEY	2826	257-136000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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1 Bo-In Lin
2
3

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(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

FORCE_MOS TECHNOLOGY CORPORATION TAIWAN

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

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☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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Authorized Signature _____ Date September 23, 2011

Typed or printed name Bo-In Lin Registration No. 33,948

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7590 07/22/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

OPAP IAP4 AUG 06 2010 PATENT & TRADEMARK OFFICE

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Yii-Shyun Lin	(Depositor's name)
	(Signature)
August 6, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/699,256	01/28/2007	Fwu-Iuan Hshieh	FMOS-0701	6938

TITLE OF INVENTION: CLOSED TRENCH MOSFET WITH FLOATING TRENCH RINGS AS TERMINATION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	10/22/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
KIM, SU C	2823	438-242000

08/10/2010 MBELETE2 00000020 11699256
01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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1 Bo-In Lin
2
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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
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☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date August 6, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

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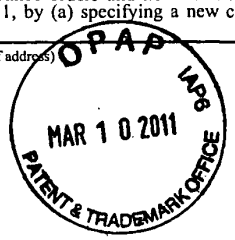
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69481 7590 01/06/2011

BO-IN LIN
13445 MANDOLI DRIVE
LOS ALTOS HILLS, CA 94022

03/11/2011 CCHAU2 00000069 12229470

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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
March 10, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/229,470	08/22/2008	Fwu-Iuan Hshieh	FMOS-0802	8882

TITLE OF INVENTION: DEPLETION MODE TRENCH MOSFET FOR IMPROVED EFFICIENCY OF DC/DC CONVERTER APPLICATIONS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	04/06/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
GUPTA, RAJ R	2814	257-365000

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1 Bo-In Lin
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(A) NAME OF ASSIGNEE: FORCE-MOS TECHNOLOGY CORP

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Cayman Island, British West Indies

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
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Authorized Signature _____ Date March 10, 2011

Typed or printed name Bo-In Lin Registration No. 33,948

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7590 11/16/2009

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

11/30/2009 CCHAU2 00000045 11810327

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02 FC:1504 300.00 OP



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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
November 24, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/810,327	06/05/2007	Fwu-Iuan Hshieh	FMOS-0704	2587

TITLE OF INVENTION: DEVICE CONFIGURATION AND METHOD TO MANUFACTURE TRENCH MOSFET WITH SOLDERABLE FRONT METAL

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	02/16/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
LIU, BENJAMIN T	2893	257-328000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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Authorized Signature _____ Date November 24, 2009

Typed or printed name Bo-In Lin Registration No. 33,948

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EX1002.184

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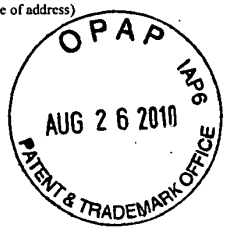
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7590 08/05/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

08/30/2010 CCHAU2 00000041 11633366

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP



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Certificate of Mailing or Transmission
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Yii-Shyun Lin	(Depositor's name)
	(Signature)
August 26, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshich	FMOS-0601	2119

TITLE OF INVENTION: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/05/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARROYO, TERESA M	2826	257-401000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bo-In Lin
2
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3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date August 26, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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PART B - FEE(S) TRANSMITTAL 02-18-09

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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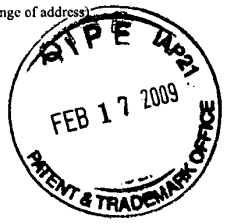
CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 02/10/2009

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

02/19/2009 CCHAU2 00000007 11788497

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP



Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
February 17, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/788,497	04/20/2007	Fwu-Iuan Hshieh	FMOS-0702	5816

TITLE OF INVENTION: TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	05/11/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
SOWARD, IDA M	2822	257-551000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 Bo-In Lin
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3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Grand Cayman, Cayman Island British West Indies

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
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☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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PTO/SB/21
FEB 17 2009
PATENT & TRADEMARK OFFICE

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh :Date: February 17, 2009
Serial No.: 11/788,497 :Group No.: 2822
Filed: April 20, 2007 :Examiner: Soward, Ida M.
Attorney Docket No.: FMOS-0702
Title: TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

To the Commissioner for Patents:

PAYMENT OF ISSUE FEE AND PUBLICATION FEE

In response to the examiner's Notice of Allowance and Fees Due mailed on February 10, 2009, a form PTO-2038 is enclosed for the amount of $1055.00, which includes $755.00 for the issuance fee (claiming small entity status) and $300.00 for the publication fee.

Respectfully submitted,
Fwu-Iuan Hshieh

By _____
Bo-In Lin, Attorney, Registration No. 33,948
13445 Mandoli Drive, Los Altos Hills, CA 94022
(650)949-0418(phone), (650)949-4118(fax)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Office Response Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on **February 17, 2009** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EH268665715US"** addressed to: Commissioner for Patents, P.O.Box 1450, Arlington, VA 22313-1450.

Yii-Shyun Lin
(Type or print name of person mailing papers)

_____
(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon to mailing. 37 CFR 1.10(b).

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
09/23/09
or Fax (571)-273-2885

SEP 22 2009

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 09/17/2009

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

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Yii-Shyun Lin	(Depositor's name)
	(Signature)
September 22, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/519,754	09/11/2006	Fwu-Juan Hshieh	HSHIEH-0602	7502

TITLE OF INVENTION: TRENCHED MOSFET DEVICE CONFIGURATION WITH REDUCED MASK PROCESSES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	12/17/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
AHMED, SELIM U	2826	257-330000

09/23/2009 CNGUYEN3 00000068 11519754
01 FC:2501 755.00 OP
02 FC:1504 300.00 OP

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 Bo-In Lin
2
3

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp. LTD
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Grand Cayman, Cayman Island

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
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4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
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5. **Change in Entity Status** (from status indicated above)
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☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Authorized Signature _____ Date September 22, 2009

Typed or printed name Bo-In Lin Registration No. 33,948

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PART B - FEE(S) TRANSMITTAL 08-30-10

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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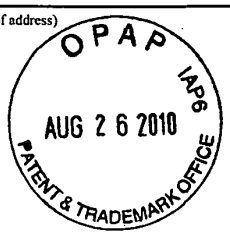
CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 08/19/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

08/30/2010 CCHAU2 00000042 11518729

01 FC:2501 755.00 OP
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Yii-Shyun Lin	(Depositor's name)
Yii-Shyun Lin	(Signature)
August 26, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/518,729	09/10/2006	Fwu-Iuan Hshich	HSHIEH-0601	4153

TITLE OF INVENTION: TRENCHED MOSFET DEVICE WITH TRENCHED CONTACTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/19/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
GUMEDZOE, PENIEL M	2891	257-330000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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1 Bo-In Lin
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3

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(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
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Authorized Signature _____ Date August 26, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

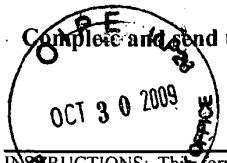
This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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uPI Semiconductor Corp.
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11-02-09

PART B - FEE(S) TRANSMITTAL



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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
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7590 10/20/2009

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

11/02/2009 HDESTA2 00000086 11981072

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Yii-Shyun Lin	(Depositor's name)
	(Signature)
October 30, 2009	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/981,072	10/31/2007	Fwu-Iuan Hshieh	FMOS-0707	8738

TITLE OF INVENTION: TRENCH MOSFET WITH IMPLANTED DRIFT REGION

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	01/20/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
DANG, PHUC T	2892	257-330000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): TAIWAN R.O.C.

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

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☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date October 30, 2009

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 04/25/2012

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/462,748	08/07/2009	Fwu-ruan Hshieh	FMOS-0703D	1413

TITLE OF INVENTION: METHOD OF MANUFACTURING TRENCHED MOSFETS WITH EMBEDDED SCHOTTKY IN THE SAME CELL

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$870	$300	$0	$1170	07/25/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
PICARDAT, KEVIN M	2822	438-259000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: FORCE_MOS TECHNOLOGY COPORATION

(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies: _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date July 24, 2012

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EX1002.191

EXHIBIT C

Maintenance Fee payments for particular subject patents.

Patent No.	Application No.
8389354	12383247
8461001	12653131
8159021	12070853
7960787	12291365
8022471	12319188
7863685	12156070
7929321	12229470
7646058	11810327
8058670	12455744
7800185	11699256
7812409	11633366
8252645	12462748
7511357	11788497
7612407	11519754
7633121	11981072
7816729	11518729

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Office of the Commissioner for Patents

TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8389354	12383247	03/19/2009	03/05/2013

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	03/05/2016	09/07/2016	03/06/2017	Closed	Unpaid
7.5 Year	03/05/2020	09/09/2020	03/05/2021	Not Open	Not Due
11.5 Year	03/05/2024	09/06/2024	03/05/2025	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

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UNITED STATES

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Office of the Commissioner for Patents

METHODS FOR MANUFACTURING TRENCH MOSFET WITH IMPLANTED DRIFT REGION

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8461001	12653131	12/09/2009	06/11/2013

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 06/11/2017 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	06/11/2016	12/13/2016	06/12/2017	Closed	Unpaid
7.5 Year	06/11/2020	12/12/2020	06/11/2021	Not Open	Not Due
11.5 Year	06/11/2024	12/12/2024	06/11/2025	Not Open	Not Due

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Entity Status SMALL

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Office of the Commissioner for Patents

TRENCH MOSFET WITH DOUBLE EPITAXIAL STRUCTURE

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8159021	12070853	02/20/2008	04/17/2012

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	04/17/2015	10/20/2015	04/18/2016	Closed	Paid
7.5 Year	04/17/2019	10/18/2019	04/17/2020	Closed	Unpaid
11.5 Year	04/17/2023	10/18/2023	04/17/2024	Not Open	Not Due

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Office of the Commissioner for Patents

CONFIGURATION OF TRENCHED SEMICONDUCTOR POWER DEVICE TO REDUCE MASKED PROCESS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7960787	12291365	11/07/2008	06/14/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	06/14/2014	12/16/2014	06/15/2015	Closed	Unpaid
7.5 Year	06/14/2018	12/15/2018	06/14/2019	Not Open	Not Due
11.5 Year	06/14/2022	12/15/2022	06/14/2023	Not Open	Not Due

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TRENCH METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET) WITH LOW GATE TO DRAIN COUPLED CHARGES (QGD) STRUCTURES

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8022471	12319188	12/31/2008	09/20/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 09/20/2015 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	09/20/2014	03/21/2015	09/21/2015	Closed	Unpaid
7.5 Year	09/20/2018	03/21/2019	09/20/2019	Not Open	Not Due
11.5 Year	09/20/2022	03/21/2023	09/20/2023	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

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TRENCH MOSFET WITH EMBEDDED JUNCTION BARRIER SCHOTTKY DIODE

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7863685	12156070	05/28/2008	01/04/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 01/04/2015 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	01/04/2014	07/08/2014	01/05/2015	Closed	Unpaid
7.5 Year	01/04/2018	07/06/2018	01/04/2019	Not Open	Not Due
11.5 Year	01/04/2022	07/06/2022	01/04/2023	Not Open	Not Due

Patent Holder Information

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Entity Status SMALL

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INSULATED GATE BIPOLAR TRANSISTOR (IGBT) WITH MONOLITHIC DEEP BODY CLAMP DIODE TO PREVENT LATCH-UP

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8058670	12455744	06/04/2009	11/15/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 11/15/2015 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	11/15/2014	05/16/2015	11/16/2015	Closed	Unpaid
7.5 Year	11/15/2018	05/16/2019	11/15/2019	Not Open	Not Due
11.5 Year	11/15/2022	05/16/2023	11/15/2023	Not Open	Not Due

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Entity Status SMALL

Phone Number 2024570160

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Office of the Commissioner for Patents

CLOSED TRENCH MOSFET WITH FLOATING TRENCH RINGS AS TERMINATION

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7800185	11699256	01/28/2007	09/21/2010

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	09/21/2013	03/22/2014	09/22/2014	Closed	Paid
7.5 Year	09/21/2017	03/23/2018	09/21/2018	Closed	Unpaid
11.5 Year	09/21/2021	03/22/2022	09/21/2022	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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EX1002.200

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DEPLETION MODE TRENCH MOSFET FOR IMPROVED EFFICIENCY OF DC/DC CONVERTER APPLICATIONS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7929321	12229470	08/22/2008	04/19/2011

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 04/19/2015 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	04/19/2014	10/21/2014	04/20/2015	Closed	Unpaid
7.5 Year	04/19/2018	10/20/2018	04/19/2019	Not Open	Not Due
11.5 Year	04/19/2022	10/20/2022	04/19/2023	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

Address DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
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EX1002.201

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DEVICE CONFIGURATION AND METHOD TO MANUFACTURE TRENCH MOSFET WITH SOLDERABLE FRONT METAL

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7646058	11810327	06/05/2007	01/12/2010

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	01/12/2013	07/13/2013	01/13/2014	Closed	Paid
7.5 Year	01/12/2017	07/13/2017	01/12/2018	Closed	Unpaid
11.5 Year	01/12/2021	07/13/2021	01/12/2022	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

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TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7812409	11633366	12/04/2006	10/12/2010

Payment Window Status

Patent expired on 10/12/2018 due to non-payment of maintenance fee.

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	10/12/2013	04/15/2014	10/14/2014	Closed	Paid
7.5 Year	10/12/2017	04/13/2018	10/12/2018	Closed	Unpaid
11.5 Year	10/12/2021	04/13/2022	10/12/2022	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

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Office of the Commissioner for Patents

TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7511357	11788497	04/20/2007	03/31/2009

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	03/31/2012	10/02/2012	04/01/2013	Closed	Paid
7.5 Year	03/31/2016	10/01/2016	03/31/2017	Closed	Unpaid
11.5 Year	03/31/2020	10/01/2020	03/31/2021	Not Open	Not Due

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Patent Holder Information

Customer # 35161

Entity Status SMALL

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Office of the Commissioner for Patents

TRENCHED MOSFET DEVICE CONFIGURATION WITH REDUCED MASK PROCESSES

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7612407	11519754	09/11/2006	11/03/2009

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	11/03/2012	05/04/2013	11/04/2013	Closed	Unpaid
7.5 Year	11/03/2016	05/04/2017	11/03/2017	Not Open	Not Due
11.5 Year	11/03/2020	05/04/2021	11/03/2021	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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TRENCHED MOSFET DEVICE WITH TRENCHED CONTACTS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7816729	11518729	09/10/2006	10/19/2010

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	10/19/2013	04/22/2014	10/20/2014	Closed	Paid
7.5 Year	10/19/2017	04/20/2018	10/19/2018	Closed	Unpaid
11.5 Year	10/19/2021	04/20/2022	10/19/2022	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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TRENCH MOSFET WITH IMPLANTED DRIFT REGION

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7633121	11981072	10/31/2007	12/15/2009

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	12/15/2012	06/18/2013	12/16/2013	Closed	Paid
7.5 Year	12/15/2016	06/16/2017	12/15/2017	Closed	Unpaid
11.5 Year	12/15/2020	06/16/2021	12/15/2021	Not Open	Not Due

Petition is pending decision. Maintenance fees cannot be processed on this page at this time.

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

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SUITE 900
WASHINGTON, DC 20006
UNITED STATES

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United States Patent and Trademark Office
Office of the Commissioner for Patents

METHOD OF MANUFACTURING TRENCHED MOSFETS WITH EMBEDDED SCHOTTKY IN THE SAME CELL

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
8252645	12462748	08/07/2009	08/28/2012

Payment Window Status

WINDOW	STATUS	FEES
3.5 Year	Closed	Unpaid

Patent expired on 08/28/2016 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	08/28/2015	03/01/2016	08/29/2016	Closed	Unpaid
7.5 Year	08/28/2019	02/29/2020	08/28/2020	Not Open	Not Due
11.5 Year	08/28/2023	02/29/2024	08/28/2024	Not Open	Not Due

Patent Holder Information

Customer # 35161

Entity Status SMALL

Phone Number 2024570160

Address DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006
UNITED STATES

EXHIBIT D

Assignment Data for each of the subject patents

Patent No.	**Application No.**	**Assignment Recordation Date**	**Reel/Frame**
8,389,354	12/383,247	Jul 14, 2022	060508/0867
8,461,001	12/653,131	Dec 9, 2009	023671/0511
8,159,021	12/070,853	Feb 20, 2008	020598/0604
7,960,787	12/291,365	Nov 7, 2008	012880/0903
8,022,471	12/319,188	Dec 31, 2008	022115/0119
7,863,685	12/156,070	May 28, 2008	021072/0282
8,058,670	12/455,744	Jun 4, 2009	022845/0902
7,800,185	11/699,256	Jan 28, 2007	018858/0947
7,929,321	12/229,470	Aug 22, 2008	021482/0773
7,646,058	11/810,327	Jun 5, 2007	019438/0898
7,812,409	11/633,366	Dec 4, 2006	018666/0118
7,511,357	11/788,497	Apr 20, 2007	019273/0651
7,612,407	11/519,754	Sep 11, 2006	018308/0892
7,816,729	11/518,729	Sep 10, 2006	018288/0790
7,633,121	11/981,072	Oct 31, 2007	020129/0966
8,252,645	12/462,748	Aug 7, 2009	023112/0422

Electronic Acknowledgement Receipt

EFS ID:	46915276
Application Number:	11633366
International Application Number:	
Confirmation Number:	2119
Title of Invention:	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS
First Named Inventor/Applicant Name:	Fwu-luan Hshieh
Customer Number:	35161
Filer:	Laura Moskowitz/Beatrice Zepeda
Filer Authorized By:	Laura Moskowitz
Attorney Docket Number:	101302-00016
Receipt Date:	28-OCT-2022
Filing Date:	04-DEC-2006
Time Stamp:	13:03:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review by the Office of Petitions	101302-16-7812409_sb0066_LEM.pdf	350165 430aee5acfc18760f5c0ccb9a8490ae0aabe2b61	no	5

Warnings:

Information:					
2	Petition for review by the Office of Petitions	101302-16-7812409_supporting_docs_LEM.pdf	2077638 4ee47dcef2d27aeb1eed156cd509496fa23a1267	no	43
Warnings:					
Information:					
		Total Files Size (in bytes):	2427803		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	101302-0005	2119

35161 7590 10/12/2022

DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006

EXAMINER	
ARROYO, TERESA M	

ART UNIT	PAPER NUMBER
2826	

NOTIFICATION DATE	DELIVERY MODE
10/12/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dwpatents@dickinsonwright.com

uPI Semiconductor Corp.
EX1002.212

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Patent No. 7,812,409 Issue Date: 12 Oct 2010 Application No. 11/633,366 Filing or 371(c) Date: 4 Dec 2006 Attorney Docket No. 101302-0005	:	DECISION ON PETITION

This is a decision on the petition pursuant to 37 C.F.R. § 1.378(b) to accept the unintentionally delayed payment of a maintenance fee for the above-identified patent, filed July 12, 2022.

The petition pursuant to 37 C.F.R. § 1.378(b) is **DISMISSED.**

As a preliminary matter, Petitioner will note "[t]he Office is…revising the rules of practice pertaining to the revival of abandoned applications (37 CFR 1.137) and acceptance of delayed maintenance fee payments (37 CFR 1.378) to provide for the revival of abandoned applications and acceptance of delayed maintenance fee payments solely on the basis of 'unintentional' delay. The PLTIA eliminates the provisions of the patent statutes relating to revival of abandoned applications or acceptance of delayed maintenance fee payments on the basis of a showing of 'unavoidable' delay." The effective date of this change is December 18, 2013. *Changes To Implement the Patent Law Treaty*, Final Rule 78 FR 62368 (Oct. 21, 2013), viewable here: http://www.gpo.gov/fdsys/pkg/FR-2013-10-21/pdf/2013-24471.pdf

Accordingly, the Office no longer revives applications or reinstates patents based on unavoidable delay.

The application from which this patent issued matured into U.S. patent number 7,812,409 on October 12, 2010. The grace period for paying the 7½-year maintenance fee provided in 37 C.F.R.

§ 1.362(e) expired at midnight on October 12, 2018, with no payment received. Accordingly, the patent expired on October 12, 2018 at midnight.

A grantable petition pursuant to 37 C.F.R. § 1.378(b) must be accompanied by:

(1) The required maintenance fee set forth in § 1.20(e) through (g);
(2) The petition fee as set forth in § 1.17(m); and,
(3) A statement that the delay in payment of the maintenance fee was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

With this petition, neither the petition fee nor the maintenance fee has been received. Petitioner provided an instruction to charge each of these fees to Deposit Account number 04-1061. The USPTO attempted to charge these fees to this Deposit Account on September 29, 2022 but was unable to do so since Petitioner is not listed as an authorized user of Deposit Account number 04-1061.

For this reason, the USPTO is unable to treat this petition on the merits. It follows that this petition must be **DISMISSED.**

The USPTO requires additional information concerning whether a delay in seeking acceptance of a delayed maintenance fee payment. See *Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications and Patents Based on Unintentional Delay*, 85 FR 12222 (March 2, 2020).

In this instance, a petition under 37 C.F.R. § 1.378 was filed more than two years after the date of expiration for nonpayment of a maintenance fee. Therefore, Petitioner must provide sufficient information of the facts and circumstances surrounding the entire delay to support a conclusion that the entire delay was unintentional. *Id.* at 12223.

When seeking reinstatement of an expired patent, a petitioner should not make a statement that the delay in payment of the maintenance fee was unintentional unless the entire delay was unintentional, including the period from discovering the maintenance fee was not timely paid until payment of the maintenance fee. For example, a statement that the delay in payment of the maintenance fee was unintentional would not be

proper when the petitioner becomes aware of an unintentional failure to timely pay the maintenance fee and then intentionally delays filing a petition for reinstatement of the patent under 37 C.F.R. § 1.378. *See* M.P.E.P. § 2590(I).

When addressing the delay, petitioner is reminded that an intentional course of action is not rendered unintentional when, upon reconsideration, the petitioner changes his or her mind as to the course of action that should have been taken. *See In re Maldague*, 10 USPQ2d 1477, 1478 (Comm'r Pat. 1988). Petitioner's failure to carry the burden of proof to establish that the "entire" delay was "unintentional" may lead to the denial of a petition under 37 C.F.R. § 1.378, regardless of the circumstances that originally resulted in the failure to timely pay the maintenance fee.

Petitioner should note that the party whose delay is relevant is the party having the right or authority to make the timely maintenance fee payment in the above-identified patent. When the entire right, title, and interest in patent have been assigned to a third party (and thus does not retain any legal or equitable interest in the invention), the delay of the patentee to whom the patent was issued is irrelevant in evaluating whether the delay was unintentional. *See Kim v. Quigg*, 718 F. Supp. 1280, 1284, 12 USPQ2d 1604, 1607-08 (E.D. Va. 1989). *See* M.P.E.P. § 711.03(c)(II)(C)-(F) for additional guidance on the information required to establish that the entire delay was unintentional.

Petitioner and the Patentee will need to address the entire period of delay on renewed petition, including the failure to have included both the petition fee and the maintenance fee with this initial petition received on July 12, 2022. Each is reminded that it is the entire period of delay which must be shown to have been unintentional, and this period begins on October 13, 2018 and ends with the filing of a grantable petition to reinstate this patent.

Any request for reconsideration of this decision **must** be filed within **TWO MONTHS** of the mailing date of this decision. Extensions of time under 37 C.F.R. § 1.136(a) are permitted.

The reply should include a cover letter entitled "Renewed Petition pursuant to 37 C.F.R. § 1.378(b)". This is not a final agency action within the meaning of 5 U.S.C § 704.

How to respond to this decision:

The response to this decision should indicate in a prominent manner that the attorney handling this matter is Paul Shanoski, and may be submitted by mail, hand delivery, facsimile, or via EFS-Web.

- Mail: Mail Stop Petition, Commissioner for Patents, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA, 22313-1450.

  If responding by mail, Petitioner is advised not to place the undersigned's name on the envelope. Only the information that appears in the footnote should be included – adding anything else to the address will delay the delivery of the response to the deciding official.

- Hand delivery: Customer Window, Randolph Building, 401 Dulany Street, Alexandria, VA, 22314.

- Facsimile: (571) 273-8300: please note this is a central facsimile number.

- EFS-Web: Registered users of EFS-Web may alternatively submit a response to this decision via EFS-Web. When filing via EFS-Web the user must select from the list of document descriptions to specify the files being submitted via EFS-Web. Based on the document description selected by the user, a document code is assigned, and a message regarding the document submitted to the USPTO will be forwarded to the appropriate organization for processing and to the appropriate official for consideration: therefore, accurate document indexing is important to facilitate efficient processing and proper consideration of the document by the USPTO. It is important for users to select the correct document description and check the application file via PAIR after the submission is completed.

Any questions concerning this matter may be directed to Attorney Advisor Paul Shanoski at (571) 272-3225.[1]

/Paul Shanoski/
Paul Shanoski
Attorney Advisor
Office of Petitions

1 Petitioner will note that all practice before the Office should be in writing, and the action of the Office will be based exclusively on the written record in the Office. *See* 37 C.F.R. § 1.2. As such, Petitioner is reminded that no telephone discussion may be controlling or considered authority for any further action(s) of Petitioner.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/633,366	12/04/2006	Fwu-Iuan Hshieh	101302-0005

CONFIRMATION NO. 2119

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

POWER OF ATTORNEY NOTICE

OC000000135111820

Date Mailed: 07/13/2022

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/11/2022.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/sltorres/

uPI Semiconductor Corp.
EX1002.218

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/633,366	12/04/2006	Fwu-Iuan Hshieh	101302-0005

CONFIRMATION NO. 2119

35161
DICKINSON WRIGHT PLLC - WASHINGTON, DC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006

POA ACCEPTANCE LETTER

OC000000135111873

Date Mailed: 07/13/2022

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/11/2022.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/sltorres/

uPI Semiconductor Corp.
EX1002.219

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/633,366	12/04/2006	Fwu-Iuan Hshieh	101302-0005

CONFIRMATION NO. 2119

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

POWER OF ATTORNEY NOTICE

OC000000135111857

Date Mailed: 07/13/2022

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/11/2022.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/sltorres/

uPI Semiconductor Corp.
EX1002.220

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JUL 12 2022

2022 JUL 14 AM 10:05

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

Docket Number (Optional) 101302-00005

Mail to: **Mail Stop Petition**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Fax: (571) 273-8300

NOTE: If information or assistance is needed in completing this form, please contact the Office of Petitions at (571) 272-3282.

Patent No. 7812409 Application Number 11633366

Issue Date October 12, 2010 Filing Date December 4, 2006

CAUTION: Maintenance fee payment must correctly identify: (1) the patent number (or reissue patent number, if a reissue) and (2) the application number of the actual U.S. application (or reissue application) leading to issuance of that patent to ensure the fee(s) is/are associated with the correct patent. 37 CFR 1.366(c) and (d).

Also complete the following information, if applicable.

The above-identified patent

☐ is a reissue of original Patent No. _____ original issue date _____

original application number _____

original filing date _____.

☐ resulted from the entry into the U.S. under 35 U.S.C. 371 of international application _____

filed on _____.

NOTE: A grantable petition requires the following items:

(1) Petition fee;
(2) Maintenance fee; and
(3) Statement that the delay in payment of the maintenance fee was unintentional.

CERTIFICATE OF MAILING OR TRANSMISSION (37 CFR 1.8(a))

I hereby certify that this paper (* along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or being transmitted to the U.S. Patent and Trademark Office by EFS-Web, or by facsimile to (571) 273-8300, on the date shown below.

July 12, 2022
Date

/nicholasmartin/
Signature

Nicholas A. Martin
Typed or Printed Name of Person Signing Certificate

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0016. Public burden for this form is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

uPI Semiconductor Corp.
EX1002.221

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

1. SMALL ENTITY

☑ Patentee asserts, or has previously asserted, small entity status. See 37 CFR 1.27.

2. LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS

☐ Patentee is no longer entitled to small entity status. See 37 CFR 1.27(g).

3. MICRO ENTITY

☐ Patentee certifies, or has previously certified, micro entity status. See 37 CFR 1.29
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

4. LOSS OF ENTITLEMENT TO MICRO ENTITY STATUS

☐ Patentee is no longer entitled to micro entity status. See 37 CFR 1.29(i).

5. MAINTENANCE FEE (37 CFR 1.20(e)-(g))

The appropriate maintenance fee must be submitted with this petition, unless it was paid earlier.

Undiscounted			Small Entity			Micro Entity		
Amount	Fee	(Code)	Amount	Fee	(Code)	Amount	Fee	(Code)
☐ $	3½ yr fee	(1551)	☐ $	3½ yr fee	(2551)	☐ $	3½ yr fee	(3551)
☐ $	7½ yr fee	(1552)	☑ $ 2130.00	7½ yr fee	(2552)	☐ $	7½ yr fee	(3552)
☐ $	11½ yr fee	(1553)	☐ $	11½ yr fee	(2553)	☐ $	11½ yr fee	(3553)

MAINTENANCE FEE BEING SUBMITTED $ 2130.00

6. PETITION FEE

The petition fee required by 37 CFR 1.17(m) of:

$ _____ Undiscounted (Fee Code 1558); or
$ 1050.00 Small Entity (Fee Code 2558); or
$ _____ Micro Entity (Fee Code 3558)

must be paid as a condition of accepting an unintentionally delayed payment of a maintenance fee.

PETITION FEE BEING SUBMITTED $ 1050.00

7. MANNER OF PAYMENT

☐ Enclosed is a check for the sum of $ _____
☑ Please charge Deposit Account No. 041061 the sum of $ $3,180.00
☐ Payment by credit card. Form PTO-2038 is attached.
☐ Payment made via EFS-Web.

8. AUTHORIZATION TO CHARGE ANY FEE DEFICIENCY

☑ The Director is hereby authorized to charge any maintenance fee or petition deficiency to Deposit Account No. 041061

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

9. OVERPAYMENT

As to any overpayment made, please

☑ Credit to Deposit Account No. 041061

OR

☐ Send refund check

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information, such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form (PTO-2038) submitted for payment purposes), is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioner/applicant should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms (PTO-2038) submitted for payment purposes are not retained in the application file and therefore are not publicly available.

10. STATEMENT

The delay in payment of the maintenance fee for this patent was unintentional.

Petitioner is reminded that a delay resulting from a deliberately chosen course of action or a change in circumstance is not an unintentional delay.

Petitioner is further reminded that a person seeking reinstatement of an expired patent should not make a statement that the delay in payment of the maintenance fee was unintentional unless the entire delay was unintentional, including the period from discovery that the maintenance fee was not timely paid until payment of the maintenance fee. For example, a statement that the delay in payment of the maintenance fee was unintentional would not be proper when the patentee becomes aware of an unintentional failure to timely pay the maintenance fee and then intentionally delays filing a petition for reinstatement of the patent under 37 CFR 1.378. See MPEP 2590.

NOTE: Where the petition under 37 CFR 1.378 is filed more than two years after the date the patent expired for nonpayment of the maintenance fee, the United States Patent and Trademark Office requires an additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional. This requirement is in addition to the requirement to provide a statement that the entire delay was unintentional. See *Clarification of the Practice for Requiring Additional Information in Petitions Filed in Patent Applications and Patents Based on Unintentional Delay*, 85 FR 12222 (March 2, 2020). See MPEP 711.03(c)(II)(C)-(F) for additional guidance on the information required to establish that the entire delay was unintentional.

☑ Because this petition under 37 CFR 1.378 is being filed more than two years after the date the patent expired for nonpayment of the maintenance fee, additional explanation of the circumstances surrounding the delay that establishes the entire delay was unintentional is enclosed herewith.

PTO/SB/66 (11-21)
Approved for use through 11/30/2024. OMB 0651-0016
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION TO ACCEPT UNINTENTIONALLY DELAYED PAYMENT OF MAINTENANCE FEE IN AN EXPIRED PATENT (37 CFR 1.378(b))

11. PETITIONER REQUESTS THAT THE DELAYED PAYMENT OF THE MAINTENANCE FEE BE ACCEPTED AND THE PATENT BE REINSTATED.

July 12, 2022
Date

/nicholasmartin/
Signature(s) of Petitioner

60926
Registration Number, if applicable

Nicholas A. Martin
Typed or Printed Name

(512) 770-4200
Telephone Number

607 W. 3rd Street, Suite 2500
Address

Austin, Texas 78701
Address

37 CFR 1.378(c) states: "Any petition under this section must be signed in compliance with § 1.33(b)."

12. ENCLOSURES

- [x] Maintenance Fee Payment
- [x] Petition fee under 37 CFR 1.17(m) (fee for filing the maintenance fee petition)
- [x] Additional sheet(s) containing statement establishing unintentional delay
- [ ] Other: _____

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects this information under authority of 5 CFR 1.290. The information in this system of records is used to manage all records of applicant including name, citizenship, residence, post office address and other information with respect to inventors and their legal representatives pertaining to the applicant's activities in connection with the invention for which a patent is sought. This information is protected from disclosure to third parties in accordance with the Privacy Act.

However, routine uses of this information may include disclosure to the following: to law enforcement and investigation in the event that the system of records indicates a violation or potential violation of law; to a Federal, state, local, or international agency, in response to its request; to an agency, organization, or individual for the purpose of performing audit or oversight operations as authorized by law; to non-federal personnel under contract to the agency; to a court for adjudication and litigation; to the Department of Justice for Freedom of Information Act (FOIA) assistance; to members of congress working on behalf of an individual; to the Office of Personnel Management (OPM) for personnel research purposes; to National Archives and Records Administration for inspection of records; and to the Office of Management and Budget (OMB)for legislative coordination and clearance. Failure to provide any part of the requested information may result in an inability to process requests for access and information. The applicable Privacy Act System of Records Notice for this information is COMMERCE/PAT-TM-7 Patent Application Files, available at Federal Register / Vol. 78, No. 61 / Friday, March 29, 2013 /Notices 19243. https://www.govinfo.gov/content/pkg/FR-2013-03-29pdf/2013-07341.pdf

Petition under 37 CFR 1.378(b) JUL 12 2022 Docket No. 101302-00005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh Attorney Docket No.: 101302-0005

Patent No.: 7812409 Confirmation No.: 2119

Issued: October 12, 2010

Title: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

PETITION FOR ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEES UNDER 37 C.F.R. 1.378(b) FOR AN UNAVOIDABLE DELAY

I. Introduction: As provided for in the below remarks, and supported by the information in the attached **Exhibits A-E**, Patentee respectfully requests revival and reinstatement of each of the "subject patents" for at least the following reasons[1]. The subject patents include:

U.S. Patent No. 8,389,354 (the '354 patent); No. 8,461,001 (the '001 patent); No. 8,159,021 (the '021 patent); No. 7,960,787 (the '787 patent); No. 8,022,471 (the '421 patent); No. 7,863,685 (the '685 patent); No. 7,929,321 (the '321 patent); No. 7,646,058 (the '058 patent); No. 8,058,670 (the '670 patent); No. 7,800,185 (the '185 patent); No. 7,812,409 (the '409 patent); No. 8,252,645 (the '645 patent); No. 7,511,357 (the '357 patent); No. 7,612,407 (the '407 patent); No. 7,633,121 (the '121 patent); and No. 7,816,729 (the '729 patent). *See* **Exhibit A**.

As discussed below, the Exhibits as follows:

Exhibit A: Application and patent information for each subject patent.
Exhibit B: Issue Fee Payment documentation for each subject patent.
Exhibit C: Maintenance Fee payments for particular subject patents.
Exhibit D: Assignment data for each subject patent.
Exhibit E: Power of Attorney filed by undersigned attorney.

Patentee, and as a result each subject patent, suffered an unavoidable delay in payment of the 3.5 and/or 7 year Maintenance Fees due to gross misconduct by the patent agent of record. That is, each subject patent suffered from the previous practitioner's error in 1) not properly

1 Patentee refers "Force-MOS Technology Corporation." *See* **Exhibit D**.

PAGE 7/17 * RCVD AT 7/12/2022 11:53:06 AM [Eastern Daylight Time] * SVR:W-PTOFAX-DTS-E4/16 * DNIS:2738300 * CSID:844-670-6009 * ANI:7325423012 * DURATION (mm-ss):06-

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EX1002.226

paying the fees and 2) not alerting Patentee as to the requirement and delinquency of such fee payments. As a result, evidenced from the information in **Exhibit B**, each subject patent issued pursuant to a properly and timely paid Issue Fee payment. However, each subject patent subsequently expired due to nonpayment of Maintenance Fee under 37 C.F.R. 1.362. *See* **Exhibit A**.

Patentee retained and relied upon the following patent agent to prosecute each of the subject patents:

Bo-In Lin **(Registration No. 33,948)**
13445 Mandoli Drive
Los Altos Hills, CA 94022

Currently, Mr. Lin is still listed as the agent of record for each of the subject patents. However, the Power of Attorney (POA) filed along with this paper seeks to remove Mr. Lin as the agent of record and assign the undersigned attorney as the attorney of record. *See* **Exhibit E**.

II. **Governing Law**: Under 37 C.F.R. 1.378(b), any petition to accept an unavoidably delayed payment of a Maintenance Fee filed under paragraph (a) of this section must include:

(1) The required Maintenance Fee set forth in §1.20 (e) through (g);

(2) The surcharge set forth in § 1.20(i)(1); and

(3) A showing that the delay was unavoidable since reasonable care was taken to ensure that the Maintenance Fee would be paid timely and that the petition was filed promptly after the patentee was notified of, or otherwise became aware of, the expiration of the patent. The showing must enumerate the steps taken to ensure timely payment of the Maintenance Fee, the date and the manner in which patentee became aware of the expiration of the patent, and the steps taken to file the petition promptly.

Under 37 C.F.R. 1.378(b), if multiple Maintenance Fees due on a single patent have not been paid, a separate petition fee is required for each delayed Maintenance Fee payment. While the Patentee can include the statements of unintentional delay in a single petition (if desired), a separate petition fee is required for each delayed Maintenance Fee payment.

An "unavoidable delay standard" is provided for as:

"[The word 'unavoidable'] is applicable to ordinary human affairs, and requires no more or greater care than is generally used and observed by prudent and careful men in relation to their most important business. It permits them in the exercise of this care to rely upon the ordinary and trustworthy agencies of mail and telegraph, worthy and reliable employees, and such other means and

PAGE 8/17 * RCVD AT 7/12/2022 11:53:06 AM [Eastern Daylight Time] * SVR:W-PTOFAX-DTS-E4/16 * DNIS:2738300 * CSID:844-670-6009 * ANI:7325423012 * DURATION (mm-ss):05-

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> instrumentalities as are usually employed in such important business. If unexpectedly, or through the unforeseen fault or imperfection of these agencies and instrumentalities, there occurs a failure, it may properly be said to be unavoidable, all other conditions of promptness in its rectification being present."[2]

III. Remarks: Patentee respectfully submits that Patentee suffered unavoidable delays in payments of the required Maintenance Fees for the subject patents based on the hidden (and potentially concealed) failures of Mr. Lin.

As evidenced in **Exhibit A** and **Exhibit B**, Mr. Lin properly and timely paid the Issue Fees for each subject patent. This established and evidences the precedent that Mr. Lin was responsible for, and would properly and timely handle the post grant fees for each subject patent.

Specifically, Mr. Lin timely paid the required Issue Fees for the subject patents during the time period beginning on March 31, 2009 (for the '357 patent) up to and including June 11, 2013 (for the '001 patent). *Id.*

Having paid the Issue Fees for each subject patent, Mr. Lin then timely paid the 3.5 year Maintenance Fees for the '729 patent, the '121 patent, the '357 patent, the '409 patent, the '185 patent, the '058 patent and the '021 patent. *See* **Exhibit A** and **Exhibit C**. These payments spanned the time period beginning on April 1, 2013 (for the '357 patent) to April 8, 2016 (for the '021 patent). *Id.* This concluded the Maintenance Fee payments, as no further payments were made by Mr. Lin.

It should be noted, and emphasized, that Mr. Lin *never* contacted the Patentee regarding the expiration of any of the subject patents. Patentee had no reason to think, believe or suspect that any of the subject patents for which the Issue Fees were paid (*i.e.*, all of them) were delinquent, expired or about to be expired, or that any required Maintenance Fees were not paid. Patentee and Mr. Lin, as is standard with patent agent – client relationships, agreed that Mr. Lin would handle all required payments, and would alert Patentee of any issue that arose during the life of each subject patent. No such alert, indication or communication otherwise was provided to Patentee.

---

2 *See, e.g.*, In re Patent No. 4,461,759, 16 USPQ2d 1883, 1884 (Dep. Ass't Comm'r Pat. 1990), and In re Katrapat, 6 USPQ2d 1863, 1866 (Comm'r Pat. & Trademarks 1988).

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It was only until May 25, 2022 that Patentee discovered that the subject patents were expired. At that time, Patentee immediately engaged the unsigned attorney to investigate the file history of each subject patent and prepare this Petition.

Therefore, Patentee had no reasonable reason or cause to suspect that 3.5 year Maintenance Fee payments for certain subject patents and that 7.5 year Maintenance Fee payments for certain subject patents were not being made. *Id.* To the contrary, as evidenced from the above fact pattern, Mr. Lin created a system and pattern for which the Patentee had no other expectation than to rely on the proper and timely payment of required fees. This is clearly evidenced from the reliably performed Issue Fee payments and the Maintenance Fee payments (up to April 8, 2016). Indeed, Mr. Lin created a pattern of reliable behavior that Patentee relied upon, which accordingly, caused the intervening and subsequent payments of Maintenance Fees to be missed that otherwise were reasonably expected to be paid.

As noted in the Section II of this paper, "unavoidable" under 37 C.F.R. 1.378(b) "requires no more or greater care than is generally used and observed by prudent and careful men in relation to their most important business....If unexpectedly, or through the unforeseen fault or imperfection of these agencies and instrumentalities, there occurs a failure, *it may properly be said to be unavoidable*, all other conditions of promptness in its rectification being present." (*Emphasis added*).[3]

Therefore, based on this reasoning, and the instant fact pattern for each subject patent, Patentee suffered from an unforeseen failure of Patentee's patent agent, which was unavoidable under 37 C.F.R. 1.378(b). Given Mr. Lin's initial responsible activities in paying Issue Fees and Maintenance Fees, discussed *supra*, Patentee could not reasonably be expected to anticipate that such responsible activities would not continue. Indeed, Patentee could not reasonably perform actions that could have remedied, identified and/or both the failed Maintenance Fee payments for the subject patents.

Moreover, Patentee notes that neither 37 CFR 1.378(b) nor 35 U.S.C. §41(c)(1) recite a maximum amount of time that may pass before reviving a patent for delayed payment of Maintenance Fees under the "unavoidable" standard.

Therefore, under 37 CFR 1.378(b), it appears clear that timely payment of the Maintenance Fees for the subject patents was unavoidably delayed due to the reasonable reliance

3 In re Patent No. 4,461,759

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by Patentee of Mr. Lin performing prudent patent practices. Mr. Lin initially prudently paid the Issue Fees and early Maintenance Fees, and Patentee reasonably relied on this to continue; therefore, the delay in the Maintenance Fee payments leading to each subject patent's expiration was clearly unavoidable.

IV. **Conclusion**: Based at least on the above provided information, for each subject patent, Patentee respectfully submits the required delayed and outstanding Maintenance Fees under 37 CFR 1.378(b)(1) and the surcharge under 37 CFR 1.378(b)(2) along with this paper. The showing of cause for the unavoidable delay under 37 CFR 1.378(b)(3) is provided in Section III of this paper, and in accompanying **Exhibits A-E**.

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Respectfully submitted,
DICKINSON WRIGHT PLLC

/nicholasmartin/

Nicholas A. Martin
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607 W. 3rd Street, Suite 2500
Austin, Texas 78701
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Fax Austin Office: (844) 670-6009

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Exhibit A

Country	Patent No.	Application No.	Status	Title	Inventor	Assignee
US	8389354	12383247	Expired - Fee Related	TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)
US	8461001	12653131	Expired - Fee Related	METHODS FOR MANUFACTURING TRENCH MOSFET WITH IMPLANTED DRIFT REGION	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (TW)
US	8159021	12070853	Expired - Fee Related	TRENCH MOSFET WITH DOUBLE EPITAXIAL STRUCTURE	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (TW)
US	7960787	12291365	Expired - Fee Related	CONFIGURATION OF TRENCHED SEMICONDUCTOR POWER DEVICE TO REDUCE MASKED PROCESS	Fwu-Iuan Hshieh	Force-MOS Technology Corporation
US	8022471	12319188	Expired - Fee Related	TRENCH METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (MOSFET) WITH LOW GATE TO DRAIN COUPLED CHARGES (Qgd) STRUCTURES	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)
US	7863685	12156070	Expired - Fee Related	TRENCH MOSFET WITH EMBEDDED JUNCTION BARRIER SCHOTTKY DIODE	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (TW)
US	7929321	12229670	Expired - Fee Related	DEPLETION MODE TRENCH MOSFET FOR IMPROVED EFFICIENCY OF DC/DC CONVERTER APPLICATIONS	Fwu-Iuan Hshieh	Force-Mos Technology Corp (KY)
US	7646058	13810327	Expired - Fee Related	DEVICE CONFIGURATION AND METHOD TO MANUFACTURE TRENCH MOSFET WITH SOLDERABLE FRONT METAL	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)
US	8058670	12455744	Expired - Fee Related	INSULATED GATE BIPOLAR TRANSISTOR (IGBT) WITH MONOLITHIC DEEP BODY CLAMP DIODE TO PREVENT LATCH-UP	Fwu-Iuan Hshieh	Force-MOS Technology Corporation
US	7800185	13999256	Expired - Fee Related	CLOSED TRENCH MOSFET WITH FLOATING TRENCH RINGS AS TERMINATION	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)
US	7812409	11633366	Expired - Fee Related	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (KY)
US	8252645	12462748	Expired - Fee Related	METHOD OF MANUFACTURING TRENCHED MOSFETS WITH EMBEDDED SCHOTTKY IN THE SAME CEL	Fwu-ruan Hshieh	Force-MOS Technology Corporation
US	7511357	11788497	Expired - Fee Related	TRENCHED MOSFETS WITH IMPROVED GATE-DRAIN (GD) CLAMP DIODES	Fwu-Iuan Hshieh	Force-MOS Technology Corporation (KY)
US	7612407	11519754	Expired - Fee Related	TRENCHED MOSFET DEVICE CONFIGURATION WITH REDUCED MASK PROCESSES	Fwu-Iuan Hshieh	Force-MOS Technology Corp. Ltd. (KY)
US	7633121	11981072	Expired - Fee Related	TRENCH MOSFET WITH IMPLANTED DRIFT REGION	Fwu-Iuan Hshieh	Force-MOS Technology Corp. (TW)
US	7816729	11518729	Expired - Fee Related	TRENCHED MOSFET DEVICE WITH TRENCHED CONTACTS	Fwu-Iuan Hshieh	Force-MOS Technology Corp., LTD.

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Exhibit A

Reason for Non-Acceptance	Filing Date	Issue Date	Prior MF Paid	Patent Atty. Info/Correspondence Address
Patent expired on 03/05/2017 due to non-payment of maintenance fee	3/19/2009	3/5/2013	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 06/11/2017 due to non-payment of maintenance fee	12/2/2009	6/11/2013	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 04/17/2020 due to non-payment of maintenance fee	2/20/2008	4/17/2012	4/8/2016, 3.5 Y	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 06/14/2015 due to non-payment of maintenance fee	11/7/2008	6/14/2011	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 09/20/2015 due to non-payment of maintenance fee	12/31/2008	9/20/2011	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 01/04/2015 due to non-payment of maintenance fee	5/28/2008	1/4/2011	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 04/19/2015 due to non-payment of maintenance fee	8/22/2008	4/19/2011	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 01/12/2018 due to non-payment of maintenance fee	6/5/2007	1/12/2010	1/13/2014, 3.5 Y	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 12/14/2015 due to non-payment of maintenance fee	6/4/2009	12/9/2010	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 09/21/2018 due to non-payment of maintenance fee	1/28/2007	9/21/2010	9/22/2014, 3.5 Y	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 10/12/2018 due to non-payment of maintenance fee	12/4/2006	10/12/2010	10/14/2014, 3.5 Y	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 09/26/2016 due to non-payment of maintenance fee	8/7/2009	12/10/2009	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 03/31/2017 due to non-payment of maintenance fee	4/20/2007	3/31/2009	4/1/2013, 3.5 Y	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 11/03/2013 due to non-payment of maintenance fee	9/11/2006	10/3/2009	n/a	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 12/15/2017 due to non-payment of maintenance fee	10/31/2007	12/15/2009	12/16/2013, 3.5 Y	Bo-in Lin (13445 Mandoli Dr)
Patent expired on 11/26/2018 due to non-payment of maintenance fee	9/10/2006	10/19/2010	10/20/2014, 3.5 y	Bo-in Lin (13445 Mandoli Dr)

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EXHIBIT B

Issue Fee Payment documentation for each subject patent.

Patent No.	Application No.
8389354	12383247
8461001	12653131
8159021	12070853
7960787	12291365
8022471	12319188
7863685	12156070
7929321	12229470
7646058	11810327
8058670	12455744
7800185	11699256
7812409	11633366
8252645	12462748
7511357	11788497
7612407	11519754
7633121	11981072
7816729	11518729

US PATENT NO. 7812409
APPLICATION NO. 11633366

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 08/05/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

08/30/2010 CCHAU2 00000041 11633366

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02 FC:1504 300.00 OP

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Yii-Shyun Lin	(Depositor's name)
	(Signature)
August 26, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

TITLE OF INVENTION: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/05/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARROYO, TERESA M	2826	257-401000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

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☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

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(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bo-In Lin
2
3

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

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Pages (Including cover): 25
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Yii-Shyun Lin	(Depositor's name)
	(Signature)
August 26, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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TITLE OF INVENTION: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/05/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARROYO, TERESA M	2826	257-401000

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1 Bo-In Lin
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3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
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5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date August 26, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh :Date: August 26, 2010
Serial No.: 11/633,366 :Group No.: 2826
Filed: December 4, 2006 :Examiner: Teresa M Arroyo
Attorney Docket No.: FMOS-0601
Title: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS
To the Commissioner for Patents:

PAYMENT OF ISSUE FEE AND PUBLICATION FEE

In response to the examiner's Notice of Allowance and Fees Due mailed on August 5, 2010, a form PTO-2038 is enclosed for the amount of $1055.00, which includes $755.00 for the issue fee (claiming small entity status) and $300.00 for the publication fee.

Respectfully submitted,
Fwu-Iuan Hshieh

By _____
Bo-In Lin, Attorney, Registration No. 33,948
13445 Mandoli Drive, Los Altos Hills, CA 94022
(650)949-0418(phone), (650)949-4118(fax)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Office Response Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on **August 26, 2010** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EH 928374271 US"** addressed to: Commissioner for Patents, P.O. Box 1450, Arlington, VA 22313-1450.

Yii-Shyun Lin
(Type or print name of person mailing papers)

_____
(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon to mailing. 37 CFR 1.10(b).

uPI Semiconductor Corp.
EX1002.240

EXHIBIT C

Maintenance Fee payments for particular subject patents.

Patent No.	Application No.
8389354	12383247
8461001	12653131
8159021	12070853
7960787	12291365
8022471	12319188
7863685	12156070
7929321	12229470
7646058	11810327
8058670	12455744
7800185	11699256
7812409	11633366
8252645	12462748
7511357	11788497
7612407	11519754
7633121	11981072
7816729	11518729

US PATENT NO. 7812409
APPLICATION NO. 11633366

United States Patent and Trademark Office

Office of the Commissioner for Patents

TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
7812409	11633366	12/04/2006	10/12/2010

Payment Window Status

WINDOW	STATUS	FEES
7.5 Year	Closed	Unpaid

Patent expired on 10/12/2018 due to non-payment of maintenance fee.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	10/12/2013	04/15/2014	10/14/2014	Closed	Paid
7.5 Year	10/12/2017	04/13/2018	10/12/2018	Closed	Unpaid
11.5 Year	10/12/2021	04/13/2022	10/12/2022	Not Open	Not Due

Patent Holder Information

Customer #

Entity Status SMALL

Phone Number 6509490418

Address Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022
UNITED STATES

PAGE 6/11 * RCVD AT 7/12/2022 12:02:11 PM [Eastern Daylight Time] * SVR:W-PTOFAX-DTS-E1/20 * DNIS:2738300 * CSID:844-670-6009 * ANI:7325423012 * DURATION (mm-ss):04-

EXHIBIT D

Assignment data for each subject patent.

Patent No.	Application No.
8389354	12383247
8461001	12653131
8159021	12070853
7960787	12291365
8022471	12319188
7863685	12156070
7929321	12229470
7646058	11810327
8058670	12455744
7800185	11699256
7812409	11633366
8252645	12462748
7511357	11788497
7612407	11519754
7633121	11981072
7816729	11518729

US PATENT NO. 7812409
APPLICATION NO. 11633366

UNITED STATES
PATENT AND TRADEMARK OFFICE

Assignment abstract of title for Application 11633366

Invention title/Inventor	Patent	Publication	Application	PCT	International registration
TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS Fwu-Iuan Hshieh	7812409 Oct 12, 2010	20080128829 Jun 5, 2008	11633366 Dec 4, 2006		

Assignments (1 total)

Assignment 1

Reel/frame	Execution date	Date recorded	Properties	Pages
018666/0118	Nov 29, 2006	Dec 4, 2006	1	2

Conveyance
ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors
HSHIEH, FWU-IUAN

Correspondent
BO-IN LIN
13445 MANDOLI DRIVE
LOS ALTOS HILLS, CA 94022

Assignee
FORCE-MOS TECHNOLOGY CORP.
GRAND CAYMAN
CAYMAN ISLANDS, BRITISH WEST INDIES
CAYMAN ISLANDS

PAGE 9/11 * RCVD AT 7/12/2022 12:02:11 PM [Eastern Daylight Time] * SVR:W-PTOFAX-DTS-E1/20 * DNIS:2738300 * CSID:844-670-6009 * ANI:7325423012 * DURATION (mm-ss):04-

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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	11633366 (Patent No. 7812409)
Filing Date	
First Named Inventor	Fwu-Iuan Hshieh
Title	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS
Art Unit	
Examiner Name	
Attorney Docket Number	101302-0005

SIGNATURE of Applicant or Patent Practitioner

Signature	/nicholasmartin/	Date (Optional)	
Name	Nicholas A. Martin	Registration Number	60926
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)	Force-MOS Technology Corporation		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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JUL 12 2022

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 35161

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Force-MOS Technology Corporation

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Chung Ming-Tao	Date (Optional)	June 30, 2022
Name	CHUNG MING TAO		
Title	President		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	11633366 (Patent No. 7812409)
Filing Date	
First Named Inventor	Fwu-Iuan Hshieh
Title	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS
Art Unit	
Examiner Name	
Attorney Docket Number	101302-0005

SIGNATURE of Applicant or Patent Practitioner

Signature	/nicholasmartin/	Date (Optional)	
Name	Nicholas A. Martin	Registration Number	60926
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)	Force-MOS Technology Corporation		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

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Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 35161

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Force-MOS Technology Corporation

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Chung Mau-Tao	Date (Optional)	June 30, 2021
Name	Chung Mau Tao		
Title	President		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt	
EFS ID:	46162251
Application Number:	11633366
International Application Number:	
Confirmation Number:	2119
Title of Invention:	TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS
First Named Inventor/Applicant Name:	Fwu-Iuan Hshieh
Correspondence Address:	Bo-In Lin - 13445 Mandoli Drive - Los Altos Hills CA 94022 US 6509490418 -
Filer:	Nicholas Martin/Beatrice Zepeda
Filer Authorized By:	Nicholas Martin
Attorney Docket Number:	FMOS-0601
Receipt Date:	11-JUL-2022
Filing Date:	04-DEC-2006
Time Stamp:	18:36:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	7812409_Transmittal_POA.pdf	689315 a91066db07024dbad3f050052a81b0f3f2b82d79	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	689315		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	10/12/2010	7812409	FMOS-0601	2119

7590 09/22/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 246 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Fwu-Iuan Hshieh, Saratoga, CA;

uPI Semiconductor Corp.
EX1002.253

PART B - FEE(S) TRANSMITTAL 08-30-10

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

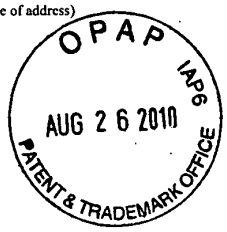
CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 08/05/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

08/30/2010 CCHAU2 00000041 11633366

01 FC:2501 755.00 OP
02 FC:1504 300.00 OP



Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Yii-Shyun Lin	(Depositor's name)
	(Signature)
August 26, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshich	FMOS-0601	2119

TITLE OF INVENTION: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/05/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARROYO, TERESA M	2826	257-401000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bo-In Lin
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Force-MOS Technology Corp.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): CAYMAN ISLANDS

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date August 26, 2010

Typed or printed name Bo-In Lin Registration No. 33,948

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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uPI Semiconductor Corp.
EX1002.254

OPAP IAP6
AUG 2 6 2010
PATENT & TRADEMARK OFFICE

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh :Date: August 26, 2010
Serial No.: 11/633,366 :Group No.: 2826
Filed: December 4, 2006 :Examiner: Teresa M Arroyo
Attorney Docket No.: FMOS-0601
Title: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

To the Commissioner for Patents:

PAYMENT OF ISSUE FEE AND PUBLICATION FEE

In response to the examiner's Notice of Allowance and Fees Due mailed on August 5, 2010, a form PTO-2038 is enclosed for the amount of $1055.00, which includes $755.00 for the issue fee (claiming small entity status) and $300.00 for the publication fee.

Respectfully submitted,
Fwu-Iuan Hshieh

By _____
Bo-In Lin, Attorney, Registration No. 33,948
13445 Mandoli Drive, Los Altos Hills, CA 94022
(650)949-0418(phone), (650)949-4118(fax)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Office Response Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on **August 26, 2010** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EH 928374271 US**" addressed to: Commissioner for Patents, P.O. Box 1450, Arlington, VA 22313-1450.

Yii-Shyun Lin
(Type or print name of person mailing papers)

_____
(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon to mailing. 37 CFR 1.10(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 08/05/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

EXAMINER	
ARROYO, TERESA M	
ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 08/05/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

TITLE OF INVENTION: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/05/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

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EX1002.256

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 08/05/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

TITLE OF INVENTION: TRENCH MOSFET WITH CELL LAYOUT, RUGGEDNESS, TRUNCATED CORNERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	11/05/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
ARROYO, TERESA M	2826	257-401000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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EX1002.257

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

7590 08/05/2010

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

EXAMINER	
ARROYO, TERESA M	
ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 08/05/2010

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 246 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 246 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

uPI Semiconductor Corp.
EX1002.258

Notice of Allowability	Application No.	Applicant(s)	
	11/633,366	HSHIEH, FWU-IUAN	
	Examiner	Art Unit	
	TERESA M. ARROYO	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment filed 4/4/10*.

2. ☒ The allowed claim(s) is/are *1,5,9,10,12 and 13*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/T. M. A./
Examiner, Art Unit 2826

uPI Semiconductor Corp.
EX1002.259

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Claims 14-18, non-elected without traverse on October 31, 2008, have been canceled.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TERESA M. ARROYO whose telephone number is (571) 272-7260. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/T. M. A./
Examiner, Art Unit 2826
/Leonardo Andújar/
Primary Examiner, Art Unit 2826

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 2119

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/633,366	12/04/2006 RULE	438	2826	FMOS-0601

APPLICANTS
Fwu-luan Hshieh, Saratoga, CA;

** CONTINUING DATA **********

** FOREIGN APPLICATIONS **********

** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY **
12/27/2006

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/TERESA M ARROYO/ Examiner's Signature	☐ /TMA/ Initials	CA	6	18	3

ADDRESS

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022
UNITED STATES

TITLE

Trench MOSFET with cell layout, ruggedness, truncated corners

FILING FEE RECEIVED		
500	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

uPI Semiconductor Corp.
EX1002.262

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	Teresa M. Arroyo	2826

SEARCHED			
Class	Subclass	Date	Examiner
257	330, 331, 372, 27.063	07/08/09	TMA

SEARCH NOTES		
Search Notes	Date	Examiner
EAST	07/08/09	TMA
EAST	01/01/10	TMA

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
257	330, 331, 372, 401 e27.091, e29.257, e21.549,	7/31/10	TMA

/T. M. A./ Examiner.Art Unit 2826	

uPI Semiconductor Corp.
EX1002.263

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	Teresa M. Arroyo	2826

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/30/2008	01/17/2009	07/08/2009	01/01/2010	07/31/2010				
1	1	÷	✓	✓	✓	=				
-	2	÷	✓	-	-	-				
-	3	÷	✓	-	-	-				
-	4	÷	✓	-	-	-				
2	5	÷	✓	✓	✓	=				
-	6	÷	✓	-	-	-				
-	7	÷	✓	-	-	-				
-	8	÷	✓	-	-	-				
3	9	÷	✓	✓	✓	=				
4	10	÷	✓	✓	✓	=				
-	11	÷	✓	-	-	-				
5	12	÷	✓	✓	✓	=				
6	13	÷	✓	✓	✓	=				
-	14	÷	N	N	N	-				
-	15	÷	N	N	N	-				
-	16	÷	N	N	N	-				
-	17	÷	N	N	N	-				
-	18	÷	N	N	N	-				

uPI Semiconductor Corp.
EX1002.264

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	**Art Unit**
	TERESA M ARROYO	2826

ORIGINAL		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
257	401	H	0	1	L	27 / 088 (2006.01.01)						
CROSS REFERENCE(S)		H	0	1	L	21 / 77 (2006.01.01)						

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
257	330	331	372	E29.257	E21.549

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	-	17												
-	2	-	18												
-	3														
-	4														
2	5														
-	6														
-	7														
-	8														
3	9														
4	10														
-	11														
5	12														
6	13														
-	14														
-	15														
-	16														

/T. M. A./ Examiner.Art Unit 2826 (Assistant Examiner)	07/31/2010 (Date)	**Total Claims Allowed:** 6	
/Leonardo Andújar/ Primary Examiner.Art Unit 2826 (Primary Examiner)	08/01/2010 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 3

uPI Semiconductor Corp.
EX1002.265

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	2	"633366".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/07/31 22:39
S1	242	Hshieh-Fwu$.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 14:41
S2	53	force-mos$.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 14:42
S3	273	S1 or S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 14:42
S4	59	S3 and power and (trench$2 with gate) and (shape$1 with cell)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 14:43
S5	18	("20060202264" | "6031265" | "6107661" | "6288454" | "6320223" | "6541818" | "6867083" | "6936890" | "6949432").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 15:22

7/31/2010 11:14:36 PM
H:\east\Workspaces\11633366.wsp

uPI Semiconductor Corp.
EX1002.266

04-06-10

OPAP
APR 04 2010
PATENT & TRADEMARK OFFICE

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh :Date: April 2, 2010

Serial No.: 11/633,366 : Group No.: 2826

Filed: December 4, 2006 : Examiner: Teresa M. Arroyo

Attorney Docket No.: FMOS-0601 @571-270-7430,273-8300(F)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Office Response Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date **April 2, 2010** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EG 059380533 US"** addressed to the: Commissioner of Patents and Trademarks, Alexandria, VA. 22313-1450.

Bo-In Lin
(Type or print name of person mailing papers)

(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon to mailing. 37 CFR 1.10(b).

To the Commissioner of Patents and Trademarks:

AMENDMENT

Dear Sir:

In response to the Examiner's Action mailed on January 13, 2010, the Applicant hereby respectfully requests that the above referenced Patent Application be amended as set forth below:

II) Please withdrawn claims 2 to 4, 6 to 8 and 11, and Amend claims 1, 5, 9, 10, 12 and 13 as set forth below:

April 2, 2010

uPI Semiconductor Corp.
EX1002.267

1.(Currently Amended) A trenched semiconductor power device comprising a plurality of trenched gates ~~gate disposed in an extended continuous trench~~ surrounding a plurality of transistor cells formed in a semiconductor substrate, wherein:

said trenched gates ~~gate~~ surrounding said transistor cells as closed cells constituting substantially square-shaped cells with rounded corners;

each of said closed cells further includes a circular trench contact ~~hole~~ disposed substantially in a central portion of said closed cells, penetrating through a source region surrounding said ~~trench~~ trenched gates and extending into a body region encompassing said source region;

said circular trench contact comprises a hole opened from a top surface of said semiconductor substrate and is filled with a contact metal plug wherein sidewalls of said hole are surrounded by and in ~~to~~ contact said source and body regions and said circular trench contact is separate from said trenched gates with said source region and body region disposed between ~~disposed at a distance away from~~ a gate oxide lining of said ~~trench~~ trenched gates ~~from~~ and all circumferential points of the circular trench contact; and

said contact metal plug connected to a source metal disposed on top of said circular trench contact ~~hole~~.

Claims 2 (Canceled)
Claim 3. (Canceled)
Claim 4. (Canceled)

April 2, 2010

5. (Currently Amended) The trenched semiconductor power device of claim 1 further comprising:

a contact resistance reduction metal layer composed of a titanium (Ti) layer ~~sandwiched between~~ disposed above a top surface said contact metal plug and below a bottom surface of said source metal for reducing a contact resistance between said contact metal plug and said source metal.

Claim 6. (Canceled)
Claim 7. (Canceled)
Claim 8. (Canceled)

9. (Currently Amended) The trenched semiconductor power device of claim 1 wherein:

said contact metal plug disposed in said hole of said circular trench contact ~~hole~~ further comprising a Ti/TiN/W metal plug.

10. (Currently Amended) The trenched semiconductor power device of claim 1 wherein:

said source metal disposed on top of and in contact with a top surface of said metal plug further comprising a layer composed of aluminum alloys including alloys of AlCu or AlSiCu.

Claim 11. (Canceled)

April 2, 2010

12. (Currently Amended) The trenched semiconductor power device of claim 1 wherein:

a diameter of a top surface of said circular trench contact is smaller than 1.0 micrometer.

~~said circular trench contact is further disposed at al distance away from outer edges of said source region from all of said circumferential points of the circular trench contact.~~

13.(Currently Amended) A trenched semiconductor power device comprising a plurality of trenched gates ~~gate disposed in an extended continuous trench~~ surrounding a plurality of transistor cells formed in a semiconductor substrate, wherein:

said trenched gates ~~gate~~ surrounding said transistor cells as closed cells constituting substantially square-shaped cells with truncated corners;

each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells with a diameter ~~at~~ of a top surface of said circuit trench contact ~~holes~~ less than 1.0 micrometer, penetrating through source regions surrounding said ~~trench~~ trenched gates and extending into body regions encompassing said source regions;

April 2, 2010

said circular trench contact comprises a hole opened from a top surface of said semiconductor substrate ~~and is disposed at a substantially an equal distance away distance from~~ wherein sidewalls of said hole are surrounded by and in contact with said source and body regions and said circular trench contact and is separate from said trenched gates with said source region and body region disposed between a gate oxide lining of said ~~trench~~ trenched gate and ~~from~~ all circumferential points of the circular trench contact ~~hole~~; and

said circular trench contact ~~hole~~ is filled with a metal plug composed of a Ti/TiN/W plug to contact said source and body regions and said metal plug contacting a source metal disposed on top of said metal plug wherein said source metal layer composed of Ti/AlCu or Ti/AlSiCu alloys.

14. (Withdrawn) A method for fabricating a trenched semiconductor power device comprising steps of forming a trenched gate as an extended continuous trench surrounding a plurality of transistor cells further comprising:

doping a source/body metal contact region in an area surrounded by said trenched gate at a location and shape such that there is substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

15. (Withdrawn) The method of claim 14 further comprising:

doping the metal contact region having substantially a circular shape such that there is a substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

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16. (Withdrawn) The method of claim 14 further comprising:

opening said trenches with truncated corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

17. (Withdrawn) The method of claim 14 further comprising:

opening said trenches with rounded corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

18. (Withdrawn) The method of claim 14 further comprising:

forming a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.

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REMARKS

In response to the Examiner's Action mailed on January 13, 2010, the claims 2 to 4 and 6 to 8, and 11 are canceled, claims 1, 5, 9, 10, 12 and 13 are amended. The applicant hereby respectfully requests that the patent application be reconsidered.

An item-by-item response to Examiner's objections or rejections is provided in the followings:

Claim Objection

The Examiner objects to claims 1, and 13 because of the informalities contained in these claims.

In response to the objections, claims 1 and 13 are amended and the informalities contained in the indefinite terms are removed and corrected.

Claim Rejections -35 USC 103

The Examiner rejects claims 1 under 35 USC 103(a) as being unpatentable under Pfirsch et al US Patent Pub. 2002/0006703 in view of US Pat. 6621107 (Blanchard et al.) The Examiner further rejects claims 5, 9, 12 and 13 under 35 USC 103(a) as being unpatentable under Pfirsch et al US Patent Pub. 2002/0006703 in view of US Pat. 6621107 (Blanchard et al.) and further in view of 6,288,454 to Allman et al. The Examiner further rejects claims 10 under 35 USC 103(a) as being unpatentable under Pfirsch et al US Patent Pub. 2002/0006703 in view of US Pat. 6621107 (Blanchard et al) and further in view of Patent 6,949,432 to Blanchard.

In response to the rejection, claims 1, 5, 9, 10, 12 and 13 are amended. The amended claim 1 is directed to a trenched semiconductor

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power device comprising a plurality of trenched gates surrounding a plurality of transistor cells formed in a semiconductor substrate, wherein:

A) said trenched gates surrounding said transistor cells as closed cells constituting substantially square-shaped cells with rounded corners;

B) each of said closed cells further includes a circular trench contact ~~hole~~ disposed substantially in a central portion of said closed cells, penetrating through a source region surrounding said trenched gates and extending into a body region encompassing said source region;

C) said circular trench contact comprises a hole opened from a top surface of said semiconductor substrate and is filled with a contact metal plug wherein sidewalls of said hole are surrounded by and in ~~to~~ contact said source and body regions and said circular trench contact is separate from said trenched gates with said source region and body region disposed between a gate oxide lining of said trenched gate and all circumferential points of the circular trench contact; and

D) said contact metal plug connected to a source metal disposed on top of said circular trench contact.

The amend claim 13 is directed to a trenched semiconductor power device comprising a plurality of trenched gates surrounding a plurality of transistor cells formed in a semiconductor substrate, wherein:

A) said trenched gates surrounding said transistor cells as closed cells constituting substantially square-shaped cells with truncated corners;

B) each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells with a diameter of a top surface of said circuit trench contact less than 1.0 micrometer, penetrating through source regions surrounding said trenched gates and extending into body regions encompassing said source regions;

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C) said circular trench contact comprises a hole opened from a top surface of said semiconductor substrate wherein sidewalls of said hole are surrounded by and in contact with said source and body regions and said circular trench contact and is separate from said trenched gates with said source region and body region disposed between a gate oxide lining of said trenched gate and all circumferential points of the circular trench contact; and

D) said circular trench contact is filled with a metal plug composed of a Ti/TiN/W plug to contact said source and body regions and said metal plug contacting a source metal disposed on top of said metal plug wherein said source metal layer composed of Ti/AlCu or Ti/AlSiCu alloys.

The amended claims 1 and 13 and also claims 5 and 12 are amended to be totally different and not obvious over Pfirsch and further in view of Blanchard. Specifically, the circular contact trench is totally different from the Schottky anode contact trench disclosed in Blanchard. The circular trench contact of this invention is totally different from the trench Schottky anode contact of Blanchard 219b in Fig. 5 because of the following differences:

1) The trenched contact shape of the Schottky diode in Blanchard is square, rectangular, hexagonal or octagonal (Figs. 4A~4E, 8, 9A~9D and 10) shape but not circular shape as the present patent application.
2) The circular trench contact in the present patent application is surrounded by source and body regions and in contact with the source and body regions. In contrast, the trench source contact 219b of Blanchard are opened in the middle of the gate 211 and is disposed immediately next to the gate lining layer 216 to insulate the trench source contact 219b from the gate 211.

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3) The circular trench contact in the present patent application is separated from the trenched gates with the source and body region disposed between the circular trench contact and the trenched gates therefore, unlike Blanchard, the gate oxide lining of the trenched gate of this invention has no contact with all circumferential points of the circular trench contact. In contrast, the trench source contact 219b of Blanchard has sidewalls in direct contact with the gate oxide lining layer 216 as that clearly shown in Fig. 5 of Blanchard.
4) The trenched contact for the Schottky diode in Blanchard extends into N epitaxial layer (Fig. 5) which is different from the trenched contact for trenched MOSFET in the present patent application as shown in Fig. 2A wherein the trenched contact penetrates n+ source region, and extends into body region but not further into the N epitaxial layer.

Moreover, the device structures and trench contact location in the present application are different from Blanchard:

1) The device structure in Blanchard has trench MOSFET with planar contact (not trenched contact) merged with Schottky diode with trenched contact, which is different from the present patent application wherein trench MOSFET has trenched contact but without integrating with trenched Schottky diode.
2) The trenched contact location in Blanchard is disposed not in trench MOSFET but only in Schottky diode. The trench MOSFET in Blanchard has planar contact which is different from the present patent application that **each** trenched closed cells has trenched contact.

For the above reasons, a combination of Pfirsch and Blanchard would not teach a person of ordinary skill to make a device directed by the present invention according to the claims 1 and 13 as now amended. Specifically, the disclosures made by Blanchard had a <u>non-circular</u> trench

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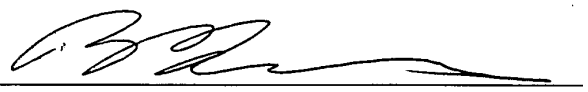
Schottky anode contact opened through the gate as part of a wider gate trench therefore, the trench Schottky anode ~~source~~ contact 219b of Blanchard contact the epitaxial layer at the bottom of the wider trenches. The configurations of Blanchard are very different from the disclosures made in this invention. The circular trench contact is formed at a location totally separate form the trenched gates. Therefore, the configurations and method of manufacturing are different from Blanchard in combination with Pfirsch. For these reasons, the Applicant would like to respectfully request that the Examiner would consider to withdraw the rejection under 35 USC 103(a) for the newly amended claims.

With the canceled and amended claims, and further with the reasons provided above, the Applicants respectfully request that the objections and rejections be withdrawn and the Patent Application as amended now be allowed.

April 2, 2010

Respectfully submitted

Fwu-Iuan Hshieh

By 

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April 2, 2010

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/633,366	12/04/2006	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/04/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $110 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ANNETTE SMITH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

7590 01/13/2010

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EXAMINER	
ARROYO, TERESA M	
ART UNIT	PAPER NUMBER
2826	

MAIL DATE	DELIVERY MODE
01/13/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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EX1002.280

Office Action Summary	Application No.	Applicant(s)	
	11/633,366	HSHIEH, FWU-IUAN	
	Examiner	Art Unit	
	TERESA M. ARROYO	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5,9,10,12 and 13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,9,10,12 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/14/09 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 5, 9, 10, 12, 13 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

3. The drawings were received on 10/14/09. These drawings are acceptable.

Claim Objections

4. Claims 1 and 13 are objected to because of the following informalities:

5. In claim 1: in the preamble, “an extended continuous trench” is unclear as to from where the trench extends; “said trench gates” should be changed to --said trenched gate-- in line 10; and “at a distance away” is vague and indefinite.

6. In claim 13: in the preamble, “an extended continuous trench” is unclear as to from where the trench extends; “said trench gates” should be changed to --said trenched gate-- in line 10; and “at a substantially an equal distance away distance” is vague, indefinite and unclear as to what is being claimed.

7. Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claim 1, to the extent taught and understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Pub. No. 2002/0006703 to Pfirsch et al. in view of US Patent No. 6621107 to Blanchard et al.

10. Regarding claim 1, in Fig. 2 Pfirsch et al. disclose a trenched semiconductor power device comprising a trenched gate 5 disposed in an extended continuous trench 2 surrounding a plurality of transistor cells 12, wherein:

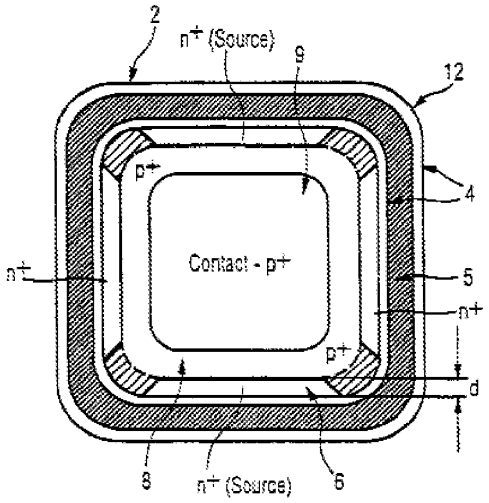
said trenched gate 5 surrounding said transistor cells 12 as closed cells constituting substantially square-shaped cells with rounded corners;

each of said closed cells 12 further includes a trench contact hole 9 disposed substantially in a central portion of said closed cells 12, penetrating through a source region 6 surrounding said trench gates 5 and extending into body regions 7 encompassing said source regions 6;

said trench contact hole 9 filled with a contact metal plug to contact said source 6 and body 7 regions; and said contact metal plug connected to a source metal disposed on top of said trench contact hole 9 (col. 8 lines 53-62, col. 10 lines 62-67, col. 11 lines 1-3).

However, Pfirsch et al. do not teach a circular trench contact hole disposed at a distance away from a gate oxide lining of a trench gate from all circumferential points of the circular trench contact.

FIG 2



11. Blanchard et al. teach a trenched semiconductor power device comprising a trenched gate 211, a gate oxide 210 and a circular trench contact hole 219b.

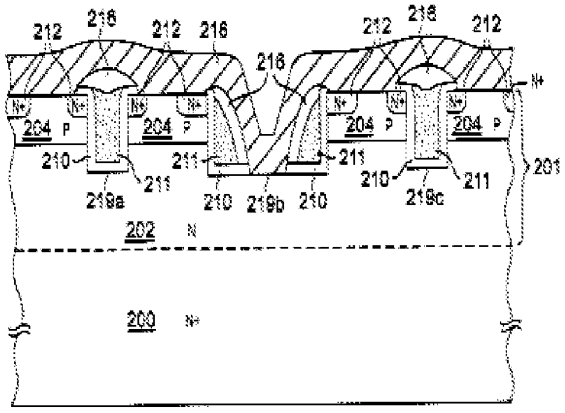


FIG. 5

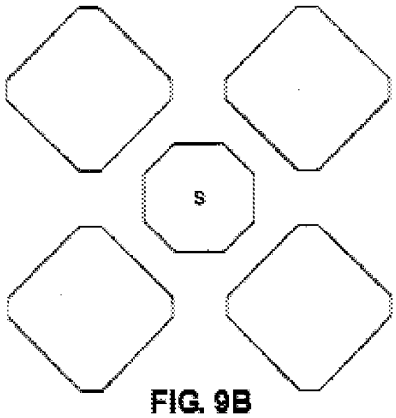


FIG. 9B

12. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a circular trench contact hole in Pfirsch et al. as shown in Blanchard et al. since the geometry of the device can be selected to vary the ratio of DMOS source perimeter to Schottky diode conducting area, optimizing device performance as discussed in the Summary at col. 3, lines 56-59 and because such a configuration increases the density of the semiconductor devices and reduces the on-resistance as taught by Imam et al. in col. 7, line 50 to col. 8, line 16.

13. Claims 5, 9, 12, 13, to the extent taught and understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Pfirsch et al. in view of Blanchard et al. as discussed regarding claim 1 above, and further in view of U.S. Patent No. 6,288,454 to Allman et al.

14. The teachings of Pfirsch et al. as modified by Blanchard et al. have been previously discussed above, however the combination fails to teach the following:

15. Claim 5, a contact resistance reduction metal layer composed of a titanium (Ti) layer sandwiched between said contact metal plug and said source metal for reducing a contact resistance between said contact metal plug and said source metal.

16. Claim 9, said contact metal plug disposed in said circular trench contact hole, source/body contact trench further comprising a Ti/TiN/W metal plug.

17. Claim 12, a diameter of a top said circular trench contact is smaller than 1.0 micrometer.

18. Claim 13, each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells with a diameter at a top of said contact holes less than 1.0 micrometer; composed of a Ti/TiN/W plug to contact said source and body regions and said metal plug contacting a source metal disposed on top of said metal plug wherein said source metal layer composed of Ti/AlCu or Ti/AlSiCu alloys.

19. In Fig. 1E, Allman et al. teach a contact resistance reduction layer (metal interconnect layer 28) composed of titanium/titanium nitride/tungsten (Ti/TiN/W) as a low resistance metal (col. 6, lines 20-43).

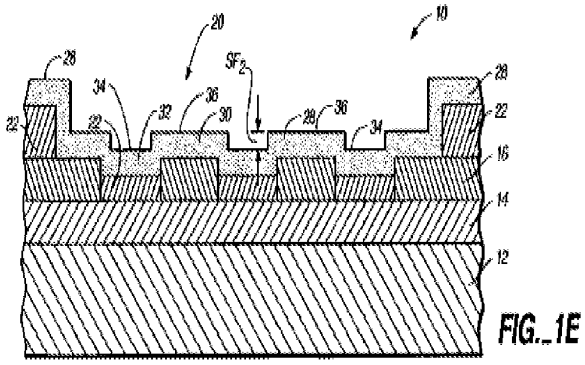


FIG._1E

20. Therefore, regarding claims 5, 9, 13, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Ti in the modified device of Pfirsch et al. because it is well known in the art that contact resistance layers are frequently composed of a Ti because of their electrically conductive properties as in Allman et al. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

21. Regarding claims 12, 13, Pfirsch et al. teach that the distance from a rounded corner of the trench contact (9) to the closest rounded corner of the transistor cell (12) is substantially equal to the distance of an edge of the trench contact to an edge of the transistor cell. Because these distances are substantially equal, then the ratio of the two distances would be a value less than one (longer distance divided by shorter distance). Further, determining the optimum diameter of the circular trench would have only involved routine skill in the art as taught by Iman et al. in col. 4, lines 11-22 and col. 6, lines 18-28.

22. Further, it would have been prima facie obvious to modify Pfirsch et al. to obtain the invention as specified in claim 12 because such a modification would have been considered a mere design consideration which fails to patentably distinguish over the prior art of Pfirsch et al.

23. Claim 10, to the extent taught and understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Pfirsch et al. in view of Blanchard et al. as discussed regarding claim 1 above, and further in view of U.S. Patent No. 6,949,432 to Blanchard.

24. Regarding claim 10, the combination of references fails to teach said source metal comprising a layer composed of aluminum alloy including alloys of AlCu or AlSiCu.

25. In Fig. 10b, Blanchard teaches a source metal 29b composed of aluminum alloy.

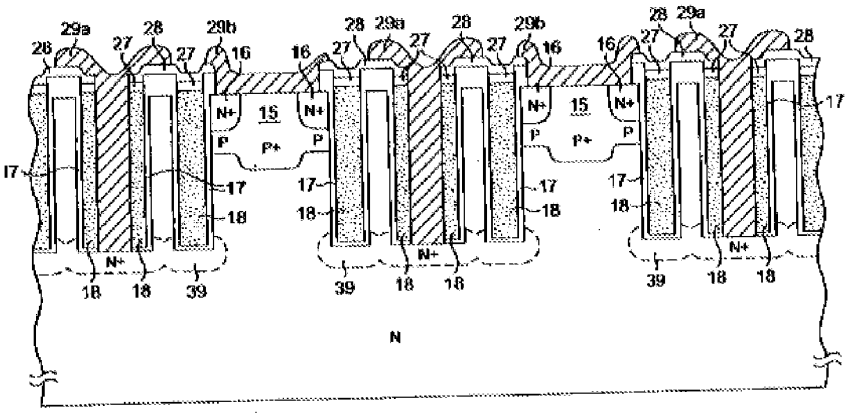


FIG. 10b

26. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an aluminum alloy in the modified device of Pfirsch et al. because they are widely used in the art as in Blanchard in col. 7, line 50 to col. 9, line 24.

Conclusion

27. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TERESA M. ARROYO whose telephone number is (571)272-7260. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TERESA M. ARROYO/

Examiner, Art Unit 2826

Notice of References Cited	Application/Control No. 11/633,366	Applicant(s)/Patent Under Reexamination HSHIEH, FWU-IUAN	
	Examiner TERESA M. ARROYO	Art Unit 2826	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2001/0031551 A1	10-2001	Hshieh et al.	438/637
*	B	US-6,621,107 B2	09-2003	Blanchard et al.	257/155
*	C	US-7,439,583 B2	10-2008	Hshieh, Fwu-Iuan	257/341
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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EX1002.290

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	242	Hshieh-Fwu$.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 14:41
L2	53	force-mos$.as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 14:42
L3	273	l1 or l2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 14:42
L4	59	l3 and power and (trench$2 with gate) and (shape$1 with cell)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 14:43
L5	18	("20060202264" | "6031265" | "6107661" | "6288454" | "6320223" | "6541818" | "6867083" | "6936890" | "6949432").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2010/01/01 15:22

1/1/2010 3:38:16 PM

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	Teresa M. Arroyo	2826

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/30/2008	01/17/2009	07/08/2009	01/01/2010					
	1	÷	✓	✓	✓					
	2	÷	✓	-	-					
	3	÷	✓	-	-					
	4	÷	✓	-	-					
	5	÷	✓	✓	✓					
	6	÷	✓	-	-					
	7	÷	✓	-	-					
	8	÷	✓	-	-					
	9	÷	✓	✓	✓					
	10	÷	✓	✓	✓					
	11	÷	✓	-	-					
	12	÷	✓	✓	✓					
	13	÷	✓	✓	✓					
	14	÷	N	N	N					
	15	÷	N	N	N					
	16	÷	N	N	N					
	17	÷	N	N	N					
	18	÷	N	N	N					

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	Teresa M. Arroyo	2826

SEARCHED			
Class	Subclass	Date	Examiner
257	330, 331, 372, e27.063	07/08/09	TMA

SEARCH NOTES		
Search Notes	Date	Examiner
EAST	07/08/09	TMA
EAST	01/01/10	TMA

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

/TERESA M ARROYO/ Examiner.Art Unit 2826	

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OIPE
OCT 14 2009
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10-15-09 FW RCE

PTO/SB/30 (01-08)
Approved for use through 02/29/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	11/633,366
Filing Date	December 4, 2006
First Named Inventor	Fwu-Iuan Hshieh
Art Unit	2826
Examiner Name	Teresa M. Arroyo
Attorney Docket Number	FMOS-0601

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. [✓] Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. [ ] Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. [ ] Other _____

   b. [✓] Enclosed

      i. [✓] Amendment/Reply

      ii. [ ] Affidavit(s)/ Declaration(s)

      iii. [ ] Information Disclosure Statement (IDS)

      iv. [ ] Other _____

2. Miscellaneous

   a. [ ] Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

   b. [ ] Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

   a. [ ] The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. _____. I have enclosed a duplicate copy of this sheet.

      i. [✓] RCE fee required under 37 CFR 1.17(e)

      ii. [ ] Extension of time fee (37 CFR 1.136 and 1.17)

      iii. [ ] Other _____

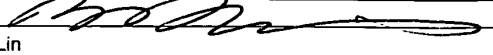
      10/16/2009 CCHAU1 00000034 11633366
      01 FC:2801 405.00 OP

   b. [ ] Check in the amount of $ _____ enclosed

   c. [✓] Payment by credit card (Form PTO-2038 enclosed)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature		Date	2009-10-14
Name (Print/Type)	Bo-In Lin	Registration No.	33,948

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature			
Name (Print/Type)	Bo-In Lin	Date	

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh :Date: October 14, 2009

Serial No.: 11/633,366 : Group No.: 2826

Filed: December 4, 2006 : Examiner: Teresa M. Arroyo

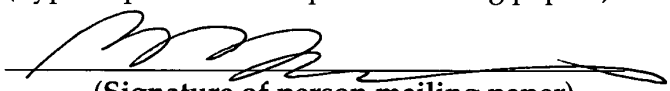
Attorney Docket No.: FMOS-0601 @571-270-7430,273-8300(F)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Office Response Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date **October 14, 2009** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EH 928476465 US"** addressed to the: Commissioner of Patents and Trademarks, Alexandria, VA. 22313-1450.

Bo-In Lin

(Type or print name of person mailing papers)



(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon to mailing. 37 CFR 1.10(b).

To the Commissioner of Patents and Trademarks:

PRELIMINARY AMENDMENT

Dear Sir:

In response to the Examiner's Action mailed on July 15, 2009, the Applicant hereby respectfully submits a Request for Continuous Examination (RCE) with a RCE Fee of $405 and a Preliminary Amendment. The Applicant hereby requests that the above referenced Patent Application be amended as set forth below:

I) Please amend the Drawings according to the Replacement Sheets of Drawings attached at the end of this Amendment Transmittal.

II) Please amend the Specification as set forth below:

October 14, 2009

1) Please amend the paragraph starting from line 34 on page 4 to line 6 on page 5 as set forth below:

Please refer to Fig. 2 for a top view of a closed cell configuration of an improved semiconductor power device 100 of this invention. The closed cell is surrounded by a trenched gate 110 that has a truncated corners 115 such that the distance B between the truncated corners to the metal contact or a doped contact region 120 is substantially equal to the distance A between the edges of the contact region 120 to the edges of the trenched gate, i.e., B = A. There is a uniform space between the surrounding trenched gate 110 and the metal contact or doped contact region 120. The weak spots around the corners in a conventional layout are therefore eliminated. Figs. 2A, 2B and 2C show three cross sectional views of the close semiconductor power cell along lines A-A', B-B' and C-C' as that shown in Fig. 2. The close semiconductor cell is surrounded by trench gates with a body region formed between the trench gates and encompassing a source region. The closed semiconductor power cell is supported on an epitaxial layer formed on top of a semiconductor substrate with the conductivity types shown for each region. The closed semiconductor power cell further includes a trench source-body trench contact 120 extended into the body region through the source region of the closed semiconductor power cell in contact with a p+ contact dopant region disposed immediately below the trench contact 120. These three cross sectional view clearly show that the distances between the inner sidewalls of the trench gates surrounding the closed semiconductor power cell is decreased from W1 to W2 and then to W3, i.e., W1> W2> W3, to form the truncated corners for the trench gates surrounding the closed semiconductor power cell. As shown in the Figs. 2 and 2A to 2C, the trench source-body trench contact 120 is disposed substantially equal distance, i.e., A=B, from the inside walls of the trench gates 110. For practical concerns of manufacturing misalignment tolerances and CD (Critical

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Dimension) variation of trench and contact, the distance A or B can be expressed as equal to or larger than:

Root Square of [(Trench CD Variation)^2 +(Contact CD Variation) ^{2} + (Misalignment between Contact and Trench) ^{2}]>0

2) Please amend the paragraph starting from line 8 to line 18 on page 5 as set forth below:

Referring to Fig. 3 for another embodiment of this invention wherein a closed cell unit 200 of a MOSFET device includes trenched gate 210 surrounding a metal contact disposed above a doped contact region 220. The doped contact region 220 is formed with substantial circular shape and the trenched gate is formed with rounded corners 215. The distance from the edge of the circular doped contact region 220 to the trenched gate 200 including the distance B to the rounded corners 215 and to the distance A to the edges of the trenched gate are substantially the same, i.e., B=A. Therefore, the ratio of B/A is substantially kept near 1.0 and certainly smaller than 1.414. The weak spots near the corners of the trenched gate that caused reduced device ruggedness are therefore eliminated. Figs. 3A, 3B, 3C and 3D show three cross sectional views of the close semiconductor power cell along lines D-D′, E-E′, F-F′ and G-G′ respectively as that shown in Fig. 3. The close semiconductor cell is surrounded by trench gates with a body region formed between the trench gates and encompassing a source region. The closed semiconductor power cell is supported on an epitaxial layer formed on top of a semiconductor substrate with the conductivity types shown for each region. The closed semiconductor power cell further includes a circular trench source-body trench contact 220 extended into the body region through the source region of the closed semiconductor power cell in contact with a p+ contact dopant region disposed immediately below the trench contact 120. The circular

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trench contact 220 is disposed at a distance away from a gate oxide lining of said trench gate from all circumferential points of the circular trench contact. These four cross sectional views clearly show that the distances between the inner sidewalls of the trench gates surrounding the closed semiconductor power cell is decreased from W'1 to W'2 and then to W'3, i.e., W'1> W'2> W'3, to form the truncated corners for the trench gates surrounding the closed semiconductor power cell with a circular trench source-body contact 220. Furthermore, Figs. 3 and 3A and 3B show D1> D2 for a circuit trench source-body contact. As shown in the Figs. 3 and 3A to 3D, the trench source-body trench contact 220 is disposed substantially at distances A and B, from the inside walls of the trench gates 210 wherein A is substantially equal to B, i.e., A=B, or B is less than 1.414A, i.e., B<1.414A. For practical concern of manufacturing misalignment tolerances and CD (Critical Dimension)variation of trench and contact, the distance A or B can be expressed as equal to or larger than:

$$\text{Root Square of } [(\text{Trench CD Variation})^2 + (\text{Contact CD Variation})^2 + (\text{Misalignment between Contact and Trench})^2] > 0$$

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II) Please withdrawn claims 2 to 4, 6 to 8 and 11, and Amend claims 1, 5, 12 and 13 as set forth below:

1.(Currently Amended) A trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

said trenched gate surrounding said transistor cells as closed cells constituting substantially square-shaped cells with rounded corners;

each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells, penetrating through a source region surrounding said trench gates and extending into a body region encompassing said source region;

said circular trench contact hole filled with a contact metal plug to contact said source and body regions and said circular trench contact is disposed at a distance away from a gate oxide lining of said trench gate from all circumferential points of the circular trench contact; and

said contact metal plug connected to a source metal disposed on top of said circular trench contact hole.

Claims 2 (Canceled)

Claim 3. (Canceled)

Claim 4. (Canceled)

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5. (Currently Amended) The trenched semiconductor power device of claim 1 wherein ~~further comprising~~:

said circular trench contact is disposed at substantially an equal distance away from a gate oxide lining of said trench gate from all of said circumferential points of the circular trench contact,

~~a contact resistance reduction metal layer composed of a titanium (Ti) layer sandwiched between said contact metal plug and said source metal for reducing a contact resistance between said contact metal plug and said source metal.~~

~~said circular trench contact hole filled with a contact metal plug to contact said source and body regions~~; and

Claim 6. (Canceled)

Claim 7. (Canceled)

Claim 8. (Canceled)

9. (Previously Presented) The trenched semiconductor power device of claim 1 wherein:

said contact metal plug disposed in said circular trench contact hole further comprising a Ti/TiN/W metal plug.

10. (Previously Presented) The trenched semiconductor power device of claim 1 wherein:

said source metal further comprising a layer composed of aluminum alloys including alloys of AlCu or AlSiCu.

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Claim 11. (Canceled)

12. (Currently Amended) The trenched semiconductor power device of claim 1 wherein:

said circular trench contact is further disposed at al distance away from outer edges of said source region from all of said circumferential points of the circular trench contact.

~~a diameter of a top said circular trench contact is smaller than 1.0 micrometer.~~

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13. (Currently Amended) A trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

said trenched gate surrounding said transistor cells as closed cells constituting substantially square-shaped cells with truncated corners;

each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells with a diameter at a top of said contact holes less than 1.0 micrometer, penetrating through source regions surrounding said trench gates and extending into body regions encompassing said source regions;

said circular trench contact hole <u>is disposed at a substantially an equal distance away distance from a gate oxide lining of said trench gate from all circumferential points of the circular trench contact hole and said circular trench contact hole is</u> filled with a metal plug composed of a Ti/TiN/W plug to contact said source and body regions and said metal plug contacting a source metal disposed on top of said metal plug wherein said source metal layer composed of Ti/AlCu or Ti/AlSiCu alloys.

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14. (Withdrawn) A method for fabricating a trenched semiconductor power device comprising steps of forming a trenched gate as an extended continuous trench surrounding a plurality of transistor cells further comprising:

doping a source/body metal contact region in an area surrounded by said trenched gate at a location and shape such that there is substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

15. (Withdrawn) The method of claim 14 further comprising:

doping the metal contact region having substantially a circular shape such that there is a substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

16. (Withdrawn) The method of claim 14 further comprising:

opening said trenches with truncated corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

17. (Withdrawn) The method of claim 14 further comprising:

opening said trenches with rounded corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

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18. (Withdrawn) The method of claim 14 further comprising:

forming a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.

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REMARKS

In response to the Examiner's Action mailed on Jul 15, 2009, the Drawings and the Specification are amended. Claims 2 to 4 and 6 to 8, and 11 are canceled, claims 1 and 13 are amended. The applicant hereby respectfully requests that the patent application be reconsidered.

An item-by-item response to Examiner's objections or rejections is provided in the followings:

Drawings

The Examiner objects to the drawings for the drawings must show the features presented in the claims.

In response to the objections, Figs. 2 and 3 are amended and the Replacement Sheets of drawings as now attached and submitted with this Amendment Transmittal disclose all features presented in the claims.

Specification

The Examiner objects to the Specification not providing antecedent basis for the features presented in the claims.

In response to the objections, the Specification is amended to provide antecedent basis for all features presented in the claims.

Claim Rejections -35 USC 112

The Examiner rejects claims 1, 5, 9, 10, 12, and 13 under 35 USC 112 first paragraph because the Specification does not provide sufficient disclosures to enable a person of ordinary skill in the art to make or use the invention

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commensurate in scope with the claims present in the Application.

In response to the rejection, the Specification is amended with additional cross sectional view shown in the drawings to fully support and enable a person of ordinary skill in the art to make, use and practice the inventions.

Claim Rejections -35 USC 103

The Examiner rejects claims 1, 5, 6, 9, 10 and 13 under 35 USC 102(b) as being unpatentable under Pfirsch et al US Patent Pub. 2202/0006703 in view of US Pat. 6,867,083 (Iman et al.).

In response to the rejection, claims 1, 5, 12 and 13 are amended. The amended claim 1 is directed to a trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

a) said trenched gate surrounding said transistor cells as closed cells constituting substantially square-shaped cells with rounded corners;

b) each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells, penetrating through a source region surrounding said trench gates and extending into a body region encompassing said source region;

c) said circular trench contact hole filled with a contact metal plug to contact said source and body regions and said circular trench contact is disposed at a distance away from a gate oxide lining of said trench gate from all circumferential points of the circular trench contact; and

d) said contact metal plug connected to a source metal disposed on top of said circular trench contact hole

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The amend claim 13 is directed to a trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

a) said trenched gate surrounding said transistor cells as closed cells constituting substantially square-shaped cells with truncated corners;

b) each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells with a diameter at a top of said contact holes less than 1.0 micrometer, penetrating through source regions surrounding said trench gates and extending into body regions encompassing said source regions;

c) **said circular trench contact hole is disposed at a substantially an equal distance away distance from a gate oxide lining of said trench gate from all circumferential points of the circular trench contact hole** and said circular trench contact hole is filled with a metal plug composed of a Ti/TiN/W plug to contact said source and body regions and said metal plug contacting a source metal disposed on top of said metal plug wherein said source metal layer composed of Ti/AlCu or Ti/AlSiCu alloys.

The amended claims 1 and 13 and also claims 5 and 12 are added with more specific limitations that a circular trench contact hole is disposed in the center of square-shape closed cell with rounded corners in the amended claim 1, or truncated corners in the amended claim 13. Furthermore, the circular contact trench is disposed at a distance away from the gate oxide lining of the trench gate.

The claims as now amended are totally different and not obvious over the cited prior art references. Specifically, please read Col. 3 lines 45-49 of Imam Patent that clearly states. " Distance 103 (distance between contact to gate oxide) increased the body resistance and corresponding

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value of the voltage in the body region or body voltage of transistor 100. The increased body resistance and corresponding body voltage reduced the latch-up immunity of transistor". However, Imam does not consider process variation issue which causes contact touch to gate oxide or trench gate resulting in gate/source shortage issue. Therefore, Imam disclosed contact structure with zero distance between circle contact and gate oxide or a side of source region 34 (Col. 8, lines 1-4 and lines 37-43) which is not realistic for manufacturing.

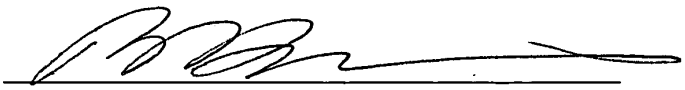
For these reasons, Iman actually teaches away from an invention according to the claims as now amended for the present invention. The configuration and method as disclosed by Iman would lead to devices manufactured with degraded gate oxide layer due to the lack of misalignment tolerance and CD variation of trench and contact allowed for the manufacturing processes. Such configuration and method when combined with Pfirsch would cause the device to malfunction due to such limitations and problems. For these reasons, the Applicant would like to respectfully request that the Examiner would consider withdraw the 25 USC 103 rejections for the claims as now amended.

With the amended drawings, specification, the canceled and amended claims, and further with the reasons provided above, the Applicants respectfully request that the objections and rejections be withdrawn and the Patent Application as amended now be allowed.

October 14, 2009

Respectfully submitted

Fwu-Iuan Hshieh

By 

Bo-In Lin - Attorney, Registration No. 33,948
13445 Mandoli Drive, Los Altos Hills, CA 94022
(650) 949-0418 (Tel) (650) 949-4118 (Fax)

October 14, 2009

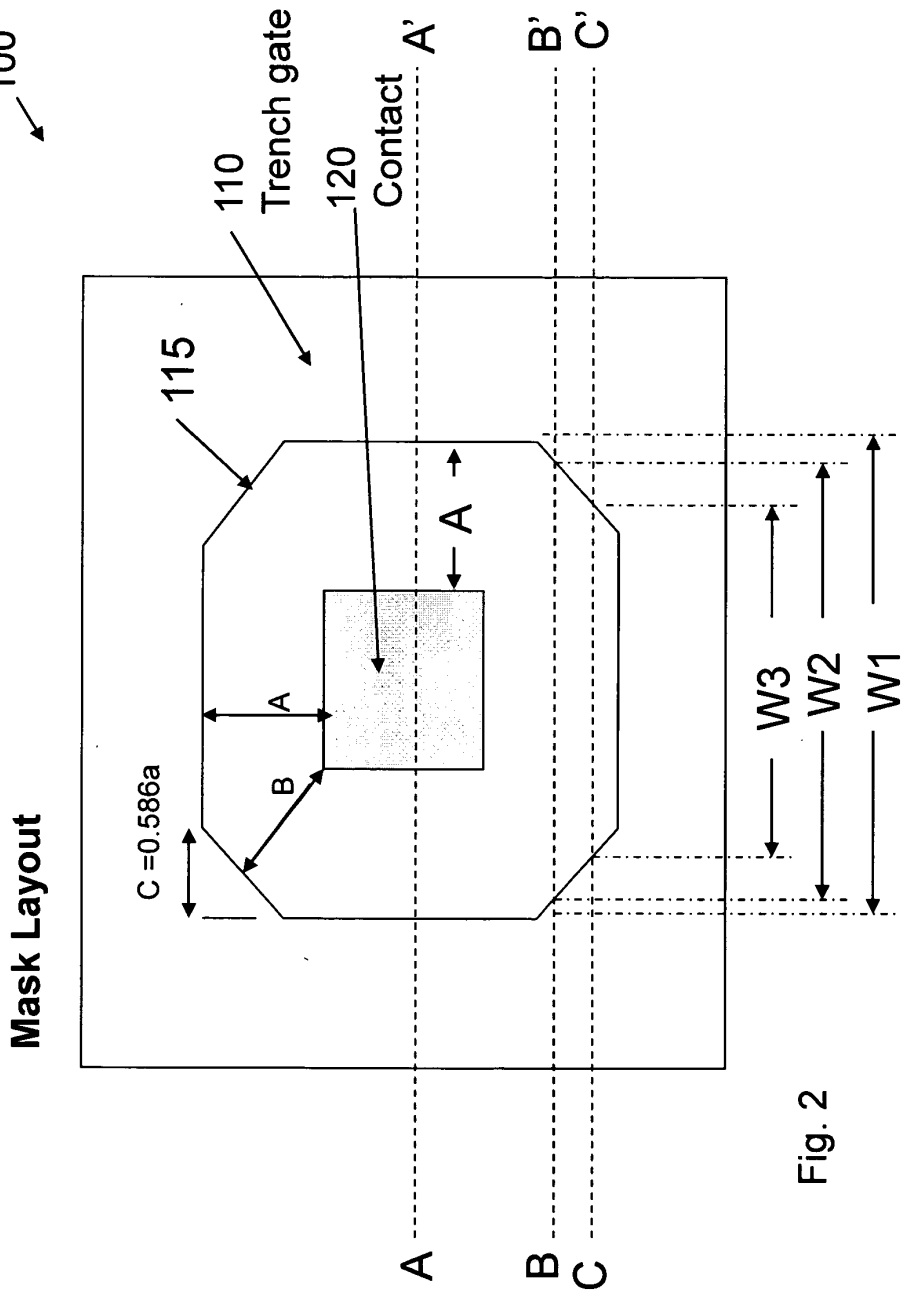

100
110
Trench gate
120
Contact
A'
B'
C'
115
A
A
B
C =0.586a
Mask Layout
W3
W2
W1
A
B
C

Fig. 2

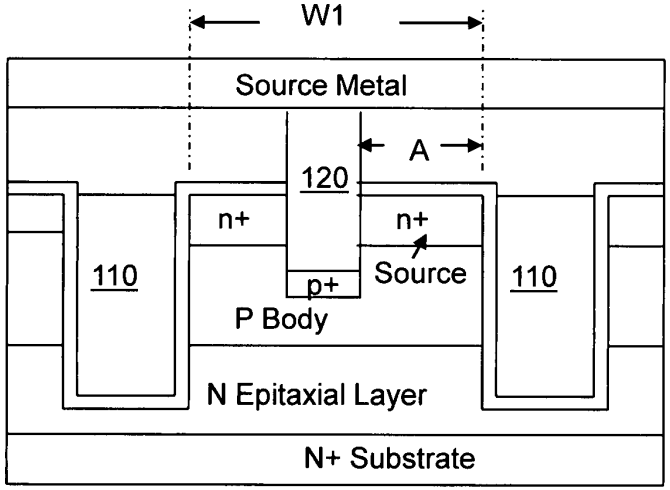


Fig. 2A (A-A' Cross Section)

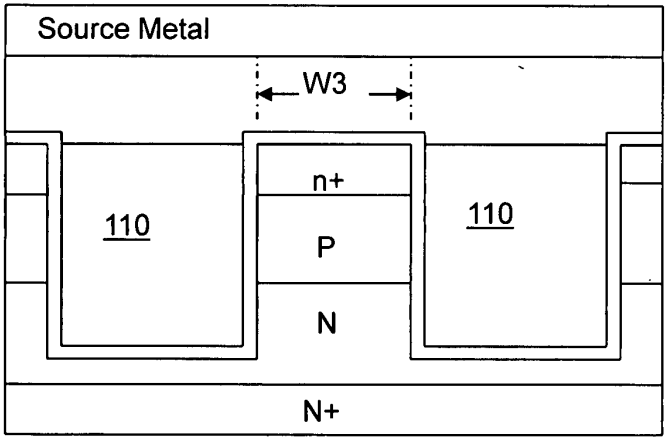


Fig. 2C (C-C' Cross Section)

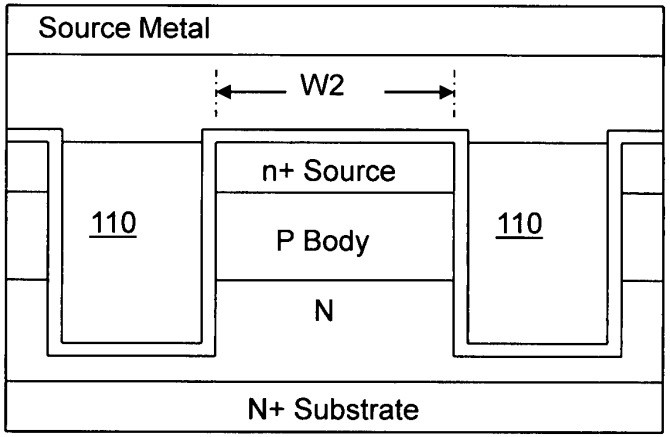


Fig. 2B (B-B' Cross Section)

1) W1 > W2 > W3

2) A (Distance between Contact and Gate Oxide)

≥ Root Square of [(Trench CD Variation) ^{2} +(Contact CD Variation)^2 + (Misalignment between Contact and Trench)^2]>0

Replacement Drawings Sheet 2 of 4 for 11/633,366 (FMOS-0601)

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EX1002.311

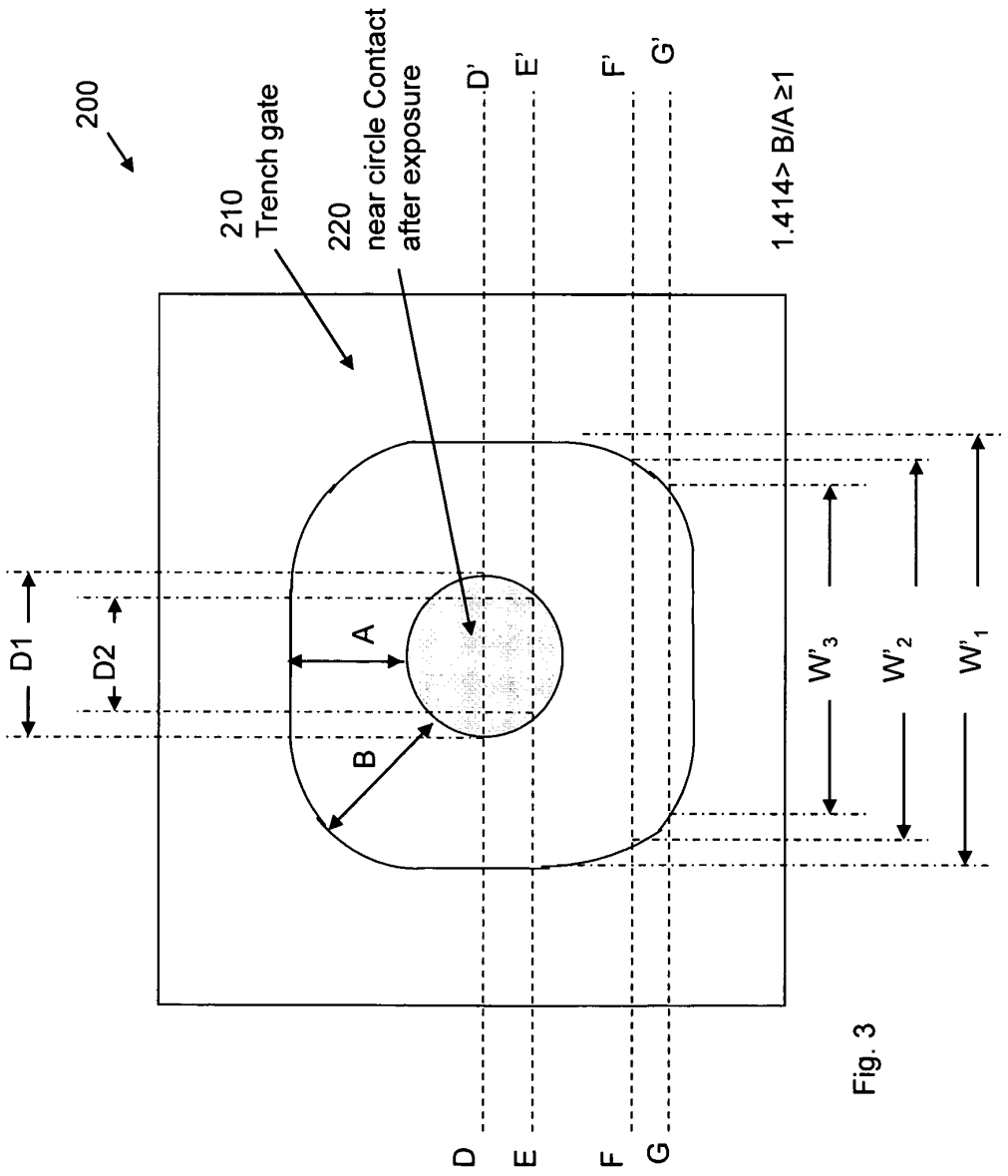

200
210
Trench gate
220
near circle Contact
after exposure
D'
E'
F'
G'
1.414> B/A ≥1
D1
D2
A
B
W'3
W'2
W'1
D
E
F
G

Fig. 3

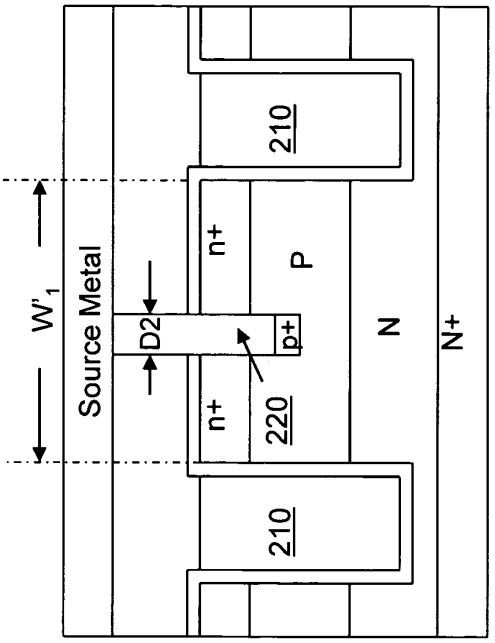


Fig. 3B (E-E' Cross Section)

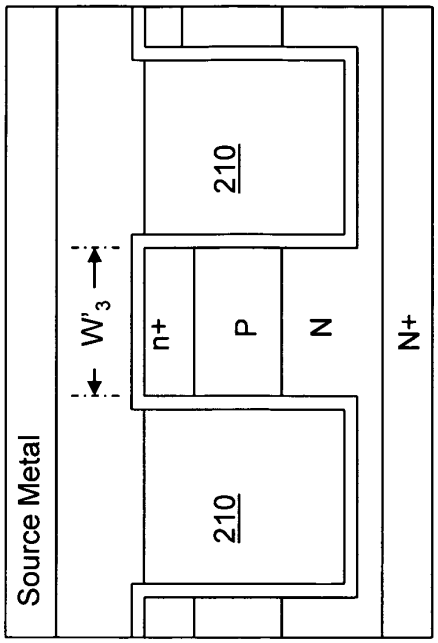


Fig. 3D (G-G' Cross Section)

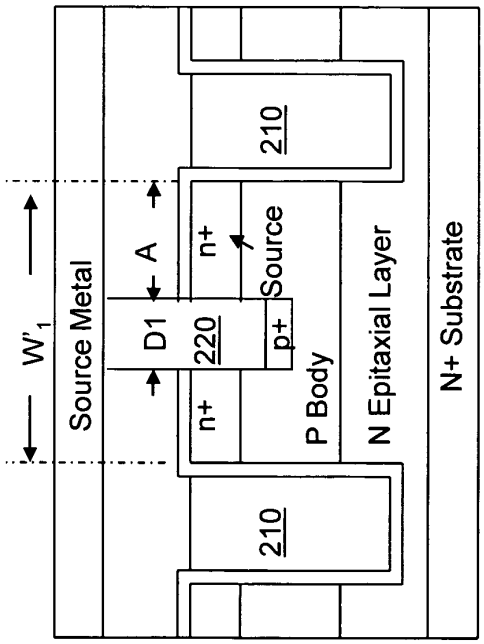


Fig. 3A (D-D' Cross Section)

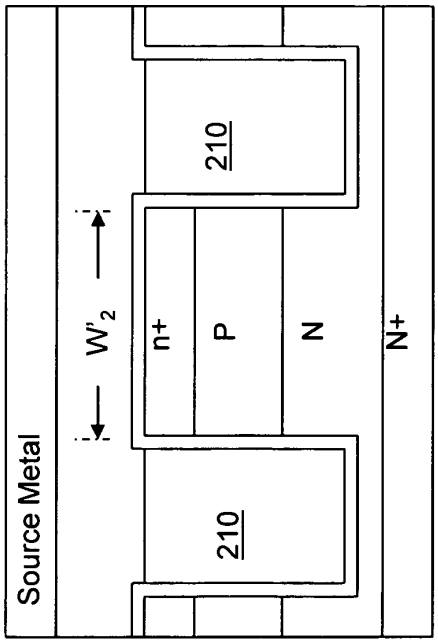


Fig. 3C (F-F' Cross Section)

DocCode - SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: **11633366** Document Date: **10/14/2009**

The presence of this form in the IFW record indicates that the following document type was received in paper and is scanned and stored in the SCORE database.

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Form Revision Date: December 8, 2006

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/633,366	Filing Date 12/04/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	10/14/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $110 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/Theresa Dawkins/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

7590 07/15/2009

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

EXAMINER	
ARROYO, TERESA M	
ART UNIT	PAPER NUMBER
2826	

MAIL DATE	DELIVERY MODE
07/15/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

uPI Semiconductor Corp.
EX1002.316

Office Action Summary	Application No.	Applicant(s)	
	11/633,366	HSHIEH, FWU-IUAN	
	Examiner	Art Unit	
	TERESA M. ARROYO	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5,9,10,12 and 13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,9,10,12 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

uPI Semiconductor Corp.
EX1002.317

DETAILED ACTION

Response to Amendment

1. The amendment to the claims filed on 04/15/09 does not comply with the requirements of 37 CFR 1.121(c) because the text of the cancelled claims should not be included. Amendments to the claims filed on or after July 30, 2003 must comply with 37 CFR 1.121(c) which states:

> (c) *Claims*. Amendments to a claim must be made by rewriting the entire claim with all changes (*e.g.*, additions and deletions) as indicated in this subsection, except when the claim is being canceled. Each amendment document that includes a change to an existing claim, cancellation of an existing claim or addition of a new claim, must include a complete listing of all claims ever presented, including the text of all pending and withdrawn claims, in the application. The claim listing, including the text of the claims, in the amendment document will serve to replace all prior versions of the claims, in the application. In the claim listing, the status of every claim must be indicated after its claim number by using one of the following identifiers in a parenthetical expression: (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).
>
> (1) *Claim listing.* All of the claims presented in a claim listing shall be presented in ascending numerical order. Consecutive claims having the same status of "canceled" or "not entered" may be aggregated into one statement (*e.g.*, Claims 1–5 (canceled)). The claim listing shall commence on a separate sheet of the amendment document and the sheet(s) that contain the text of any part of the claims shall not contain any other part of the amendment.
>
> (2) *When claim text with markings is required.* All claims being currently amended in an amendment paper shall be presented in the claim listing, indicate a status of "currently amended," and be submitted with markings to indicate the changes that have been made relative to the immediate prior version of the claims. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. Only claims having the status of "currently amended," or "withdrawn" if also being amended, shall include markings. If a withdrawn claim is currently amended, its status in the claim listing may be identified as "withdrawn—currently amended."
>
> (3) *When claim text in clean version is required.* The text of all pending claims not being currently amended shall be presented in the claim listing in clean

version, *i.e.*, without any markings in the presentation of text. The presentation of a clean version of any claim having the status of "original," "withdrawn" or "previously presented" will constitute an assertion that it has not been changed relative to the immediate prior version, except to omit markings that may have been present in the immediate prior version of the claims of the status of "withdrawn" or "previously presented." Any claim added by amendment must be indicated with the status of "new" and presented in clean version, *i.e.*, without any underlining.

(4) *When claim text shall not be presented; canceling a claim.*

(i) No claim text shall be presented for any claim in the claim listing with the status of "canceled" or "not entered."

(ii) Cancellation of a claim shall be effected by an instruction to cancel a particular claim number. Identifying the status of a claim in the claim listing as "canceled" will constitute an instruction to cancel the claim.

(5) *Reinstatement of previously canceled claim.* A claim which was previously canceled may be reinstated only by adding the claim as a "new" claim with a new claim number.

Since the reply filed on 04/15/09 appears to be *bona fide*, the amendment has been entered, however, in the next response, Applicant mus submit an amendment in compliance with 37 CFR 1.121 in order to avoid abandonment.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 5, 9, 10, 12, 13 have been considered but are moot in view of the new ground(s) of rejection.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "a contact metal plug to contact said source and body regions" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: There is no support in the specification for a contact resistance reduction metal layer as recited in claim 5, a contact metal plug as recited in claim 9, a source metal layer as recited in claim 10, a metal plug, a source metal layer, contact holes as recited in claim 13.

5.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1, 5, 9, 10, 12, 13 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a top view of a closed cell and a metal contact surrounded by a gate, does not reasonably provide enablement for a contact hole penetrating through a source region and extending into body regions and a contact metal plug to contact the source and body regions. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. The specification does not provide enablement for claims 5, 9, 10, or 13 at all. A cross-sectional view similar to prior art Figures 1B-1D would be helpful to understand the invention recited in claims 1 and 13.

8. The other claims are rejected as being dependent on an indefinite base claim.

Claim Rejections - 35 USC § 103

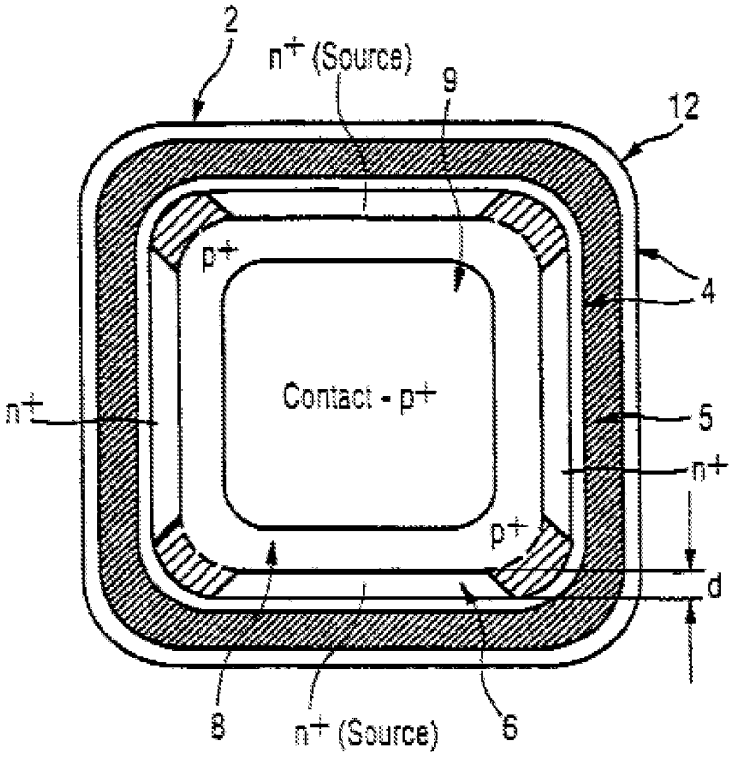
9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1, to the extent taught and understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Pub. No. 2002/0006703 to Pfirsch et al. in view of US Patent No. 6,867,083 to Imam et al.

10. Regarding claim 1, in Fig. 2 Pfirsch et al. disclose a trenched semiconductor power device comprising a trenched gate 5 disposed in an extended continuous trench 2 surrounding a plurality of transistor cells 12, wherein: said trenched gate 5 surrounding said transistor cells 12 as closed cells constituting substantially square-shaped cells with rounded corners; each of said closed cells 12 further includes a trench contact hole 9 disposed substantially in a central portion of said closed cells 12, penetrating through [a] source region 6 surrounding said trench gates 5 and extending into body regions 7 encompassing said source regions 6; said trench contact hole 9 filled with a contact metal plug to contact said source 6 and body 7 regions; and said contact metal plug connected to a source metal disposed on top of said trench contact hole 9 (col. 8 lines 53-62, col. 10 lines 62-67, col. 11 lines 1-3). However, Pfirsch et al. do not teach a circular trench contact hole.

FIG 2



11.

12. In Figs 5, 6, 9, 10, Imam et al. teach a trenched semiconductor power device comprising a trenched gate 43, an extended continuous trench 26, a plurality of substantially square-shaped cells 37 (col. 5, lines 35-59); each of said closed cells further includes a circular trench contact hole 36/46/50 disposed substantially in a central portion of said closed cells 37, penetrating through [a] source region 34 surrounding said trench gates 43 and extending into body regions 33 encompassing said source regions 34; said circular trench contact hole 36/46/50 filled with a contact metal plug to contact said source 34 and body 33 regions; and said contact metal plug

connected to a source metal disposed on top of said circular trench contact hole 36/46/50 (col. 4, lines 63-67).

13. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a circular trench contact hole in Pfirsch et al. because such a configuration increases the density of the semiconductor devices and reduces the on-resistance as taught by Imam et al. in col. 7, line 50 to col. 8, line 16.

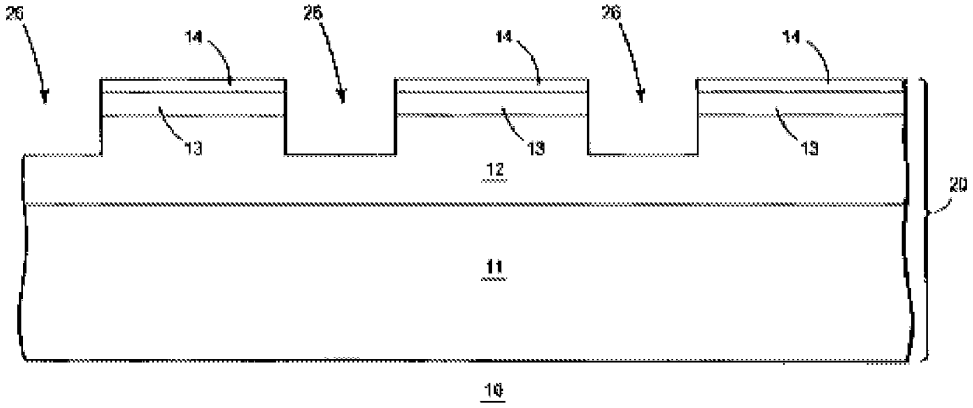


FIG. 5

14.

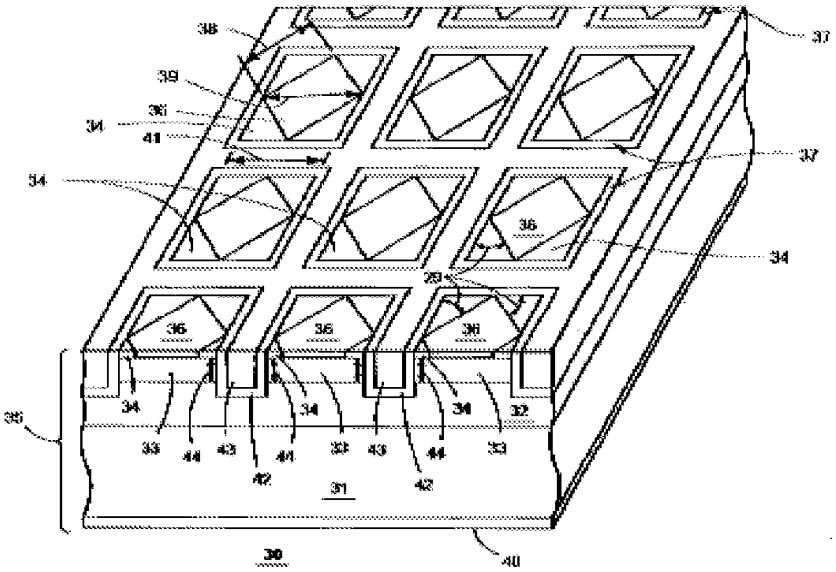


FIG. 6

15.

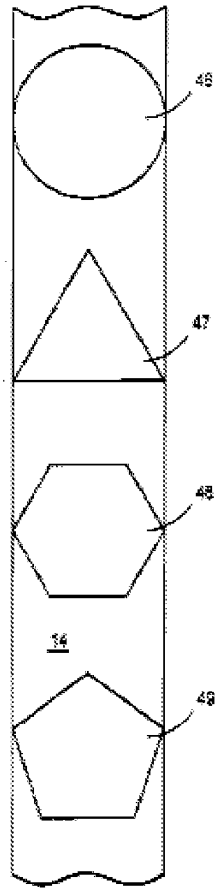


FIG. 9

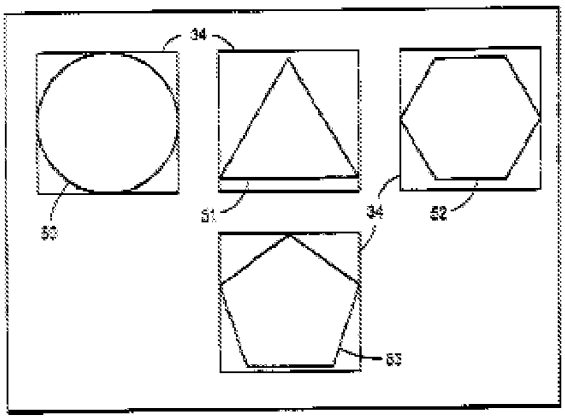


FIG. 10

16.

17. Claims 5, 9, 12, 13, to the extent taught and understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Pfirsch et al. in view of Imam et al. as discussed regarding claim 1 above, and further in view of U.S. Patent No. 6,288,454 to Allman et al.

18. The teachings of Pfirsch et al. as modified by Imam et al. have been previously discussed above, however the combination fails to teach the following:

19. Claim 5, a contact resistance reduction metal layer composed of a titanium (Ti) layer sandwiched between said contact metal plug and said source metal for reducing a contact resistance between said contact metal plug and said source metal.

20. Claim 9, said contact metal plug disposed in said circular trench contact hole, source/body contact trench further comprising a Ti/TiN/W metal plug.

21. Claim 12, a diameter of a top said circular trench contact is smaller than 1.0 micrometer.

22. Claim 13, each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells with a diameter at a top of said contact holes less than 1.0 micrometer; composed of a Ti/TiN/W plug to contact said source and body regions and said metal plug contacting a source metal disposed on top of said metal plug wherein said source metal layer composed of Ti/AlCu or Ti/AlSiCu alloys.

23. In Fig. 1E, Allman et al. teach a contact resistance reduction layer (metal interconnect layer 28) composed of titanium/titanium nitride/tungsten (Ti/TiN/W) as a low resistance metal (col. 6, lines 20-43).

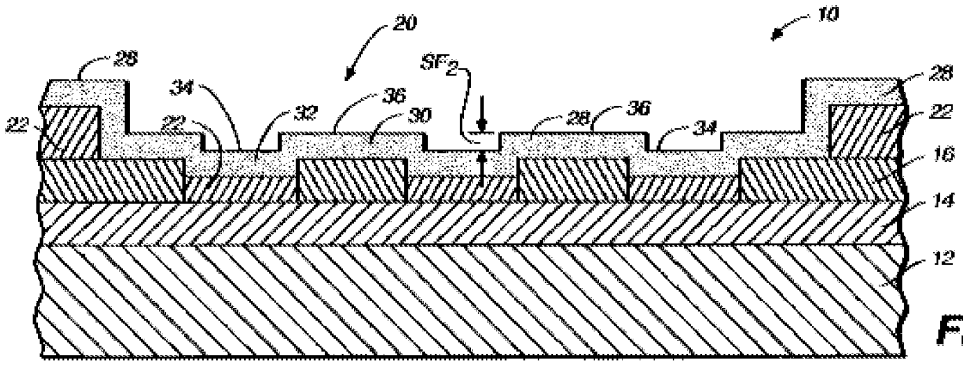


FIG._1E

24.

25. Therefore, regarding claims 5, 9, 13, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Ti in the modified device of Pfirsch et al. because it is well known in the art that contact resistance layers are frequently composed of a Ti because of their electrically conductive properties as in Allman et al. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

26. Regarding claims 12, 13, Pfirsch et al. teach that the distance from a rounded corner of the trench contact (9) to the closest rounded corner of the transistor cell (12) is substantially equal to the distance of an edge of the trench contact to an edge of the transistor cell. Because these distances are substantially equal, then the ratio of the two distances would be a value less than one (longer distance divided by shorter distance). Also, Imam et al. discuss the diameter of the circular trench in col. 4, lines 11-22 and col. 6, lines 18-28.

27. Further, it would have been prima facie obvious to modify Pfirsch et al. to obtain the invention as specified in claim 12 because such a modification would have been considered a mere design consideration which fails to patentably distinguish over the prior art of Pfirsch et al. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950) (Claims to a hydraulic power press which read on the prior art except with regard to the position of the starting switch were held unpatentable because shifting the position of the starting switch would not have modified the operation of the device.); *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975) (the particular placement of a contact in a conductivity measuring device was held to be an obvious matter of design choice). However, "The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device." *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).

28. Claim 10, to the extent taught and understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Pfirsch et al. in view of Imam et al. as discussed regarding claim 1 above, and further in view of U.S. Patent No. 6,949,432 to Blanchard.

29. Regarding claim 10, the combination of references fails to teach said source metal comprising a layer composed of aluminum alloy including alloys of AlCu or AlSiCu.

30. In Fig. 10b, Blanchard teaches a source metal 29b composed of aluminum alloy.

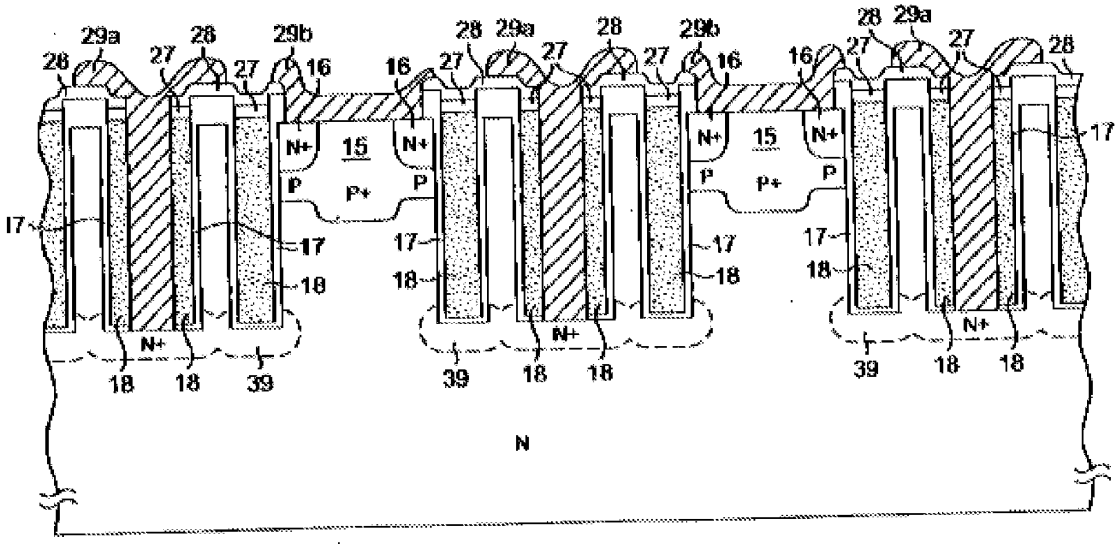


FIG. 10b

31.

32. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an aluminum alloy n the modified device of Pfirsch et al. because they are widely used in the art as in Blanchard.

Conclusion

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The other references cited on PTO-892 teach cells having rounded corners.

34. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TERESA M. ARROYO whose telephone number is (571) 272-7260. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TMA

/Leonardo Andújar/

Primary Examiner, Art Unit 2826

Notice of References Cited	Application/Control No. 11/633,366	Applicant(s)/Patent Under Reexamination HSHIEH, FWU-IUAN	
	Examiner TERESA M. ARROYO	Art Unit 2826	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,107,661 A	08-2000	Okabe et al.	257/330
*	B	US-6,320,223 B1	11-2001	Hueting et al.	257/341
*	C	US-6,867,083 B2	03-2005	Imam et al.	438/212
*	D	US-6,936,890 B2	08-2005	Hueting et al.	257/330
*	E	US-2006/0202264 A1	09-2006	Bhalla et al.	257/330
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	Teresa M. Arroyo	2826

SEARCHED			
Class	Subclass	Date	Examiner
257	330, 331, 372, e27.063	07/08/09	TMA

SEARCH NOTES		
Search Notes	Date	Examiner
EAST	07/08/09	TMA

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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EX1002.334

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	Teresa M. Arroyo	2826

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/30/2008	01/17/2009	07/08/2009						
	1	÷	✓	✓						
	2	÷	✓	-						
	3	÷	✓	-						
	4	÷	✓	-						
	5	÷	✓	✓						
	6	÷	✓	-						
	7	÷	✓	-						
	8	÷	✓	-						
	9	÷	✓	✓						
	10	÷	✓	✓						
	11	÷	✓	-						
	12	÷	✓	✓						
	13	÷	✓	✓						
	14	÷	N	N						
	15	÷	N	N						
	16	÷	N	N						
	17	÷	N	N						
	18	÷	N	N						

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EX1002.335

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	71	power.bstx. and corner $2.bstx. and bipolar. bstx. and (trench$3 with gate) and 257/330,331,372, e27.063.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2009/06/09 13:22
L2	44	("5072266" | "5168331" | "5341011").PN. OR ("5866931").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2009/06/09 13:24
L3	12	power.bstx. and corner $2.bstx. and (bipolar with latch$6).bstx. and (trench$3 with gate)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2009/06/09 13:35
L4	150	("4593302" | "4631564" | "4663644" | "4680853" | "4767722" | "4794561" | "4824793" | "4893160").PN. OR ("5072266").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2009/06/09 13:44
L5	13	("20030062570" | "20030127688" | "5072266" | "5541425" | "5656843" | "5744826" | "5770878" | "5866931" | "6107661" | "6133587" | "6215149" | "6525373").PN. OR ("6781196").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2009/06/09 13:44
L6	4	("20040036121" | "6168996" | "6445036" | "7126187").PN. OR ("7361952").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2009/06/09 13:46
L7	22	("4941026" | "5072266" | "5698880" | "5714781" | "5747851" | "5776812" | "5780324").PN. OR ("6107661").URPN.	US-PGPUB; USPAT; USOCR	AND	ON	2009/06/09 13:48
S1	12	power.bstx. and corner $2.bstx. and (bipolar with latch$6).bstx. and (trench$3 with gate)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2009/06/09 13:14

6/9/2009 1:52:30 PM

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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	("20020006703").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 11:52
L2	1	("6541818").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 11:52
L3	1	("6949432").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 12:09
L4	1	("20060102953").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 15:01
L5	62	semiconductor and power and (gate near3 trench$2) and (cell near6 (round or circular))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2009/07/08 15:02
L6	38	l5 and (hole or contact or plug or trench) near6 source near6 body	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2009/07/08 15:02
L7	20	l6 and @pd<"20061204"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2009/07/08 15:03
L8	1	("6031265").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 15:42
L9	1	("4941026").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 15:47
L10	1	("6133587").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 15:52
L11	1	("6867083").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 15:56
L12	1	("6288454").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 17:21
L13	2	"633366".apn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2009/07/08 17:45
L14	6	(("6107661") or ("200610295351683 31") or ("5866931") or ("6133587") or ("6168996") or ("7528444") or ("6781196")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 18:36

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L15	14	(US-20060102953-$ or US-20060202264-$ or US-20030047776-$ or US-20050088895-$).did. or (US-6936890-$ or US-6320223-$ or US-4941026-$ or US-6133587-$ or US-6867083-$ or US-6168996-$ or US-6781196-$ or US-7528444-$ or US-6107661-$ or US-5866931-$).did.	US-PGPUB; USPAT	AND	ON	2009/07/08 18:38
L16	0	("l15and(roundorcircular)").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/07/08 18:38
L17	9	l15 and (round or circular)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT	AND	ON	2009/07/08 18:39

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04-16-09 IFW

OIPE IAP40 APR 15 2009 PATENT & TRADEMARK OFFICE

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh, :Date: April 15, 2009

Serial No.: 11/633,366 : Group No.: 4136

Filed: December 4, 2006 : Examiner: Stacy P. Barbadillo

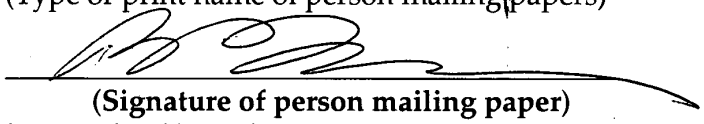
Attorney Docket No.: FMOS-0601 @571-270-7430,273-8300(F)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Office Response Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date **April 15, 2009** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EB 892837735 US"** addressed to the: Commissioner of Patents and Trademarks, Alexandria, VA. 22313-1450.

Bo-In Lin

(Type or print name of person mailing papers)



(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon to mailing. 37 CFR 1.10(b).

To the Commissioner of Patents and Trademarks:

AMENDMENT

Dear Sir:

In response to the Examiner's Action mailed on January 26, 2009, the Applicant hereby respectfully requests that the above referenced Patent Application be amended as set forth below:

April 15, 2009

I) Please amend the Specification as set forth below:

1) Please replace the paragraph starting from line 32 to page 3, line 6 with a paragraph as set forth below:

Another aspect of the present invention to provide new and improved manufacturing process to manufacture a semiconductor power device with improved closed cell configuration wherein the surrounding gate is arranged with truncated corner layout. The manufacturing process includes a step of "exposure through the mask such that the square contact becomes approximately circular shaped contact and truncated corners become smoother. The truncated corners are formed by design layout and not by process. It is by nature that the truncated corners in layout become rounded after exposure due to resolution issue of 0.18 to 0.35 μm photolithography. The spaces between the trenched gate and the metal contact are therefore more uniform in the closed cell to enhance the device ruggedness.

2) Please delete line 6 on page 3 as set forth below:

~~(I think it is OK to leave this paragraph here for later reference if it is correct)~~

April 15, 2009

II) Please withdrawn claims 2 to 4, 6 to 8 and 11, and Amend claims 1, 5 and 9 to 13 as set forth below::

1.(Currently Amended) A trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

said trenched gate surrounding said transistor cells as closed cells constituting substantially square-shaped cells with ~~truncated~~ rounded corners;

each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells, penetrating through a source regions surrounding said trench gates and extending into body regions encompassing said source regions;

said circular trench contact hole filled with a contact metal plug to contact said source and body regions; and

said contact metal plug connected to a source metal disposed on top of said circular trench contact hole.

2. (Canceled) The trenched semiconductor power device of claim 1 wherein:

said closed cells further includes a contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with substantially a uniform space between them.

April 15, 2009

3. (Canceled) The trenched semiconductor power device of claim 2 further comprising:

a doped contact region disposed below said contact metal to enhance an electrical contact between the metal contact and the source region and the body region, and the doped contact region having substantially a uniform space between the contact dopant region and the trenched gate surrounding the closed cells.

4. (Canceled) The trenched semiconductor power device of claim 1 further comprising:

an insulation layer covering said power device having a source/body contact opened through said insulation and extended into an epitaxial layer in said semiconductor substrate for disposing a metal contact therein to contact a source region and a body region of said semiconductor power device wherein said contact opening disposed substantially at a center of an area surrounded by said trenched gate whereby there is substantially a uniform space between them.

5. (Currently Amended) The trenched semiconductor power device of claim 1 further comprising:

a contact resistance reduction metal layer composed of a titanium (Ti) layer sandwiched between said contact metal plug and said source metal for reducing a contact resistance between said contact metal plug and said source metal. ~~a low resistance metal for covering an interface area between said source region and said body region and said contact metal for reducing a contact resistance to said source region and said body region.~~

April 15, 2009

6. (Canceled) The trenched semiconductor power device of claim 5 wherein:

said contact resistance reduction layer composed of or Ti/TiN as said low resistance metal.

7. (Canceled) The trenched semiconductor power device of claim 4 further comprising:

a contact resistance reduction doped region comprising a region of high concentration dopant ions disposed below said contact opening for reducing a resistance of said contact metal to said body region of said semiconductor power device.

8. (Canceled) The trenched semiconductor power device of claim 4 further comprising:

an insulation layer covering said power device having a source/body contact opened through said insulation layer and extended into said source and body regions for disposing a metal contact plug therein to contact a source region and a body region of said semiconductor power device wherein said source/body contact surrounded by said trenched gate having a substantially uniform space between them.

9. (Currently Amended) The trenched semiconductor power device of claim 1 wherein:

said contact metal plug disposed in said circular trench contact hole ~~source/body contact trench~~ further comprising a Ti/TiN/W metal plug.

April 15, 2009

10. (Currently Amended) The trenched semiconductor power device of claim 1 wherein:

said source metal further comprising a layer composed of aluminum alloys including alloys of AlCu or AlSiCu. ~~contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/Al alloy plug.~~

11. (Canceled) The trenched semiconductor power device of claim 8 further comprising:

a contact resistance reduction doped region disposed in said substrate comprising a region of high concentration dopant ions in contact with said source/body contact for reducing a resistance of said contact metal to said source region and body region of said semiconductor power device.

April 15, 2009

12. (Currently Amended) The trenched semiconductor power device of claim 1 wherein ~~further comprising~~:

a diameter of a top said circular trench contact is smaller than 1.0 micrometer.

~~closed cells further includes a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.~~

13. (Currently Amended) A trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

said trenched gate surrounding said transistor cells as closed cells constituting substantially square-shaped cells with ~~rounded~~ truncated corners.

each of said closed cells further includes a circular trench contact hole disposed substantially in a central portion of said closed cells with a diameter at a top of said contact holes less than 1.0 micrometer, penetrating through source regions surrounding said trench gates and extending into body regions encompassing said source regions;

said circular trench contact hole filled with a metal plug composed of a Ti/TiN/W plug to contact said source and body regions and said metal plug contacting a source metal disposed on top of said metal plug wherein said source metal layer composed of Ti/AlCu or Ti/AlSiCu alloys.

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14. (Withdrawn) A method for fabricating a trenched semiconductor power device comprising steps of forming a trenched gate as an extended continuous trench surrounding a plurality of transistor cells further comprising:

doping a source/body metal contact region in an area surrounded by said trenched gate at a location and shape such that there is substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

15. (Withdrawn) The method of claim 14 further comprising:

doping the metal contact region having substantially a circular shape such that there is a substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

16. (Withdrawn) The method of claim 14 further comprising:

opening said trenches with truncated corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

17. (Withdrawn) The method of claim 14 further comprising:

opening said trenches with rounded corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

April 15, 2009

18. (Withdrawn) The method of claim 14 further comprising:

forming a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.

April 15, 2009

REMARKS

In response to the Examiner's Action mailed on January, 26, 2009, claims 2 to 4 and 6 to 8, and 11 are canceled, claims 1, 5, 9, 10, and 12 to 13 are amended. The applicant hereby respectfully requests that the patent application be reconsidered.

An item-by-item response to Examiner's objections or rejections is provided in the followings:

Claim Rejections -35 USC 102

The Examiner rejects claims 1 and 13 under 35 USC 102(b) as being anticipated by Pfirsch et al ('818).

In response to the rejection, claims 1 and 13 are amended. The amended claims are added with more specific limitations that a circular trench contact hole is disposed in the center of square-shape closed cell with rounded corners in the amended claim 1, or truncated corners in the amended claim 13. These structural features are shown in Fig. 3 of the present patent application. Specifically, claim 13 is amended to direct to a trenched semiconductor power device comprising a circular trench contact hole with top diameter less than 1.0 micrometer, and Ti/AlCu or Ti/AlSiCu as source metal connecting to Ti/TiN/W contact metal plug. The amended claims 1 and 13 are different and not obvious over Pfirsch because these structural features have not been shown or suggested by Pfirsch et al. and also different from the Ti/TiN/Al plug as shown in Allman ('454).

Furthermore, the amended claims 1 and 13 have different top view of closed cells from that of Pfirsch which has a closed cell with square trench gate with rounded corner and square contact with rounded corner as shown in Fig. 2, 5 and 6 in Pfirsch.

April 15, 2009

Claim Rejections -35 USC 103

The Examiner rejects claims 2 and 3 under 35 USC 103(a) as being unpatentable over Pfirsch et al. in view of Blanchard. In response to the rejection, claims 2 and 3 are canceled.

The Examiner rejects claims 4, 5, 7, 8 and 11 under 35 USC 103(a) as being unpatentable over Pfirsch et al. in view of Hshieh. In response to the rejection, claims 4, 7, 8 and 11 are canceled and claim 5 are amended.

The amended claim 5 is directed to a metal layer deposited between contact metal plug and source metal for contact resistance reduction between the metal plug and the source metal instead of a shallow high concentration body dopant layer 139 for reduction contact resistance between source metal and body region cited by the Examiner from col. 9, lines 7-15 of Hshieh. A more careful reading of the col. 9, lines 7-15 as below, the amended claim 5 certainly clarifies that Hshieh does not teach a resistance reduction metal layer sandwiched between the metal plug and the source metal as now amended.

[7-15] A shallow body dopant implant is then carried out also through the contact openings with boron ions at 30-80 KeV with an ion beam of $2X10^{14}$ to $1X10^{15}/cm^2$ flux density thus forming a shallow high concentration body dopant regions 139 to reduce the contact resistance and further improve the device ruggedness. A layer of contact metal is deposited over the entire top surface. A metal mask is then employed to etch and define the source contact s 150 and the gate contact 180.

The Examiner rejects claims 6, 9 and 10 under 35 USC 103(a) as being unpatentable over Pfirsch et al. in view of Hshieh and further in view of Allman. In response to the rejection, claim 6 is canceled by merging it into claim 5 with the reason specified above regarding to amended claim 5, and claims 6 and 9 are amended. The amended claims 6 and 9 now includes a

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further limitation with a narrower scope wherein the contact metal plug is disposed into a circular trench contact hole penetrating through the source region and extending into body region as that specified in the amended claim 1 which is quite different from the disclosures made by Hshieh and Allman (contact hole does not etch through source region and into body region).

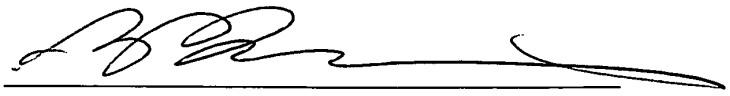
The Examiner rejects claim 12 under 35 USC 103(a) as being unpatentable over Pfirsch. In response to the rejection, claim 12 is amended with limitation of top diameter of the circular trench contact hole smaller than 1.0 micrometer and furthermore, that since claim 12 is dependent on a novel and non-obvious claim 1 as now amended, claim 12 would also be novel, non-obvious and would be allowable according the newly added limitation to further narrow and limit the scopes of the claims.

With the amended specification, the canceled and amended claims, and further with the reasons provided above, the Applicants respectfully request that the objections and rejections be withdrawn and the Patent Application as amended now be allowed.

April 15, 2009

Respectfully submitted

Fwu-Iuan Hshieh

By 

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13445 Mandoli Drive, Los Altos Hills, CA 94022
(650) 949-0418 (Tel) (650) 949-4118 (Fax)

April 15, 2009

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/633,366	Filing Date 12/04/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	**04/15/2009**	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 18	Minus	** 20	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $110 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/LAJUAN HICKSON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

7590 01/26/2009

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

EXAMINER	
BARBADILLO, STACY P	
ART UNIT	PAPER NUMBER
4136	

MAIL DATE	DELIVERY MODE
01/26/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

uPI Semiconductor Corp.
EX1002.353

Office Action Summary	Application No.	Applicant(s)	
	11/633,366	HSHIEH, FWU-IUAN	
	Examiner	Art Unit	
	STACY P. BARBADILLO	4136	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *14-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

uPI Semiconductor Corp.
EX1002.354

DETAILED ACTION

Amendment/Response to Election/Restriction

1. Applicant's election without traverse of claims 1-13 in the reply filed on October 31, 2008 is acknowledged.

Claims 14-18 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on October 31, 2008.

Specification

2. The disclosure is objected to because of the following informalities:

Page 2, line 36 of the specification has been lined through. Line 36 requires proper editing so that the entire sentence makes sense.

Page 3, line 8 of the specification includes applicant's remarks in parentheses and should be removed.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Pfirsch et al. (U.S. Patent No. 6,541,818, from hereinafter "Pfirsch").

Regarding claim 1, Pfirsch discloses a trenched semiconductor power device comprising a trenched gate (trench 2, source region 6, body region 7) disposed in an extended continuous trench surrounding a plurality of transistor cells (transistor cell 12), wherein: said trenched gate surrounding said transistor cells as closed cells with truncated corners (col. 8 lines 53-62, col. 10 lines 62-67, col. 11 lines 1-3) (see figs. 1-7A).

Regarding claim 13, Pfirsch discloses a trenched semiconductor power device comprising a trenched gate (trench 2, source region 6, body region 7) disposed in an extended continuous trench surrounding a plurality of transistor cells (transistor cell 12), wherein: said trenched gate surrounding said transistor cells as closed cells with rounded corners (col. 8 lines 53-62, col. 10 lines 62-67, col. 11 lines 1-3) (see figs. 1-7A).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pfirsch in view of Blanchard (U.S. Patent No. 6,949,432, from hereinafter “Blanchard”). The teachings of Pfirsch have been previously discussed above.

Regarding claim 2, Pfirsch fails to teach said closed cells further includes a contact metal to contact a contact source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with substantially a uniform space between them.

However, Blanchard does teach said closed cells further includes a contact metal (metal layer 23) to contact a contact source and a body regions (drain contact regions 29*a*) of said semiconductor power device wherein said contact metal surrounded by said trenched gate (gate electrode 18) with substantially a uniform space between them (col. 8, lines 15-28) (see figs. 3, 10*a*, 10*b*).

In view of the teaching of Blanchard, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch with the teaching of Blanchard in order to complete the transistor structure.

It is well know in the art that metal layers are typically used to interconnect each device within itself as well as to connect the device to other metal layers. Without this interconnectivity, the device would not operate as the transistor would be incomplete.

Regarding claim 3, Pfirsch fails to teach a doped contact region disposed below said contact metal to enhance an electrical contact between the metal contact and the source region and the body region, and the doped contact region having substantially a uniform space between the contact dopant region and the trenched gate surrounding the closed cells.

However, Blanchard does teach a doped contact region (drain access region 26) disposed below said contact metal to enhance an electrical contact between the metal

contact and the source region (source regions 16*a*/16*b*) and the body region (body regions 15*a*/15*b*), and the doped contact region having substantially a uniform space between the contact dopant region and the trenched gate surrounding the closed cells (col. 5, lines 2-8) (see figs. 1-3).

In view of the teaching of Blanchard, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch with the teaching of Blanchard to dope the contact region in order to reduce the resistivity between the device itself and the metal layers above the device.

It is well known in the art that reducing resistivity in a transistor to improve electrical conductivity can be done by doping the appropriate device regions with impurities. This doping is beneficial to the device as a path lower in resistance is created which allows current flow within the device and to and from the device to flow more freely.

5. Claims 4, 5, 7, 8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pfirsch in view of Hshieh (U.S. Patent No. 6,031,265, from hereinafter “Hshieh”). The teachings of Pfirsch have been previously discussed above.

Regarding claim 4, Pfirsch fails to teach an insulation layer covering said power device having a source/body contact opened through said insulation and extended into an epitaxial layer in said semiconductor substrate for disposing a metal contact therein to contact a source region and a body region of said semiconductor power device wherein said contact opening disposed substantially at a center of an area surrounded by said trenched gate whereby there is substantially a uniform space between them.

However, Hshieh does teach an insulation layer (insulation layer 145) covering said power device having a source/body contact opened through said insulation and extended into an epitaxial layer in said semiconductor substrate for disposing a metal contact therein to contact a source region and a body region of said semiconductor power device wherein said contact opening disposed substantially at a center of an area surrounded by said trenched gate whereby there is substantially a uniform space between them (col. 8, lines 59-67) (see figs. 4F-4H).

In view of the teaching of Hshieh, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch with Hshieh to achieve an insulation layer that covered the entire transistor.

It is well known in the art that insulation layers are utilized in the making of transistors for electrical isolation between devices. It is beneficial to put down insulation layers so that transistors do not interfere with each other electrically, which would lead to device failure.

Regarding claim 5, Pfirsch fails to teach a contact resistance reduction layer composed of a low resistance metal for covering an interface area between said source region and said body region and said contact metal for reducing a contact resistance to said source region and said body region.

However, Hshieh does to teach a contact resistance reduction layer composed of a low resistance metal for covering an interface area between said source region and said body region and said contact metal for reducing a contact resistance to said source region and said body region (col. 9, lines 7-15) (see fig. 4H).

In view of the teaching of Hshieh, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch with Hshieh in order to achieve a contact resistance reduction layer in the transistor.

It is well known in the art that a contact resistance layer in a transistor is beneficial because the device will perform more efficiently. Lower resistance to current in the device also increases the robustness of the device, which leads to decreased chances that the device will fail to operate.

Regarding claim 7, Pfirsch fails to teach a contact resistance reduction doped region comprising a region of high concentration dopant ions disposed below said contact opening for reducing a resistance of said contact metal to said body region of said semiconductor power device.

However, Hshieh does teach a contact resistance reduction doped region comprising a region of high concentration dopant ions disposed below said contact opening for reducing a resistance of said contact metal to said body region of said semiconductor power device (col. 8, line 67, col. 9, lines 1-7) (see fig. 4H).

In view of the teaching of Hshieh, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch with Hshieh in order to achieve a contact resistance reduction doped region below the contact opening of the transistor.

It is well known in the art that doping this region of a transistor is beneficial to the device in that the doped impurities are useful in reducing the parasitic resistance and thus increasing device ruggedness.

Regarding claim 8, Pfirsch fails to teach an insulation layer covering said power device having a source/body contact opened through said insulation layer and extended into said source and body regions for disposing a metal contact plug therein to contact a source region and a body region of said semiconductor power device wherein said source/body contact surrounded by said trenched gate having a substantially uniform space between them.

However, Hshieh does teach an insulation layer (insulation layer 145) covering said power device having contact opened through said insulation and extended into said source and body regions for disposing a metal contact plug therein to contact a source region and a body region of said semiconductor power device wherein said source/body contact surrounded by said trenched gate having a substantially uniform space between them (col. 8, lines 59-67) (see figs. 4F-4H).

In view of the teaching of Hshieh, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch with Hshieh to achieve an insulation layer that covered the entire transistor.

It is well known in the art that insulation layers are utilized in the making of transistors for electrical isolation between devices. It is beneficial to put down insulation layers so that transistors do not interfere with each other electrically, which would lead to device failure.

Regarding claim 11, Pfirsch fails to teach a contact resistance reduction doped region disposed in said substrate comprising a region of high concentration dopant ions

in contact with said source/body contact for reducing a resistance of said contact metal to said source region and body region of said semiconductor power device.

However, Hshieh does teach a contact resistance reduction doped region disposed in said substrate comprising a region of high concentration dopant ions in contact with said source/body contact for reducing a resistance of said contact metal to said source region and body region of said semiconductor power device (col. 8, line 67, col. 9, lines 1-7) (see fig. 4H).

In view of the teaching of Hshieh, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch with Hshieh in order to achieve a contact resistance reduction doped region below the contact opening of the transistor.

It is well known in the art that doping this region of a transistor is beneficial to the device in that the doped impurities are useful in reducing the parasitic resistance and thus increasing device ruggedness.

6. Claims 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pfirsch in view of Hshieh and further in view of Allman et al. (U.S. Patent No. 6,288,454, from hereinafter “Allman”). The teachings of Pfirsch as modified by Hshieh have been previously discussed above.

Regarding claim 6, Pfirsch as modified by Hshieh fails to teach a contact resistance reduction layer composed of or Ti/TiN as a low resistance metal.

However, Allman does teach a contact resistance reduction layer (metal

interconnect layer 28) composed of Ti/TiN as a low resistance metal (col. 6, lines 20-43) (see fig. 1E).

In view of the teaching of Allman, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch and Hshieh in order to achieve a contact resistance layer composed of Ti/TiN.

It is well known in the art that contact resistance layers in transistors are widely composed of a Ti/TiN because of their electrically conductive properties. Because these elements have good electrical conductivity, they are frequently used to reduce resistance in transistors.

Regarding claim 9, Pfirsch as modified by Hshieh fails to teach a contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/W metal plug.

However, Allman does teach a contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/W metal plug (col. 6, lines 21-43) (see fig. 1E).

In view of the of Allman, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch and Hshieh with Allman to achieve a contact metal plug made of Ti/TiN/W.

The usage of Ti/TiN/W as a metal plug is well known in the art. That combination is beneficial because of its electrically conductive properties, which allow for interconnection of the devices metal layers.

Regarding claim 10, Pfirsch as modified by Hshieh fails to teach a contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/Al alloy plug (col. 5, lines 28-31) (see fig. 1A).

However, Allman does teach a contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/Al alloy plug.

In view of the teaching of Allman, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Pfirsch and Hshieh with Allman to achieve a contact metal plug made of Ti/TiN/Al.

The usage of Ti/TiN/Al as a metal plug is well known in the art. That combination is beneficial because of its electrically conductive properties, which allow for interconnection of the devices metal layers.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pfirsch.

The teachings of Pfirsch have been previously discussed above.

Pfirsch fails to teach said closed cells further includes a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.

However, Pfirsch does teach that the distance from a rounded corner of the trench contact (9) to the closest rounded corner of the transistor cell (12) is substantially equal to the distance of an edge of the trench contact to an edge of the transistor cell.

Because these distance are substantially equal, then the ratio of the two distances would be a value less than one (longer distance divided by shorter distance).

In view of the teaching of Pfirsch and with ordinary skill in the art, it would have been an obvious matter of design choice to design a trench gate device that has a ratio of the longer distance to the shorter distance less than 1.414. A transistor cell with truncated corners as disclosed in Pfirsch will have a ratio that is very near 1.0, meaning that it will always be less than 1.414, given that the two distances are substantially equal in length as the reference discloses.

Therefore, it would have been prima facie obvious to modify Pfirsch to obtain the invention as specified in claim 12 because such a modification would have been considered a mere design consideration which fails to patentably distinguish over the prior art of Pfirsch.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to STACY P. BARBADILLO whose telephone number is (571)270-7430. The examiner can normally be reached on Mon. - Thurs. 6:30am-5pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lisa Caputo can be reached on 571-272-2388. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SB/
January 17, 2009

/Lisa M. Caputo/

Supervisory Patent Examiner, Art Unit 4136

.

Notice of References Cited	Application/Control No. 11/633,366	Applicant(s)/Patent Under Reexamination HSHIEH, FWU-IUAN	
	Examiner STACY P. BARBADILLO	Art Unit 4136	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,031,265 A	02-2000	Hshieh, Fwu-Iuan	257/334
*	B	US-6,288,454 B1	09-2001	Allman et al.	257/797
*	C	US-6,541,818 B2	04-2003	Pfirsch et al.	257/331
*	D	US-6,949,432 B2	09-2005	Blanchard, Richard A.	438/259
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

uPI Semiconductor Corp.
EX1002.368

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	STACY P BARBADILLO	4136

SEARCHED			
Class	Subclass	Date	Examiner
257	331, 797, 334,	1/17/2009	SB
438	259	1/17/2009	SB

SEARCH NOTES		
Search Notes	Date	Examiner
Consult with Lisa Caputo (SPE trainer)	9/18/08	SB
Consult with Steve Smoot (primary 2813)	9/18/08	SB
General keyword and EAST seach attached	1/17/2009	SB

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

uPI Semiconductor Corp.
EX1002.369

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	STACY P BARBADILLO	4136

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/30/2008	01/17/2009							
	1	÷	✓							
	2	÷	✓							
	3	÷	✓							
	4	÷	✓							
	5	÷	✓							
	6	÷	✓							
	7	÷	✓							
	8	÷	✓							
	9	÷	✓							
	10	÷	✓							
	11	÷	✓							
	12	÷	✓							
	13	÷	✓							
	14	÷	N							
	15	÷	N							
	16	÷	N							
	17	÷	N							
	18	÷	N							

uPI Semiconductor Corp.
EX1002.370

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BIB DATA SHEET

CONFIRMATION NO. 2119

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/633,366	12/04/2006 RULE	438	4136	FMOS-0601

APPLICANTS
Fwu-luan Hshieh, Saratoga, CA;

** CONTINUING DATA **********

** FOREIGN APPLICATIONS **********

** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY **
12/27/2006

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/STACY P BARBADILLO/ Examiner's Signature	☐ SB Initials	CA	6	18	3

ADDRESS
Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022
UNITED STATES

TITLE
Trench MOSFET with cell layout to improve ruggedness

FILING FEE RECEIVED		
500	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

uPI Semiconductor Corp.
EX1002.371

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"20020006703".pn.	US-PGPUB; USPAT	OR	ON	2009/01/12 08:15
S2	1	"6541818".pn.	US-PGPUB; USPAT	OR	ON	2009/01/12 08:17
S3	14	("4767722" | "4969024" | "4994871" | "5468982" | "5821583" | "5998837" | "6002143" | "6262470").PN. OR ("6541818").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/12 08:17
S4	1	"5468982".pn.	US-PGPUB; USPAT	OR	ON	2009/01/12 08:40
S5	43	("4567641").PN. OR ("5468982").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/12 08:41
S6	4994	trench adj gate	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2009/01/12 09:55
S7	607767	top adj view	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2009/01/12 09:55
S8	523	S6 and S7	US-PGPUB; USPAT	OR	ON	2009/01/12 09:56
S9	81	parasitic adj latchup or parasitic adj latch adj up	US-PGPUB; USPAT	OR	ON	2009/01/12 09:56
S10	9407	latch adj up or latchup	US-PGPUB; USPAT	OR	ON	2009/01/12 09:56
S11	81	S9 and S10	US-PGPUB; USPAT	OR	ON	2009/01/12 09:57
S12	0	S8 and S11	US-PGPUB; USPAT	OR	ON	2009/01/12 09:58
S13	21	S8 and S10	US-PGPUB; USPAT	OR	ON	2009/01/12 09:59
S14	556670	titanium or ti	US-PGPUB; USPAT	OR	ON	2009/01/12 10:39
S15	131	S8 and S14	US-PGPUB; USPAT	OR	ON	2009/01/12 10:39
S16	308311	tin or titanium adj1 nitride	US-PGPUB; USPAT	OR	ON	2009/01/12 10:39
S17	50	S15 and S16	US-PGPUB; USPAT	OR	ON	2009/01/12 10:39

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S18	1820543	w or tungsten	US-PGPUB; USPAT	OR	ON	2009/01/12 10:40
S19	46	S17 and S18	US-PGPUB; USPAT	OR	ON	2009/01/12 10:40
S20	4059613	alumnum or al	US-PGPUB; USPAT	OR	ON	2009/01/12 10:40
S21	31	S19 and S20	US-PGPUB; USPAT	OR	ON	2009/01/12 10:40
S22	1	"6031265".pn.	US-PGPUB; USPAT	OR	ON	2009/01/12 15:01
S23	1	"5998873".pn.	US-PGPUB; USPAT	OR	ON	2009/01/12 15:02
S24	23	("5072266" | "5558313" | "5814858" | "5818084").PN. OR ("6031265").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/01/12 15:14
S25	0	S24 and (tungsten near3 plug)	US-PGPUB; USPAT	OR	ON	2009/01/12 15:15
S26	467951	plug	US-PGPUB; USPAT	OR	ON	2009/01/12 15:15
S27	2	S26 and S24	US-PGPUB; USPAT	OR	ON	2009/01/12 15:16
S28	75584	mosfet	US-PGPUB; USPAT	OR	ON	2009/01/12 15:31
S29	222420	tungsten	US-PGPUB; USPAT	OR	ON	2009/01/12 15:31
S30	10175	S28 and S29	US-PGPUB; USPAT	OR	ON	2009/01/12 15:31
S31	467951	plug	US-PGPUB; USPAT	OR	ON	2009/01/12 15:31
S32	2812	S30 and S31	US-PGPUB; USPAT	OR	ON	2009/01/12 15:31
S33	180742	metal near layer	US-PGPUB; USPAT	OR	ON	2009/01/12 15:31
S34	1435	S32 and S33	US-PGPUB; USPAT	OR	ON	2009/01/12 15:32
S35	3539	trench adj gate	US-PGPUB; USPAT	OR	ON	2009/01/12 15:32
S36	90	S34 and S35	US-PGPUB; USPAT	OR	ON	2009/01/12 15:33
S37	1407146	resistance	US-PGPUB; USPAT	OR	ON	2009/01/14 13:25
S38	210849	titanim or ti	US-PGPUB; USPAT	OR	ON	2009/01/14 13:25
S39	116306	S37 and S38	US-PGPUB; USPAT	OR	ON	2009/01/14 13:25

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S40	308508	(titanium adj1 nitride) or (tin)	US-PGPUB; USPAT	OR	ON	2009/01/14 13:26
S41	43173	S39 and S40	US-PGPUB; USPAT	OR	ON	2009/01/14 13:26
S42	1407334	contact near S38 resistance	US-PGPUB; USPAT	OR	ON	2009/01/14 13:26
S43	43173	S41 and S42	US-PGPUB; USPAT	OR	ON	2009/01/14 13:26
S44	1896191	layer	US-PGPUB; USPAT	OR	ON	2009/01/14 13:26
S45	39478	S43 and S44	US-PGPUB; USPAT	OR	ON	2009/01/14 13:27
S46	3543	trench adj1 gate	US-PGPUB; USPAT	OR	ON	2009/01/14 13:27
S47	221	S45 and S46	US-PGPUB; USPAT	OR	ON	2009/01/14 13:27
S48	11307	metal near2 plug	US-PGPUB; USPAT	OR	ON	2009/01/14 13:28
S49	34	S47 and S48	US-PGPUB; USPAT	OR	ON	2009/01/14 13:28
S50	3543	trench adj1 gate	US-PGPUB; USPAT	OR	ON	2009/01/14 13:30
S51	11307	metal near2 plug	US-PGPUB; USPAT	OR	ON	2009/01/14 13:30
S52	75	S50 and S51	US-PGPUB; USPAT	OR	ON	2009/01/14 13:30
S53	250	("ti/tin/w")	US-PGPUB; USPAT	OR	ON	2009/01/14 13:30
S54	7	S52 and S53	US-PGPUB; USPAT	OR	ON	2009/01/14 13:30
S55	250	("ti/tin/w")	US-PGPUB; USPAT	OR	ON	2009/01/14 13:32
S56	11307	metal near2 plug	US-PGPUB; USPAT	OR	ON	2009/01/14 13:32
S57	37	S55 and S56	US-PGPUB; USPAT	OR	ON	2009/01/14 13:33
S58	1	"6541818".pn.	US-PGPUB; USPAT	OR	ON	2009/01/14 16:56
S59	3553	trench adj1 gate	US-PGPUB; USPAT	OR	ON	2009/01/16 09:09
S60	4870	dmos	US-PGPUB; USPAT	OR	ON	2009/01/16 09:09
S61	516	S59 and S60	US-PGPUB; USPAT	OR	ON	2009/01/16 09:09
S62	308876	(titanium adj1 nitride) or (tin)	US-PGPUB; USPAT	OR	ON	2009/01/16 09:09

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S63	94	S61 and S62	US-PGPUB; USPAT	OR	ON	2009/01/16 09:09
S64	250	("ti/tin/w")	US-PGPUB; USPAT	OR	ON	2009/01/16 09:10
S65	4	S63 and S64	US-PGPUB; USPAT	OR	ON	2009/01/16 09:10
S66	1	"6949432".pn.	US-PGPUB; USPAT	OR	ON	2009/01/17 12:40
S67	2	"6031265".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/01/17 12:51

1/17/2009 12:52:14 PM
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PLUS Search Results for S/N 11633366, Searched Thu Jan 15 09:46:09 EST 2009

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

5763915 99
6121135 81
6992352 98
20010003367 98
20040232482 98
20080128829 98
20080179662 98
6172398 82
6031265 82
5341011 82
5380671 82
5474943 82
5479041 82
5668026 82
5917216 82
5973361 82
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11-03-08

IFW



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fwu-Iuan Hshieh, :Date: October 31, 2008

Serial No.: 11/633,366 : Group No.: 4136

Filed: December 4, 2006 : Examiner: Stacy P. Barbadillo

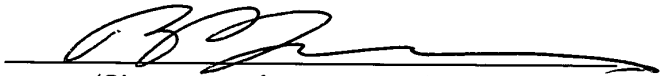
Attorney Docket No.: FMOS-0601 @571-270-7430,273-8300(F)

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Office Response Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date **October 31, 2008** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EH 164894220 US"** addressed to the: Commissioner of Patents and Trademarks, Alexandria, VA. 22313-1450.

Bo-In Lin

(Type or print name of person mailing papers)



(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon to mailing. 37 CFR 1.10(b).

To the Commissioner of Patents and Trademarks:

AMENDMENT

Dear Sir:

In response to the Examiner's Action mailed on October 6, 2008 for Election and Restriction, please amend the claims as set forth below. The Applicants hereby respectfully elect semiconductor power device directed by claims 1 to 13 classified in class 257, subclass E21-598, for examination. The non-elected invention included in claims 14 to 18 directed to methods for making semiconductor devices are withdrawn, under 35 U.S.C. §121, from the present Application without traverse.

October 31, 2008

I) Please withdrawn claims 14-18 as set forth below:

1.(Original) A trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

said trenched gate surrounding said transistor cells as closed cells with truncated corners.

2. (Original) The trenched semiconductor power device of claim 1 wherein:

said closed cells further includes a contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with substantially a uniform space between them.

3. (Original) The trenched semiconductor power device of claim 2 further comprising:

a doped contact region disposed below said contact metal to enhance an electrical contact between the metal contact and the source region and the body region, and the doped contact region having substantially a uniform space between the contact dopant region and the trenched gate surrounding the closed cells.

October 31, 2008

4. (Original) The trenched semiconductor power device of claim 1 further comprising:

an insulation layer covering said power device having a source/body contact opened through said insulation and extended into an epitaxial layer in said semiconductor substrate for disposing a metal contact therein to contact a source region and a body region of said semiconductor power device wherein said contact opening disposed substantially at a center of an area surrounded by said trenched gate whereby there is substantially a uniform space between them.

5. (Original) The trenched semiconductor power device of claim 4 further comprising:

a contact resistance reduction layer composed of a low resistance metal for covering an interface area between said source region and said body region and said contact metal for reducing a contact resistance to said source region and said body region.

6. (Original) The trenched semiconductor power device of claim 5 wherein:

said contact resistance reduction layer composed of or Ti/TiN as said low resistance metal.

7. (Original) The trenched semiconductor power device of claim 4 further comprising:

a contact resistance reduction doped region comprising a region of high concentration dopant ions disposed below said contact opening for reducing a resistance of said contact metal to said body region of said semiconductor power device.

October 31, 2008

8. (Original) The trenched semiconductor power device of claim 4 further comprising:

an insulation layer covering said power device having a source/body contact opened through said insulation layer and extended into said source and body regions for disposing a metal contact plug therein to contact a source region and a body region of said semiconductor power device wherein said source/body contact surrounded by said trenched gate having a substantially uniform space between them.

9. (Original) The trenched semiconductor power device of claim 8 wherein:

said contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/W metal plug.

10. (Original) The trenched semiconductor power device of claim 8 wherein:

said contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/Al alloy plug.

11. (Original) The trenched semiconductor power device of claim 8 further comprising:

a contact resistance reduction doped region disposed in said substrate comprising a region of high concentration dopant ions in contact with said source/body contact for reducing a resistance of said contact metal to said source region and body region of said semiconductor power device.

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12. (Original) The trenched semiconductor power device of claim 1 further comprising:

said closed cells further includes a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.

13. (Original) A trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

said trenched gate surrounding said transistor cells as closed cells with rounded corners.

14. (Withdrawn) A method for fabricating a trenched semiconductor power device comprising steps of forming a trenched gate as an extended continuous trench surrounding a plurality of transistor cells further comprising:

doping a source/body metal contact region in an area surrounded by said trenched gate at a location and shape such that there is substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

October 31, 2008

15. (Withdrawn) The method of claim 14 further comprising:

doping the metal contact region having substantially a circular shape such that there is a substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

16. (Withdrawn) The method of claim 14 further comprising:

opening said trenches with truncated corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

17. (Withdrawn) The method of claim 14 further comprising:

opening said trenches with rounded corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

18. (Withdrawn) The method of claim 14 further comprising:

forming a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.

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Respectfully submitted
Fwu-Iuan Hshieh

By 

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October 31, 2008

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/633,366	Filing Date 12/04/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☒ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	150		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	150		TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	10/31/2008	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 18	Minus	** 20	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $110 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/FELICIA ALLEN-JENKINS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601	2119

7590 10/06/2008

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022

EXAMINER	
BARBADILLO, STACY P	
ART UNIT	PAPER NUMBER
4136	

MAIL DATE	DELIVERY MODE
10/06/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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EX1002.385

Office Action Summary	Application No.	Applicant(s)	
	11/633,366	HSHIEH, FWU-IUAN	
	Examiner	Art Unit	
	STACY P. BARBADILLO	4136	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-18* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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EX1002.386

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-13 are drawn to a trenched semiconductor power device, classified in class 257, subclass E21.598.

II. Claims 14-18 are, drawn to a method for fabrication of a trenched semiconductor power device, classified in class 438, subclass 270.

The inventions are independent or distinct, each from the other because:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed in group I does not need the step of doping a source/body metal contact region in an area surrounded by said trenched gate at a location and shape such that there is substantially a uniform space between the doped metal contact region and the surrounding trenched gate as claimed in group II.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above

and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement

will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product

are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder**. Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STACY P. BARBADILLO whose telephone number is (571) 270-7430. The examiner can normally be reached on Monday-Thursday, 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lisa M. Caputo can be reached on (571) 272-2388. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SB/
September 18, 2008

/Lisa M. Caputo/
Supervisory Patent Examiner, Art Unit 4136

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BIB DATA SHEET

CONFIRMATION NO. 2119

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/633,366	12/04/2006	438	4136	FMOS-0601

APPLICANTS
Fwu-luan Hshieh, Saratoga, CA;

** CONTINUING DATA **********

** FOREIGN APPLICATIONS **********

** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY **
12/27/2006

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /STACY P BARBADILLO/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	6	18	3

ADDRESS
Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA 94022
UNITED STATES

TITLE
Trench MOSFET with cell layout to improve ruggedness

FILING FEE RECEIVED		
500	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

uPI Semiconductor Corp.
EX1002.392

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	STACY P BARBADILLO	4136

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Consult with Lisa Caputo (SPE trainer)	9/18/08	SB
Consult with Steve Smoot (primary 2813)	9/18/08	SB

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

uPI Semiconductor Corp.
EX1002.393

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11633366	HSHIEH, FWU-IUAN
	Examiner	Art Unit
	STACY P BARBADILLO	4136

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/30/2008								
	1	÷								
	2	÷								
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	17	÷								
	18	÷								

uPI Semiconductor Corp.
EX1002.394

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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/633,366	12/04/2006	Fwu-Iuan Hshieh	FMOS-0601

CONFIRMATION NO. 2119

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA94022

Title: Trench MOSFET with cell layout to improve ruggedness

Publication No. US-2008-0128829-A1
Publication Date: 06/05/2008

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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Pre-Grant Publication Division, 703-605-4283

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
11/633,366	12/04/2006	2812	500	FMOS-0601	6	18	3

CONFIRMATION NO. 2119

Bo-In Lin
13445 Mandoli Drive
Los Altos Hills, CA94022

FILING RECEIPT

Date Mailed: 12/28/2006

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Fwu-luan Hshieh, Saratoga, CA;

Assignment For Published Patent Application

Force-MOS Technology Corp.

Power of Attorney:
Bo-In Lin--33948

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 12/27/2006

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/633,366**

Projected Publication Date: 06/05/2008

Non-Publication Request: No

Early Publication Request: No

** SMALL ENTITY **

Title

Trench MOSFET with cell layout to improve ruggedness

Preliminary Class

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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017899 U.S. PTO 120406

PTO/SB/05 (09-04)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	FMOS-0601
First Inventor	Fwu-luan Hshieh
Title	TRENCH MOSFET WITH CELL LAYOUT T
Express Mail Label No.	EQ978881903US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☑ **Fee Transmittal Form** (e.g., PTO/SB/17)
   (Submit an original and a duplicate for fee processing)
2. ☑ **Applicant claims small entity status.**
   See 37 CFR 1.27.
3. ☑ **Specification** [*Total Pages* 11]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. ☑ **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 6]
5. **Oath or Declaration** [*Total Sheets* 2]
   a. ☑ Newly executed (original or copy)
   b. ☐ A copy from a prior application (37 CFR 1.63(d))
   (for continuation/divisional with Box 18 completed)
   i. ☐ DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ **Application Data Sheet.** See 37 CFR 1.76
7. ☐ **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   ☐ Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
   (if applicable, items a. – c. are required)
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☐ Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria VA 22313-1450

ACCOMPANYING APPLICATION PARTS

9. ☑ **Assignment Papers** (cover sheet & document(s))
   Name of Assignee Force-MOS Technology Corp.
10. ☐ **37 CFR 3.73(b) Statement** *(when there is an assignee)* ☑ **Power of Attorney**
11. ☐ **English Translation Document** *(if applicable)*
12. ☐ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of citations attached
13. ☐ **Preliminary Amendment**
14. ☑ **Return Receipt Postcard** (MPEP 503)
    (Should be specifically itemized)
15. ☐ **Certified Copy of Priority Document(s)**
    (if foreign priority is claimed)
16. ☐ **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i).
    Applicant must attach form PTO/SB/35 or equivalent.
17. ☑ Other: Fee transmittal form, PTO-2038

113006 U.S.PTO 11763366 120406

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.:

Prior application information: *Examiner* _____ *Art Unit:* _____

19. CORRESPONDENCE ADDRESS

☐ The address associated with Customer Number: _____ ***OR*** ☑ Correspondence address below

Name	Bo-In Lin				
Address	13445 Mandoli Drive				
City	Los Altos Hills	State	CA	Zip Code	94022
Country	USA	Telephone	(650)949-0418	Fax	(650)949-4118

Signature		Date	12/4/06
Name (Print/Type)	Bo-In Lin	Registration No. (Attorney/Agent)	33,948

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
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PTO/SB/17 (01-06)
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Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2006

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500.00

Complete if Known	
Application Number	
Filing Date	
First Named Inventor	Fwu-Iuan Hshieh
Examiner Name	
Art Unit	
Attorney Docket No.	FMOS-0601

METHOD OF PAYMENT (check all that apply)

☐ Check ☑ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☐ Deposit Account Deposit Account Number: _____ Deposit Account Name: _____

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☐ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION (All the fees below are due upon filing or may be subject to a surcharge.)

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	500
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		Extra Claims		Fee ($)		Fee Paid ($)
18	- 20 or HP =	0	x	25	=	0

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims		Extra Claims		Fee ($)		Fee Paid ($)
3	- 3 or HP =	0	x	100	=	0

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		Extra Sheets		Number of each additional 50 or fraction thereof		Fee ($)		Fee Paid ($)
	- 100 =		/ 50 =		(round up to a whole number) x		=	

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): _____	

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 33,948	Telephone 650-949-0418
Name (Print/Type)	Bo-In Lin		Date 12/4/06

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

TRENCH MOSFET WITH CELL LAYOUT TO IMPROVE RUGGEDNESS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to the cell structure, device configuration and fabrication process of power semiconductor devices. More particularly, this invention relates to a novel and improved cell structure, device configuration and improved process for fabricating a trenched semiconductor power device with improved ruggedness with truncated corners.

2. Description of the Related Art

Configuration of conventional semiconductor power device, particularly those of trenched semiconductor power devices, is still confronted with a technical difficult of parasitic bipolar NPN latch up. The parasitic bipolar NPN latch-up difficulties are specially pronounced near the trench corners. Referring to Fig. 1A for a top view of a closed cell unit and Figs. 1B and 1C for two different side cross sectional views to show the relative position arrangement of a metal source/body contact 15 from the trenched gate 20. Fig. 1B shows a cross section view of a MOSFET device with planar two-dimensional source/body metal contacts to n+ and p+ horizontally and Fig. 1C shows a cross section view of a MOSFET device with trenched three-dimensional source/body metal contacts to n+ vertically and P+ horizontally. As illustrated in the top view of Fig. 1A both of the cells of Figs. 1B and 1C have a square cell configuration and the shortest distance between the peripheral sides of the metal contact 15 to the trenched gates is longer from the corner of the metal contact 15 to the corner of the trenched gates. Specifically, the shortest distance between the peripheral sides of the contact metal 15 to four sides of the trenched gate is "A". In contrast, the shortest distance between the metal-contact 15 to the corners of the trenched gates is "B" where:

$$B = 1.414\ A \qquad (1)$$

Referring to Fig. 1D for a cross sectional view for showing an implanting step to form the metal contact dopant P+ region 25. The resistance R between the channel and the P+ region 25 is proportional to the space, i.e., the shortest distance between the metal contact region 15 and the trenched gates 20. Therefore, the space between the metal contact 15 and the trenched gates 20 as represented by the distances A and B, plays an important role in determining the device ruggedness. For this reasons, there are weak points of the MOSFET device due the non-uniform space between the square contact and the trench in the closed cell. These weak points occur at the four corners that result in low avalanche current and reduced device ruggedness due to the parasitic N^+PN latches up near the trench corners when I*R> 0.7 volts. When bias between Base P(Pwell) and emitter N+(n+ source) of the parasitic N+PN is larger than 0.7 volts, P/N+ diode will be turned on, and thus automatically trigger turn-on of the parasitic N+PN bipolar.

Therefore, there is still a need in the art of the semiconductor device fabrication, particularly for trenched power MOSFET design and fabrication, to provide a novel cell structure, device configuration and fabrication process that would resolve these difficulties and design limitations.

SUMMARY OF THE PRESENT INVENTION

It is therefore an aspect of the present invention to provide new and improved semiconductor power device configuration, such as a MOSFET device with a close cell unit configuration with the surrounding gate arranged with truncated corner or rounded corner layout. The purpose of the truncated corners or the rounded corners of the gate trenches is to make the space between the trenched gate and the metal contact more uniform in the closed cell to enhance the device ruggedness. The above-discussed problems as that encountered in the conventional device configuration are therefore resolved.

Another aspect of the present invention to provide new and improved manufacturing process to manufacture a semiconductor power device with improved closed cell configuration wherein the surrounding gate is arranged with truncated corner layout. The manufacturing process includes a step of ~~making the corners of the trenched gates and contact into truncated corners by~~

"exposure through the mask such that the square contact becomes approximately circular shaped contact and truncated corners become smoother. The truncated corners are formed by design layout not process. It is by nature that truncated corners in layout becomes rounded after exposure due to resolution issue of 0.18 ~0.35 μm photolithography. The spaces between the trenched gate and the metal contact are therefore more uniform in the closed cell to enhance the device ruggedness.

(I think it is OK to leave this paragraph here for later reference if it is correct)

Another aspect of the present invention to provide new and improved closed cell configuration of a semiconductor power device with a design rule that the greatest difference between the longest distance and the shortest distance between the source/body contact and the trenched gate is significantly less than a predefined value to achieve an improved device ruggedness. In an exemplary embodiment, the ratio of the longest distance to the shortest distance is less than 1.414 to achieve an improved device-ruggedness over the conventional squared-shaped closed cell layout.

Briefly, in a preferred embodiment, the present invention discloses a trenched semiconductor power device that includes a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells in an active cell area wherein the layout of the trenched gate surrounding the transistor cells as closed cells having truncated corners. In an exemplary embodiment, the closed cells further includes a contact metal to contact a source and a body regions wherein the contact metal the trenched gate surrounding the transistor cell have a uniform space between them. In another exemplary embodiment, the semiconductor power device further includes a contact dopant region disposed below the contact metal to enhance an electrical contact between the metal contact and the source region and the body region, and the contact dopant region having substantially circular shape to achieve a uniform space between the contact dopant region and the trenched gate surrounding the closed cells.

Furthermore, in an exemplary embodiment, this invention discloses a manufacturing process for manufacturing a trenched semiconductor power device that includes a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells wherein the layout of the trenched gate

surrounding the transistor cells as closed cells. The method includes a step of doping a source/body metal contact region in an area surrounded by said trenched gate at a location and shape such that there is substantially a uniform space between the doped metal contact region and the surrounding trenched gate. In an exemplary embodiment, the method further includes a step of doping the metal contact region having substantially a circular shape such that there is a substantially a uniform space between the doped metal contact region and the surrounding trenched gate. In another exemplary embodiment, the method further includes a step of fabricating the trenches with truncated corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

These and other objects and advantages of the present invention will no doubt become obvious to those of ordinary skill in the art after having read the following detailed description of the preferred embodiment, which is illustrated in the various drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1A is a top view and Figs. 1B to 1D are cross sectional views for illustrating a configuration cell layout of a closed cell unit of a MOSFET device with non-uniform space between the metal contact the trenched gates surrounding the closed unit cells.

Fig. 2 is an improved cell layout a closed unit cell for a MOSFET device of this invention to achieve uniform space between the metal contact and the trenched gates surrounding the closed cell unit to enhance the device ruggedness.

Fig. 3 is another improved cell layout a closed unit cell for a MOSFET device of this invention with substantially circular contact dopant regions to achieve improved uniformity of space between the metal contact and the trenched gates surrounding the closed cell unit to enhance the device ruggedness.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

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EX1002.404

Please refer to Fig. 2 for a top view of a closed cell configuration of an improved semiconductor power device 100 of this invention. The closed cell is surrounded by a trenched gate 110 that has a truncated corners 115 such that the distance B between the truncated corners to the metal contact or a doped contact region 120 is substantially equal to the distance A between the edges of the contact region 120 to the edges of the trenched gate, i.e., B = A. There is a uniform space between the surrounding trenched gate 110 and the metal contact or doped contact region 120. The weak spots around the corners in a conventional layout are therefore eliminated.

Referring to Fig. 3 for another embodiment of this invention wherein a closed cell unit 200 of a MOSFET device includes trenched gate 210 surrounding a metal contact disposed above a doped contact region 220. The doped contact region 220 is formed with substantial circular shape and the trenched gate is formed with rounded corners 215. The distance from the edge of the circular doped contact region 220 to the trenched gate 200 including the distance B to the rounded corners 215 and to the distance A to the edges of the trenched gate are substantially the same, i.e., B=A. Therefore, the ratio of B/A is substantially kept near 1.0 and certainly smaller than 1.414. The weak spots near the corners of the trenched gate that caused reduced device ruggedness are therefore eliminated.

The process for manufacturing the semiconductor power device as disclosed above thus includes a step of ~~making the corners of the trenched gates into truncated corners by~~ "exposure through the mask" such that the square contact becomes approximately circular shaped contact and truncated corners become smoother. The truncated corners are formed by design layout not process. It is by nature that truncated corners in layout as that shown in Fig. 2 and becomes rounded as shown in Fig. 3. Such configuration is formed after exposure because of the photolithography resolution of 0.18 ~0.35 micrometers. A MOSFET device shown in Fig.3 is another embodiment that can be produced by applying a design layout that implemented as on of the manufacturing processes.

(I think it is OK to leave this paragraph here for later reference if it is correct)

Although the present invention has been described in terms of the presently preferred embodiment, it is to be understood that such disclosure is

not to be interpreted as limiting. Various alternations and modifications will no doubt become apparent to those skilled in the art after reading the above disclosure. Accordingly, it is intended that the appended claims be interpreted as covering all alternations and modifications as fall within the true spirit and scope of the invention.

CLAIMS

I claim:

1. A trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

said trenched gate surrounding said transistor cells as closed cells with truncated corners.

2. The trenched semiconductor power device of claim 1 wherein:

said closed cells further includes a contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with substantially a uniform space between them.

3. The trenched semiconductor power device of claim 2 further comprising:

a doped contact region disposed below said contact metal to enhance an electrical contact between the metal contact and the source region and the body region, and the doped contact region having substantially a uniform space between the contact dopant region and the trenched gate surrounding the closed cells.

4. The trenched semiconductor power device of claim 1 further comprising:

an insulation layer covering said power device having a source/body contact opened through said insulation and extended into an epitaxial layer in said semiconductor substrate for disposing a metal contact therein to contact a source region and a body region of said semiconductor power device wherein said contact opening disposed substantially at a center of an area surrounded by said trenched gate whereby there is substantially a uniform space between them.

5. The trenched semiconductor power device of claim 4 further comprising:

a contact resistance reduction layer composed of a low resistance metal for covering an interface area between said source region and said body region and said contact metal for reducing a contact resistance to said source region and said body region.

6. The trenched semiconductor power device of claim 5 wherein:

said contact resistance reduction layer composed of or Ti/TiN as said low resistance metal.

7. The trenched semiconductor power device of claim 4 further comprising:

a contact resistance reduction doped region comprising a region of high concentration dopant ions disposed below said contact opening for reducing a resistance of said contact metal to ~~said source region and~~ body region of said semiconductor power device.

(N+ is not disposed below contact for 2D contact structure)

8. The trenched semiconductor power device of claim 4 further comprising:

an insulation layer covering said power device having a source/body contact opened through said insulation layer and extended into said source and body regions for disposing a metal contact plug therein to contact a source region and a body region of said semiconductor power device wherein said source/body contact surrounded by said trenched gate having a substantially uniform space between them.

9. The trenched semiconductor power device of claim 8 wherein:

said contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/W metal plug.

10. The trenched semiconductor power device of claim 8 wherein:

said contact metal plug disposed in said source/body contact trench further comprising a Ti/TiN/Al alloy plug.

11. The trenched semiconductor power device of claim 8 further comprising:

a contact resistance reduction doped region disposed in said substrate comprising a region of high concentration dopant ions in contact with said source/body contact for reducing a resistance of said contact metal to said source region and body region of said semiconductor power device.

12. The trenched semiconductor power device of claim 1 further comprising:

said closed cells further includes a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.

13. A trenched semiconductor power device comprising a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells, wherein:

said trenched gate surrounding said transistor cells as closed cells with rounded corners.

14. A method for fabricating a trenched semiconductor power device comprising steps of forming a trenched gate as an extended continuous trench surrounding a plurality of transistor cells further comprising:

doping a source/body metal contact region in an area surrounded by said trenched gate at a location and shape such that there is

substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

15. The method of claim 14 further comprising:

doping the metal contact region having substantially a circular shape such that there is a substantially a uniform space between the doped metal contact region and the surrounding trenched gate.

16. The method of claim 14 further comprising:

opening said trenches with truncated corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

17. The method of claim 14 further comprising:

opening said trenches with rounded corners surround the doped contact region whereby there is a uniform space between the doped contact region and the surrounding trenched gate.

18. The method of claim 14 further comprising:

forming a source/body contact metal to contact a source and a body regions of said semiconductor power device wherein said contact metal surrounded by said trenched gate with a ratio of a longest distance and a shortest distance between said source/body contact and the trenched gate is less than 1.414.

ABSTRACT

A trenched semiconductor power device that includes a trenched gate disposed in an extended continuous trench surrounding a plurality of transistor cells wherein the layout of the trenched gate surrounding the transistor cells as closed cells having truncated corners or rounded corners. In an exemplary embodiment, the closed cells further includes a contact metal to contact a source and a body regions wherein the contact metal the trenched gate surrounding the transistor cell have a uniform space between them. In another exemplary embodiment, the semiconductor power device further includes a contact dopant region disposed below the contact metal to enhance an electrical contact between the metal contact and the source region and the body region, and the contact dopant region having substantially circular shape to achieve a uniform space between the contact dopant region and the trenched gate surrounding the closed cells.

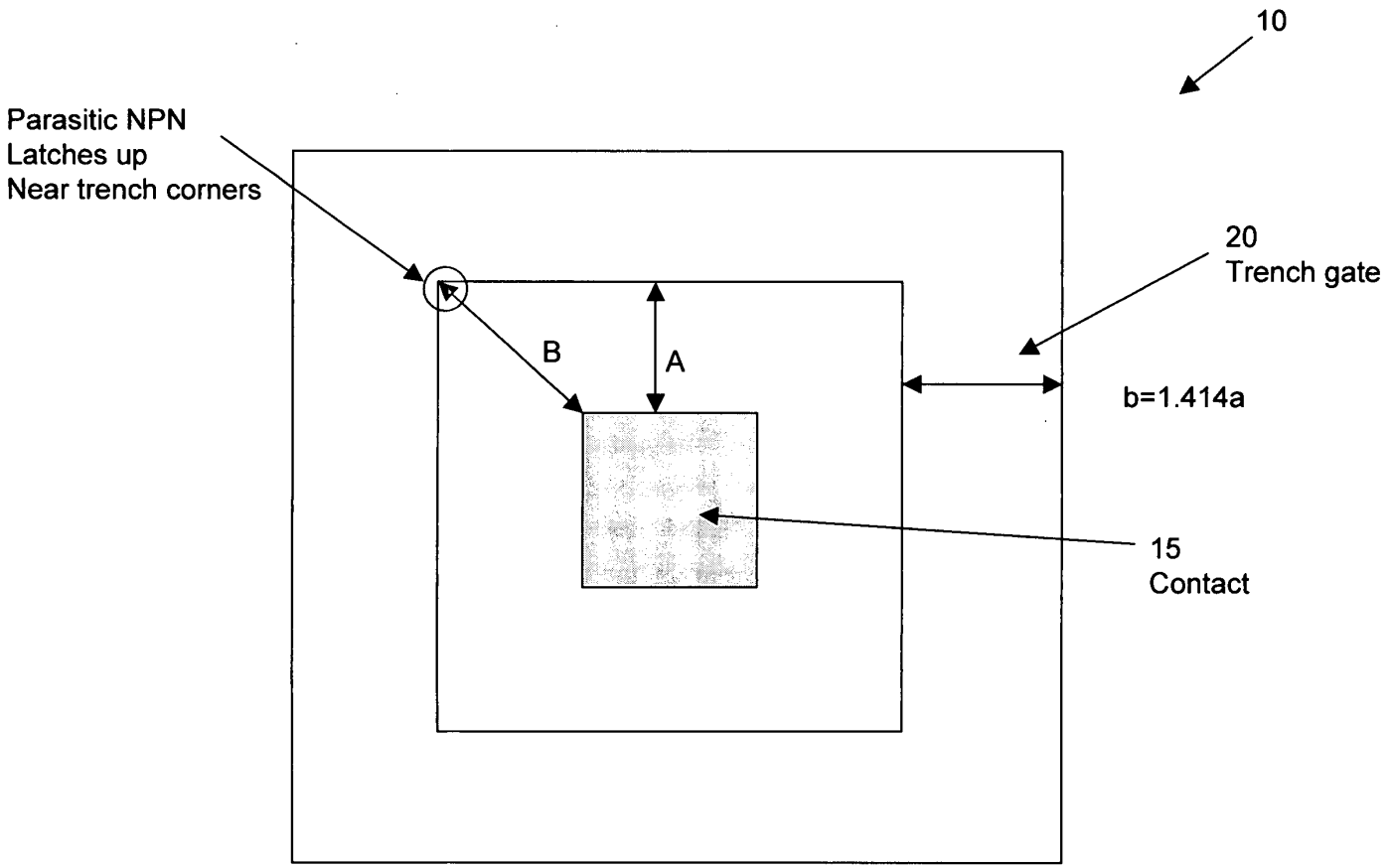


Fig. 1A (Prior Art)

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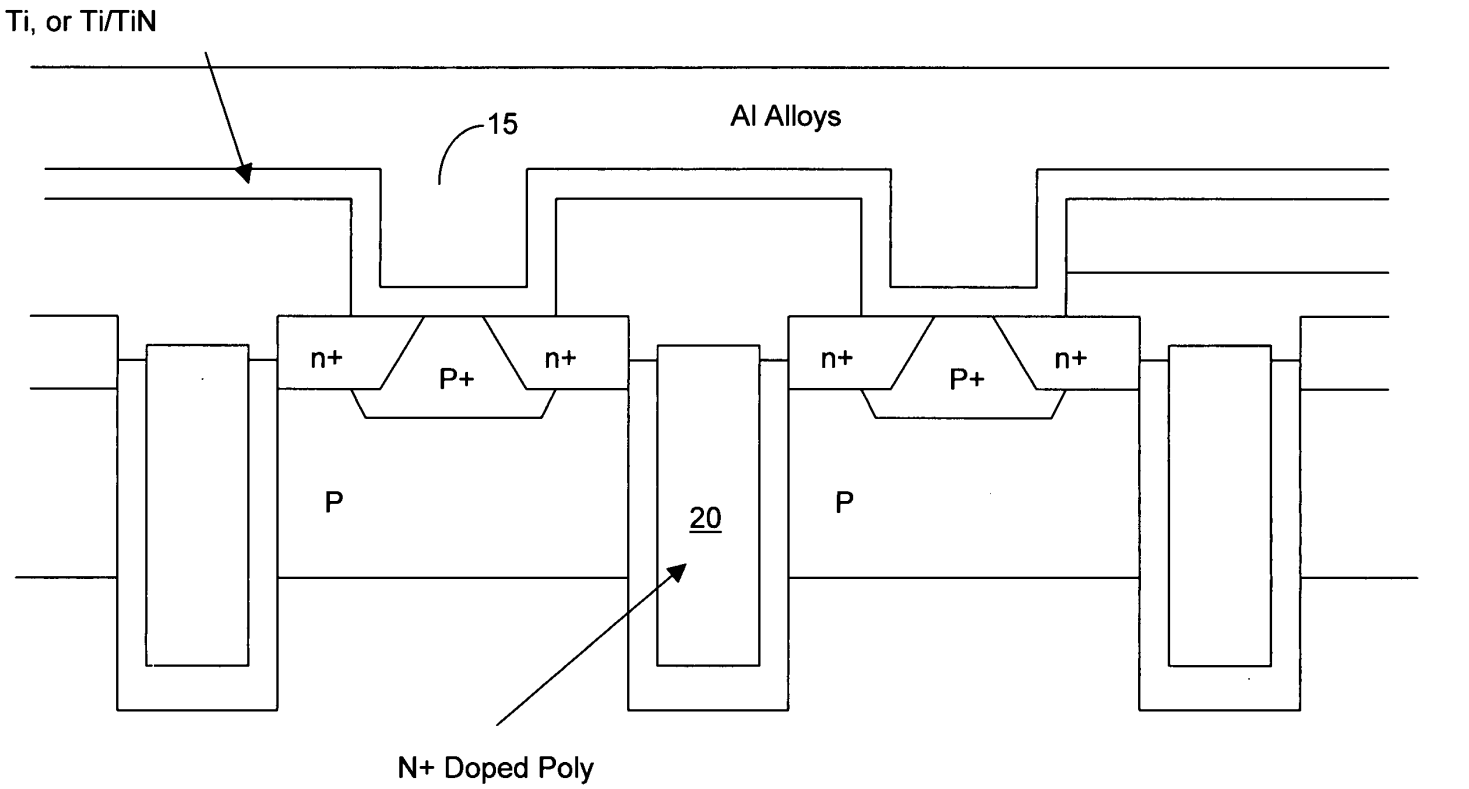


Fig. 1B (Prior Art)

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EX1002.413

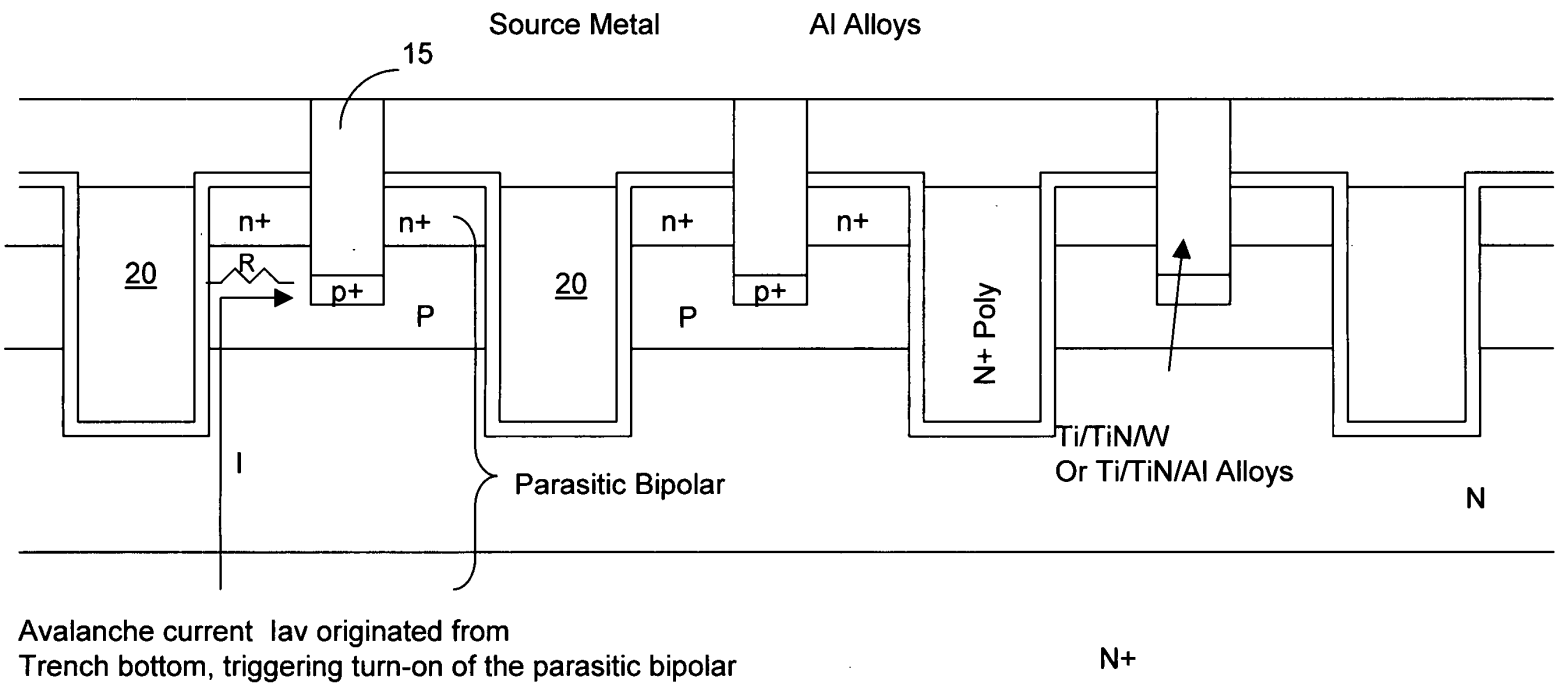


Fig. 1C (Prior Art)

uPI Semiconductor Corp.
EX1002.414

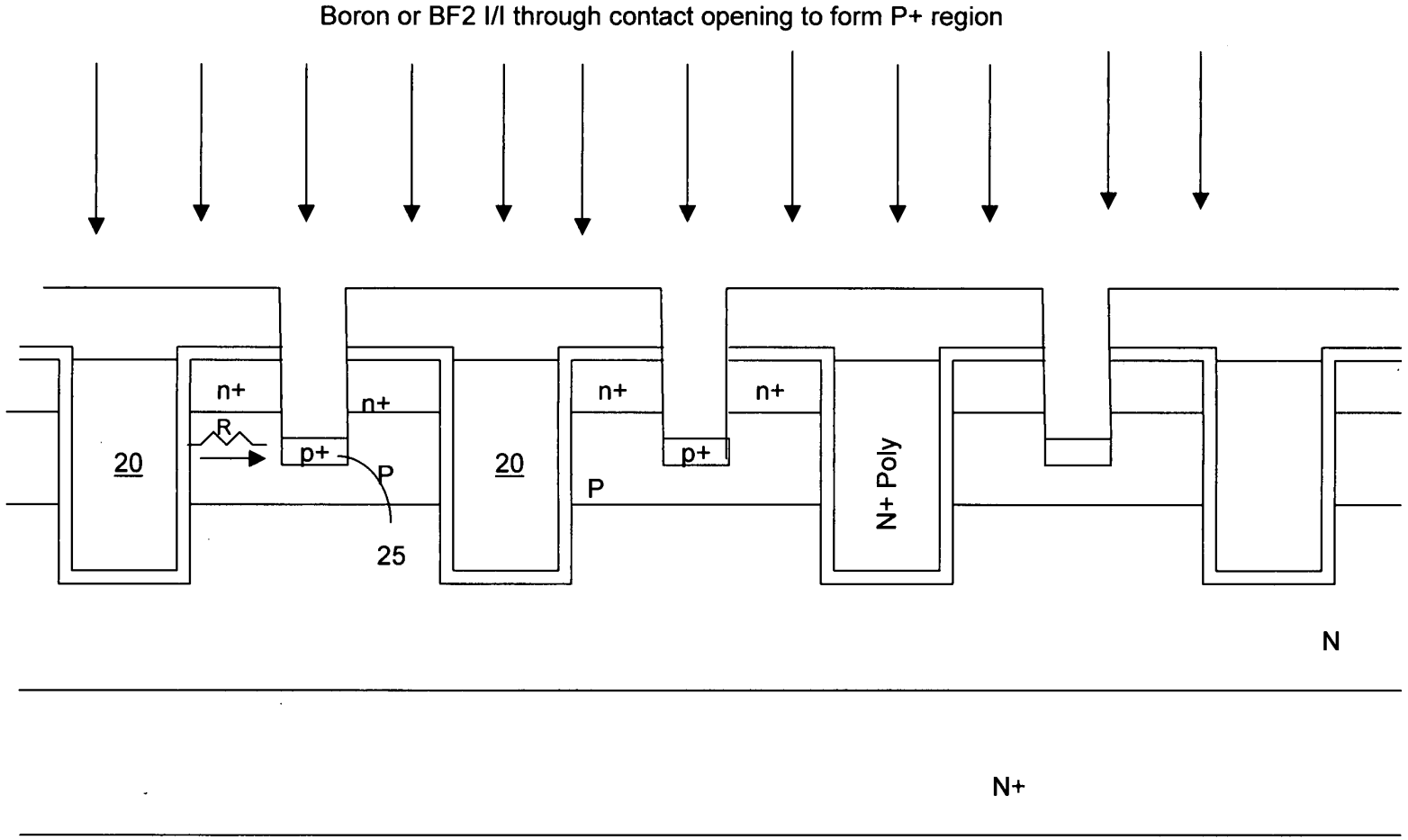


Fig. 1D (Prior Art)

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EX1002.415

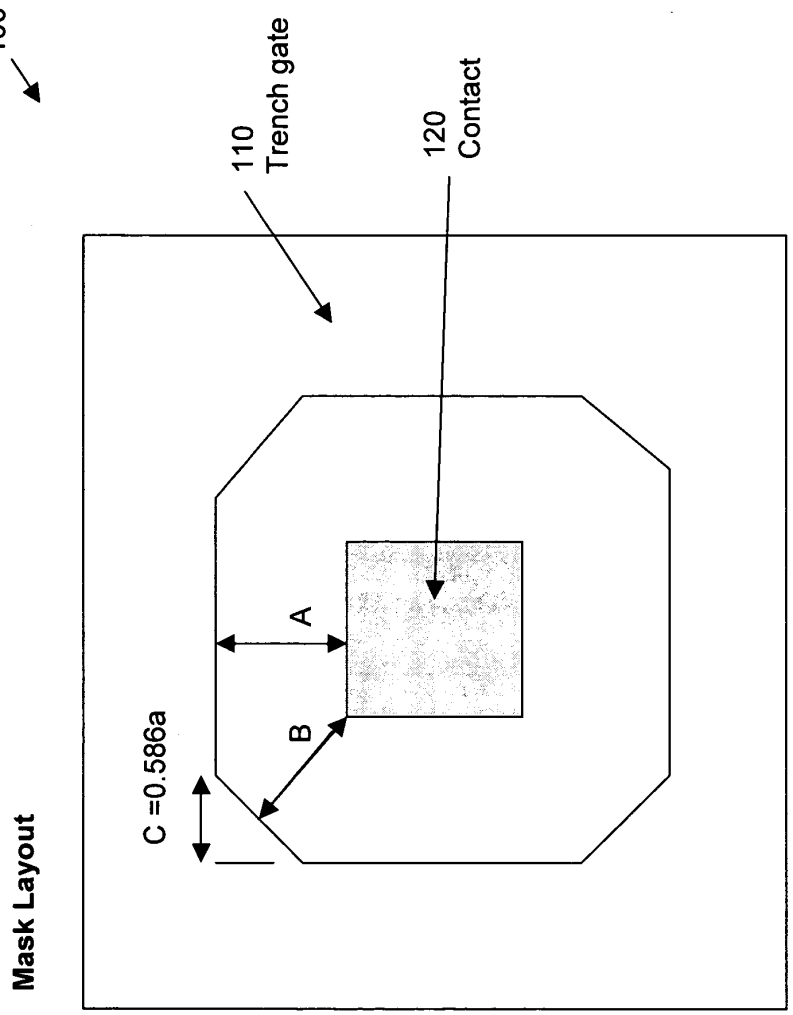


Fig. 2

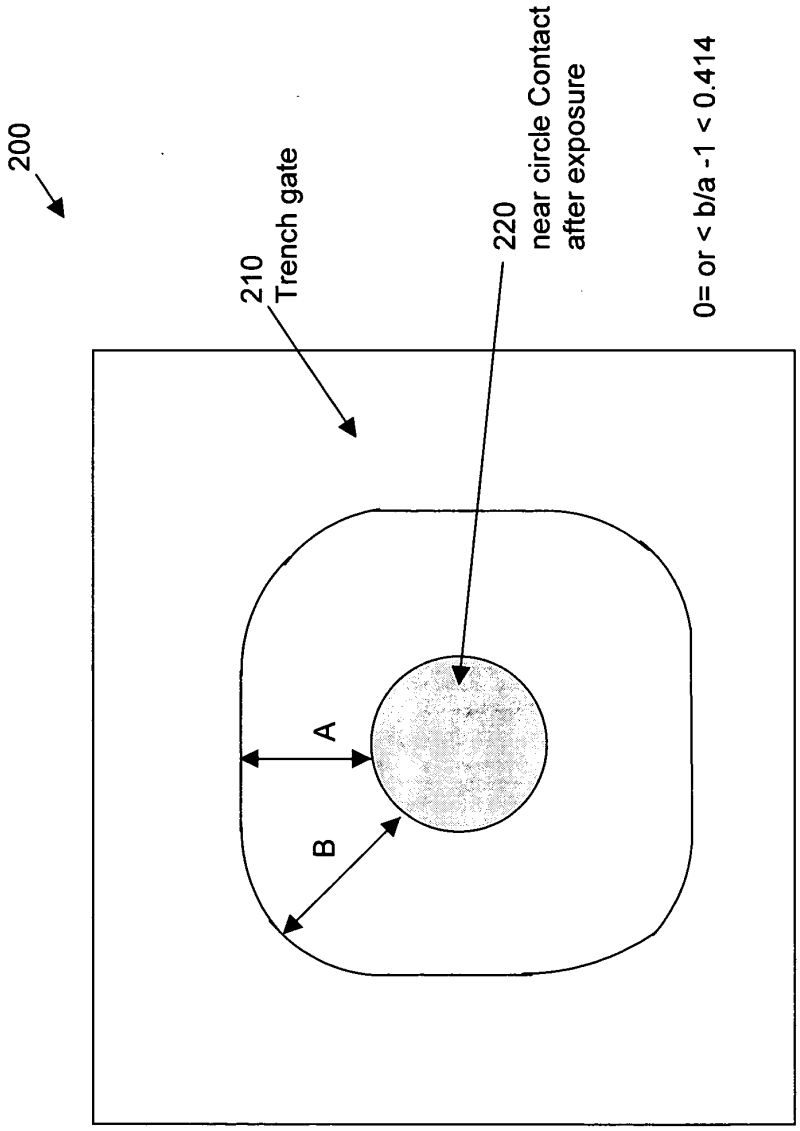

200
210
Trench gate
220
near circle Contact
after exposure
0= or < b/a -1 < 0.414
A
B

Fig. 3

002-1650-949-4118

fm Bo-In Lin

Docket No.FMOS-0601

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

TITLE: **TRENCH MOSFET WITH CELL LAYOUT TO IMPROVE RUGGEDNESS**

the specification of which (check one)
_X_ is attached hereto.
__ was filed on_____as Application Serial No._____and was amended on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, ¤1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code ¤119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s) Priority Claimed

_____ _____ _____ __Yes __No
(Number) (Country) (Day/Month/Year Filed)

I hereby claim the benefit under Title 35, United States Code, ¤120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, ¤112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, ¤1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

_____ _____ _____
(Application Serial No.) (Filing Date) (Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

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Docket No.FMOS-0601

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Inventor's signature: Date:

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Full name of third joint-inventor:

Inventor's signature:

Date:

Residence:

Citizenship:

Post office address:

Full name of fourth joint-inventor:

Inventor's signature: Date:

Residence:

Citizenship:

Post office address:

Full name of fifth joint-inventor:

Inventor's signature: Date:

Residence:

Citizenship:

Post office address:

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PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

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01 FC:2011	150.00 OP
02 FC:2111	250.00 OP
03 FC:2311	100.00 OP

PTO-1556
(5/87)

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PTO/SB/06 (12-04)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875 Effective December 8, 2004

Application or Docket Number: 11633566

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	150.00		N/A	300.00
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	$250		N/A	$500
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	$100		N/A	$200
TOTAL CLAIMS (37 CFR 1.16(i))	18 minus 20 =	* 0	X$ 25 =		OR	X$50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	* 0	X100 =			X200 =	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			+180=			+360=	
			TOTAL	500		TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X$ 25 =		OR	X$50 =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X100 =		OR	X200 =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					+180=		OR	+360=	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

1, 13, 14,

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X$ 25 =		OR	X$50 =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X100 =		OR	X200 =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					+180=		OR	+360=	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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