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	Filing Date		2011-10-20
	First Named Inventor	Chun-Hsien Lin	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	66007-405DIV	

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	4	5879975		1999-03-09	Karlsson , et al.	
	5	6661066		2003-12-09	Kuroi , et al.	
	6	5840611		1998-11-24	Lee , et al.	
	7	6674137		2004-01-06	Nissa	
	8	6060375		2000-05-09	Owyang , et al.	

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	1	SEIDEL et al., "Anisotropic Etching of Crystalline Silicon in Alkaline Solutions: I. Orientation Dependence and Behavior of Passivation Layers", Journal of the Electrochemical Society Inc, Vol. 137, No. 11, November 1990, pp3612-3626	☐
	2	SEIDEL et al., "Anisotropic Etching of Crystalline Silicon in Alkaline Solutions: II. Influence of Dopants", Journal of the Electrochemical Society Inc, Vol. 137, No. 11, November 1990, pp3622-3632	☐

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Signature	/Justin King/	Date (YYYY-MM-DD)	2011-10-20
Name/Print	Justin King	Registration Number	50,464

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First Named Inventor/Applicant Name:		Chun-Hsien Lin		
Filer:		Anthony King/Justin King		
Attorney Docket Number:		66007-405DIV		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	380	380
Utility Search Fee	1111	1	620	620
Utility Examination Fee	1311	1	250	250
Pages:				
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Total in USD (\$)				1250

Electronic Acknowledgement Receipt	
EFS ID:	11227139
Application Number:	13277384
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Confirmation Number:	9619
Title of Invention:	METHOD FOR FABRICATING SEMICONDUCTOR DEVICE
First Named Inventor/Applicant Name:	Chun-Hsien Lin
Customer Number:	65358
Filer:	Anthony King/Justin King
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Attorney Docket Number:	66007-405DIV
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METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The application is a divisional of an application serial no. 12/572498, filed October 2, 2009. The entirety of the above-mentioned patent are hereby incorporated by reference herein and made a part of this specification.

FIELD OF THE INVENTION

[0002] The invention relates to a method of fabricating a semiconductor device. More particularly, the invention relates to a method of fabricating a semiconductor device with trench of various widths.

BACKGROUND OF THE INVENTION

[0003] With the continual miniaturization of semiconductor devices, dimensions of gate structures are also gradually reduced. Therefore, the thickness of gate dielectric layers also needs to be reduced to prevent the performance of the devices from being affected. Generally, the material of the gate dielectric layers usually includes silicon oxide. However, the leakage current phenomenon frequently occurs when reducing the thickness of the gate dielectric layers adopting silicon oxide. In order to reduce the occurrence of leakage current, a conventional method is to replace silicon oxide with high dielectric constant (high-k) material for the gate dielectric layers. When applying high dielectric constant material in the gate dielectric layers, the gates adopting polysilicon then react with high dielectric constant material to generate Fermi-level pinning, thereby

resulting in an increase in the threshold voltage so as to affect device performance. In one of the conventional techniques, the metal layer is applied as the gate, that is, the work function metal layer known in the art, to prevent the threshold voltage from increasing and therefore reducing the resistance of the device.

[0004] In a conventional gate structure composed of a high dielectric constant dielectric layer and a metal gate, the dummy patterns are first formed and then the gate structures are formed in the current method. In other words, the dummy patterns and the interlayer dielectric layer are first formed on the substrate. Next, the dummy patterns are removed, and then the metal gate structures are formed in the openings that are formed after the removal of the dummy patterns.

[0005] However, in the process of patterning the dummy pattern material layer to form the dummy patterns, due to the constraints of the etching process, the resultant dummy patterns are usually shaped into trapezoids having a narrow top and a wide bottom, so that an included angle between the top sidewall of each the dummy pattern and the surface of the interlayer dielectric layer is about 88° ~ 89° . Since the trapezoid dummy patterns have a narrow top and a wide bottom, an opening with a narrower top portion is formed after the dummy patterns are removed. Hence, when the opening is filled with the metal layer by a sputtering process, the effect of metal gap fill is poor, so that problems such as overhang and the like usually occur to cause the formation of voids in the metal layer, thereby affecting the reliability and performance of the device.

SUMMARY OF THE INVENTION

[0006] Accordingly, the invention provides a method of fabricating a semiconductor device to carry out an ion implantation process before dummy patterns are formed, so as to enhance the reliability and performance of the device.

[0007] The invention provides a method of fabricating a semiconductor device. Firstly, a polysilicon layer is formed on a substrate. An N-type dopant is doped into the polysilicon layer. Next, a portion of the polysilicon layer is removed to form a plurality of dummy patterns. Each dummy pattern includes a top, a bottom, and a neck arranged between the top and the bottom. Here, the width of the neck is narrower than that of the top. Thereafter, a dielectric layer is formed on the substrate. The dielectric layer covers the substrate between adjacent dummy patterns and exposes the top of each dummy pattern. Subsequently, the dummy patterns are removed to form a plurality of trenches in the dielectric layer. Afterwards, a plurality of gate structures is formed in the trenches respectively.

[0008] According to an embodiment of the invention, the depth of the polysilicon layer doped with the highest concentration of the N-type dopant and the neck are substantially located on the same horizontal level of height.

[0009] According to an embodiment of the invention, the concentration of the N-type dopant doped in the bottom of the polysilicon layer is greater than the concentration of the N-type dopant doped in the top of the same.

[0010] According to an embodiment of the invention, the concentration of the N-type dopant doped increases gradually from the top

to the bottom of the polysilicon layer.

[0011] According to an embodiment of the invention, the method of fabricating the semiconductor device further includes a step of doping another N-type dopant into the polysilicon layer.

[0012] According to an embodiment of the invention, the N-type dopant is phosphorus (P), antimony (Sb), or arsenic (As).

[0013] According to an embodiment of the invention, when the N-type dopant is phosphorus, the energy for doping is greater than 1 Kev but less than 20 KeV and the dose therefor is greater than $1E15\text{ cm}^{-2}$ but less than $8E15\text{ cm}^{-2}$.

[0014] According to an embodiment of the invention, the top and the neck have a first height therebetween, the neck and the bottom have a second height therebetween, and the ratio of the first height to the second height is substantially 2:1.

[0015] According to an embodiment of the invention, an included angle between the sidewall of the top of each trench and the surface of the dielectric layer is larger than 90° .

[0016] According to an embodiment of the invention, the method of removing a portion of the polysilicon layer further includes an etching process using a halogen-containing reactant.

[0017] According to an embodiment of the invention, before the dummy patterns are removed, a high dielectric constant layer is further formed between the substrate and each of the dummy patterns.

[0018] According to an embodiment of the invention, the method of fabricating the semiconductor device further includes a step of forming a source/drain region in the substrate at respective sides of the gate structure. The method of forming the source/drain region, for example, includes

performing an ion implantation process or a selective epitaxy growth (SEG) process.

[0019] According to an embodiment of the invention, after the dummy patterns are formed and before the dielectric layer is formed, a spacer is further formed on the sidewall of each dummy pattern.

[0020] In light of the foregoing, in the method of fabricating the semiconductor device of the invention, the ion implantation process is performed after the polysilicon layer is formed. Thus, when removing a portion of the polysilicon layer, different etching rates at different depth locations of the doped polysilicon layer are utilized to form the dummy patterns having the width of the neck narrower than the width of the top. Hence, when removing the dummy patterns and filling the metal layer, not only are the dummy patterns removed rapidly, but the effect of metal gap fill is also improved, such that voids do not form easily, thereby greatly enhancing the reliability and performance of the device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The present invention will become more readily apparent to those ordinarily skilled in the art after reviewing the following detailed description and accompanying drawings, in which:

[0022] Figs. 1A through 1E are cross-sectional views schematically illustrating a process for fabricating a semiconductor device according to an embodiment of the invention.

[0023] Fig. 2 and Fig. 3 respectively illustrate schematic cross-sectional views of dummy patterns according to another embodiment of the invention.

[0024] Fig. 4 is a cross-sectional view schematically illustrating a

semiconductor device according to another embodiment of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0025] The present invention will now be described more specifically with reference to the following embodiments. It is to be noted that the following descriptions of preferred embodiments of this invention are presented herein for purpose of illustration and description only. It is not intended to be exhaustive or to be limited to the precise form disclosed.

[0026] Figs. 1A through 1E are cross-sectional views schematically illustrating a process for fabricating a semiconductor device according to an embodiment of the invention. It should be noted that the method of fabricating the semiconductor device described in the following adopts a gate last process to form a complementary metal oxide semiconductor (CMOS) device for illustration. People skilled in the art should be able to embody the invention based on the illustration, whereas the scope of the invention is not limited thereto. The formation of a single metal oxide semiconductor (MOS) device may also be implemented. Moreover, the disposition locations, the manners and the sequence of formation of other components such as metal gate structures, doped regions, spacers, stop layers, and the like are all fabricated with techniques known to people skilled in the art based on conventional arts, and are not limited to the descriptions illustrated in the following embodiments.

[0027] Referring to Fig. 1A, a substrate 100 is provided. The substrate 100, for example, is a semiconductor substrate such as an N-type or a P-type silicon substrate, group III-V semiconductor substrate, and the like. The substrate 100 includes a first region 101a and a second region 101b. The first region 101a and the second region 101b are spaced by

isolation structures 102. In one embodiment, when the first region 101a is a P-type metal oxide semiconductor (PMOS) region, the second region 101b is an N-type metal oxide semiconductor (NMOS) region. The isolation structures 102 are shallow trench isolation structures, for example.

[0028] Next, a high dielectric constant (high-k) material layer 104 and a polysilicon layer 106 are sequentially formed on the substrate 100. The material of the high dielectric constant material layer 104 is, for example, a dielectric material with a dielectric constant greater than 4, such as TiO_2 , HfO_2 , ZrO_2 , Al_2O_3 , La_2O_3 , Y_2O_3 , Gd_2O_3 , Ta_2O_5 , or a combination thereof. The high dielectric constant material layer 104 is fabricated by a chemical vapor deposition (CVD) process, for instance. In one embodiment, before the high dielectric constant material layer 104 is formed, an insulation material layer 103 is also optionally formed on a surface of the substrate 100 to enhance an adhesion between the high dielectric constant material layer 104 and the substrate 100. The insulation material layer 103 is made of, for example, silicon oxide and formed, for example, in a thermal oxidizing process. The polysilicon layer 106 can be used as a material layer of dummy patterns to be formed subsequently, and is formed in a CVD process, for instance.

[0029] Afterwards, an ion implantation process 107 is performed to dope an N-type dopant into the polysilicon layer 106. In the ion implantation process 107, a blanket doping process is performed to the polysilicon layer 106 using a vertical ion implantation manner, for example. The N-type dopant, for example, is phosphorus (P), antimony (Sb), or arsenic (As). A concentration of the N-type dopant distributed in the polysilicon layer 106 varies with different depth locations in the

polysilicon layer 106. For instance, the depth with the highest concentration of the doped N-type dopant is between the top and the bottom of the polysilicon layer 106. Alternatively, the concentration of the doped N-type dopant gradually increases from the top to the bottom of the polysilicon layer 106. In one embodiment, when the thickness of the polysilicon layer 106 is about 500 Å to 600 Å and the N-type dopant implanted is phosphorus, an appropriate energy within a range of 1 Kev to 20KeV and a dose within a range of $1\text{E}15$ to $8\text{E}15\text{ cm}^{-2}$ are utilized in the ion implantation process 107. As a consequence, the location with the highest concentration of the N-type dopant is at a depth of about 300 Å to 400 Å away from the surface of the polysilicon layer 106.

[0030] Referring to Fig 1B, a patterned hard mask layer 108 is formed on the polysilicon layer 106. The patterned hard mask layer 108, for example, has openings to expose a portion of the surface of the polysilicon layer 106. In this step, the disposition of the openings of the patterned hard mask layer 108 is designed according to locations of gate structures to be formed subsequently. That is, the locations of the polysilicon layer 106 covered by the patterned hard mask layer 108 are the locations of the gate structures subsequently formed. The material of the patterned hard mask layer 108 is selected from materials having etching selectivity different from that of the polysilicon layer 106. Here, the material is silicon nitride, silicon oxide, or silicon oxynitride, for example. In a formation of the patterned hard mask layer 108, a layer of hard mask material layer (not shown) is first formed on the substrate 100 using the CVD process, for example. Thereafter, a photolithographic process and an etching process are sequentially performed by adopting a photoresist material to remove a portion of the hard mask material layer.

[0031] Subsequently, the patterned hard mask layer 108 is used as a mask to remove the exposed polysilicon layer 106, so as to form a plurality of dummy patterns 110. Afterwards, the high dielectric constant material layer 104 and the insulation material layer 103 are patterned to form the high dielectric constant layer 104a and the insulation layer 103a. Here, the high dielectric constant layer 104a and the insulation layer 103a are adopted jointly as a gate dielectric layer of the gate structure to be subsequently formed. Each dummy pattern 110 includes a top 110a, a neck 110b, and a bottom 110c. The neck 110b is arranged between the top 110a and the bottom 110c. The width of the neck 110b is narrower than that of the top 110a, and the width of the neck 110b is narrower than that of the bottom 110c, for example. Therefore, a cross-section with a funnel-like shape is formed. In one embodiment, when the top 110a and the neck 110b have a first height H_1 therebetween, and the neck 110b and the bottom 110c have a second height H_2 therebetween, the ratio of the first height H_1 to the second height H_2 is substantially 2:1. In a method of removing a portion of the polysilicon layer 106 to form the dummy patterns 110, a halogen-containing reactant is used for etching. A plasma gas source adopted in dry etching to remove a portion of the polysilicon layer 106 contains fluorine radicals, chlorine radicals, or bromine radicals, for instance.

[0032] It should be noted that the etching rate of the polysilicon layer 106 doped with the N-type dopant is higher than the etching rate of the undoped polysilicon material, and the etching rate increases as the concentration of the N-type dopant enhances. Therefore, the depth of the polysilicon layer 106 doped with the highest concentration of the N-type dopant and the neck 110b are substantially located on the same horizontal

level of height as illustrated in Fig. 1B.

[0033] The above-mentioned embodiment is illustrated with the dummy patterns 110 having funnel-like cross-sections. However, the invention is not limited thereto. People of ordinary skills in the art should understand that as long as the width of the neck is narrower than that of the top, the dummy patterns can also be in other shapes. In other words, the concentration distribution of the N-type dopant in the polysilicon layer 106 is adjusted by controlling parameters such as an implantation energy of the ion implantation process 107 and the like. As a result, the location of the horizontal level of height of the highest N-type dopant concentration substantially corresponds to the location of the horizontal level of height of the narrowest width of the dummy patterns formed later. Fig. 2 and Fig. 3 respectively illustrate schematic cross-sectional views of dummy patterns according to another embodiment of the invention. In Figs. 2 and 3, identical reference numerals are used for the same elements as those in Fig. 1B, and description of those elements is omitted.

[0034] In one embodiment, the concentration of the N-type dopant doped in the bottom of the polysilicon layer 106 is made greater than the concentration of the N-type dopant doped in the top thereof by controlling parameters such as the energy for implanting the N-type dopant in the ion implantation process 107 and the like. As illustrated in Fig. 2, after a portion of the polysilicon layer 106 is removed by the etching process, the width of a neck 200b of each dummy pattern 200 is, for instance, narrower than the width of a top 200a. Moreover, the width of the neck 200b substantially equals to the width of a bottom 200c, so as to form a cross-section with a wide top and a narrow bottom.

[0035] In one embodiment, the concentration of the doped N-type

dopant is increased from the top to the bottom of the polysilicon layer 106 by controlling the parameters such as the energy for implanting the N-type dopant in the ion implantation process 107 and the like. As illustrated in Fig. 3, after a portion of the polysilicon layer 106 is removed by the etching process, the width a neck 300b of each dummy pattern 300 is, for instance, narrower than the width of a top 300a. Moreover, the width of the neck 300b is greater than the width of a bottom 300c, for example, so as to form a trapezoid cross-section reducing gradually from the top to the bottom.

[0036] Moreover, in other embodiments of the invention, a plurality of N-type dopants is doped into the polysilicon layer 106, so that the polysilicon layer 106 has the etching rate required at different depths, thereby facilitating the formation of dummy patterns. Obviously, the method of doping the N-type dopant into the polysilicon layer 106 is not limited to the embodiments aforementioned. That is, various methods are acceptable as long as the N-type dopant is doped into the polysilicon material to form dummy patterns having the width of the top greater than that of the neck. People with ordinary skills in the art can make necessary adjustments based on actual demands.

[0037] Referring to Fig. 1C simultaneously, the dummy patterns 110 are used as masks for carrying out the ion implantation process so as to form lightly-doped regions 113a in the substrate 100 at respective sides of the dummy pattern 110 within the first region 101a, and to form lightly-doped regions 113b in the substrate 100 at respective sides of the dummy pattern 110 within the second region 101b. The lightly-doped regions 113a and 113b serve as source/drain extension regions of respective MOS transistors to be formed. When the first region 101a is

the PMOS region, the lightly-doped regions 113a are P-type lightly-doped regions. When the second region 101b is the NMOS region, the lightly-doped regions 113b are N-type lightly-doped regions. Thereafter, spacers 112 are formed on sidewalls of the dummy patterns 110. The material of the spacers 112 is silicon oxide, silicon nitride, or silicon oxynitride, for example. In a method of forming the spacers 112, for example, a layer of spacer material (not illustrated) is first formed on the substrate 100 by the CVD process, and a portion of the spacer material layer is removed by an anisotropic etching process. In addition, although the spacers 112 are merely illustrated with single-layer structures in Fig. 1C, the spacers 112 can also be multi-layer spacer structures.

[0038] Afterwards, source/drain regions 114a are formed in the substrate 100 at the respective sides of the dummy pattern 110 within the first region 101a, and source/drain regions 114b are formed in the substrate 100 at the respective sides of the dummy pattern 110 within the second region 101b. When the first region 101a is the PMOS region, the source/drain regions 114a are P-type heavily-doped regions or SiGe epitaxial layers, for example. When the second region 101b is the NMOS region, the source/drain regions 114b are N-type heavily-doped regions, for instance. In one embodiment, the source/drain regions 114a and 114b are formed by the ion implantation process, for example, so as to form the P-type or the N-type heavily-doped regions respectively in the substrate 100. In another embodiment, in the formation of the source/drain regions 114a, a portion of the substrate 100 at the respective sides of the dummy pattern 110 within the first region 101a is first removed to form trenches (not shown), for example. Subsequently, a selective epitaxy growth (SEG) process is performed to form the SiGe epitaxial layer in each trench. The

SiGe epitaxial layer is not only used as the source/region region of the PMOS transistor, but also increases a compressive stress of a channel of the PMOS transistor, so that mobility of holes increases, thereby enhancing operation speed and performance of the PMOS transistor.

[0039] After the source/drain regions 114a and 114b are formed, a stop layer 116 is optionally formed on the substrate 100 to cover the first region 101a and the second region 101b entirely. The stop layer 116 is made of silicon nitride, and formed by the CVD process, for example. In one embodiment, the stop layer 116 is utilized as a stress layer providing compressive stress or tensile stress to a channel region. Moreover, the stop layer 116 is capable of generating the tensile stress suitable for the channel of the NMOS transistor or the compressive stress suitable for the channel of the PMOS transistor by changing process parameters in the formation of the stop layer 116. Afterwards, a dielectric layer 118 is formed on the substrate 100 as an interlayer dielectric (ILD) layer. The dielectric layer 118 covers the substrate 100 and the dummy patterns 110 entirely, for instance. The dielectric layer 118, for example, is made of silicon oxide, and can be formed by the CVD process.

[0040] Referring to Fig. 1D, a portion of the dielectric layer 118 and a portion of the stop layer 116 are removed to expose upper surfaces of the dummy patterns 110. A portion of the dielectric layer 118 and a portion of the stop layer 116 are removed by performing a chemical-mechanical polishing (CMP) process or an etching-back process, for example. Thereafter, the dummy patterns 110 are removed to form the trenches 120 and a surface of the high dielectric constant layer 104a is exposed. The dummy patterns 110 are removed, for example, by carrying out a wet etching process, which utilizes KOH solution as an etching solution.

[0041] It should be illustrated that the polysilicon doped with the N-type dopant usually has a higher etching rate than the undoped polysilicon. In addition, the etching rate of the polysilicon doped with the N-type dopant is far higher than the etching rate of the polysilicon doped with the P-type dopant. In the previous step, the polysilicon layer is doped with the N-type dopant before the dummy patterns 110 are formed. Therefore, when the dummy patterns 110 are removed by wet etching, a rapid removing rate results and the residual polysilicon material does not remain easily in the trenches 120. Additionally, the doping of the N-type dopant into the polysilicon layer further compensates the P-type dopant implanted in the formation of the lightly-doped regions 113a and 113b or the source-drain regions 114a and 114b. Thus, problems such as troublesome removal of the dummy patterns 110 resulted from P-type dopant overdope are prevented.

[0042] Referring to Fig. 1E, a work function metal layer 122 is formed conformally on the surface of the trench 120 in the first region 101a, and a work function metal layer 124 is formed conformally on the surface of the trench 120 in the second region 101b. The material of the work function metal layers 122 and 124 includes all materials capable of achieving the work function required, such as TiN, TiAlx, TaC, TaCNO, TaCN, or TaN, for instance. The work function metal layers 122 and 124 are formed by the CVD or a physical vapor deposition (PVD) process, for example. The material of the work function metal layer 122 and that of the work function metal layer 124 are different, for instance. In one embodiment, when the first region 101a is the PMOS region, the material of the work function metal layer 122 is TiN, for instance. When the second region 101b is the NMOS region, the material of the work function

metal layer 124 is TiAlx, for example. Next, a metal layer 126 is filled into the trenches 120 so as to form gate structures 130a and 130b respectively. The metal layer 126 is made of, for example, Al, aluminum-rich TiAlx, Ti, or a combination thereof, and formed by the CVD process or the PVD process.

[0043] Generally, the work function value required by the PMOS transistor is approximately from 5 eV to 5.1 eV, and the work function value required by the NMOS transistor is approximately from 4 eV to 4.1 eV. The work function of the gate structure 130a is determined by the metal layer 126 and the work function metal layer 122 underneath. The work function of the gate structure 130b is determined by the metal layer 126 and the work function metal layer 124 underneath. Therefore, the work function values respectively required by the PMOS transistor and the NMOS transistor can be achieved by adjusting the material and the thickness of the work function metal layers 122 and 124.

[0044] It should be illustrated that since the width of the neck is narrower than that of the top of each dummy pattern, the trench 120 formed after the removal of each dummy pattern is shaped into a structure having a wide opening in the top portion. That is, an included angle θ_1 between the sidewall of the top 120a of the trench 120 and the surface of the dielectric layer 118 is larger than 90° , for instance. Hence, the trenches 120 each having a wide opening in the top portion not only facilitate the rapid removal of the dummy patterns, but also have superior metal gap fill effect when forming the metal layer 126 so that voids are not formed easily.

[0045] Fig. 1E is used as an exemplary example in the following to further illustrate the structure of the semiconductor device of the

invention.

[0046] Referring to Fig. 1E, the semiconductor device of the present embodiment includes the substrate 100, the gate structures 130a and 130b, and the source/drain regions 114a and 114b. The substrate 100 includes the first region 101a and the second region 101b spaced by the isolation structures 102. When the first region 101a, for instance, is the PMOS region, the second region 101b is the NMOS region. The dielectric layer 118 is disposed on the substrate 100, and the trenches 120 are disposed in the dielectric layer 118. Each trench 120 includes a top 120a, a neck 120b, and a bottom 120c. The neck 120b is arranged between the top 120a and the bottom 120c.

[0047] The gate structure 130a, for example, is disposed within the first region 101a, and includes the insulation layer 103a, the high dielectric constant layer 104a, the work function metal layer 122, and the metal layer 126 disposed sequentially on the substrate 100. The high dielectric constant layer 104a and the insulation layer 103a are adopted jointly as a gate dielectric layer of the gate structure 130a, for example. The work function of the gate structure 130a is determined by the metal layer 126 and the work function metal layer 122 underneath, for example. The source/drain regions 114a are disposed in the substrate 100 at respective sides of the gate structure 130a. In one embodiment, the lightly-doped regions 113a are disposed in the substrate 100 between the gate structure 130a and the source/drain regions 114a.

[0048] The gate structure 130b, for example, is disposed within the second region 101b, and includes the insulation layer 103a, the high dielectric constant layer 104a, the work function metal layer 124, and the metal layer 126 disposed sequentially on the substrate 100. The high

dielectric constant layer 104a and the insulation layer 103a are adopted jointly as a gate dielectric layer of the gate structure 130b. The work function of the gate structure 130b is determined by the metal layer 126 and the work function metal layer 124 underneath, for example. The source/drain regions 114b are disposed in the substrate 100 at the respective sides of the gate structure 130b. In one embodiment, the lightly-doped regions 113b are disposed in the substrate 100 between the gate structure 130b and the source/drain regions 114b.

[0049] As aforementioned, the gate structures 130a and 130b are disposed in the trenches 120, for example. The insulation layer 103a is disposed on the surface of the substrate 100 in the trenches 120. The high dielectric constant layer 104a is disposed on the surface of the insulation layer 103a. The work function metal layer 122 and the work function metal layer 124 are conformally disposed on the surfaces of the trenches 120 in the first region 101a and the second region 101b, and cover the high dielectric constant layer 104a, respectively. The metal layer 126 fills the trenches 120 and covers the work function metal layers 122 and 124.

[0050] It should be noted that each trench 120 is a structure having a wide opening in the top portion, for example. That is, an included angle θ_1 between the sidewall of the top 120a of each trench 120 and the surface of the dielectric layer 118 is larger than 90° , for example. The width of the neck 120b of each trench 120 is narrower than that of the top 120a, and the width of the neck 120b is narrower than that of the bottom 120c, for example. Therefore, cross-sections with a funnel-like shape are formed. In one embodiment, the ratio of the height from the neck 120b to the top 120a and the height from the neck 120b to the bottom 120c is substantially 2:1. In other words, when the depth of the trenches 120 is about 500 Å to

600 Å, the difference in height between the neck 120b and the top 120a of each trench 120, for example, is about 300 Å to 400 Å.

[0051] In addition, the gate structures in the semiconductor device of the invention not only form the funnel-like trenches aforementioned, but can also form trenches of other shapes. Fig. 4 is a cross-sectional view schematically illustrating a semiconductor device according to another embodiment of the invention. In Fig. 4, identical reference numerals are used for the same elements as those in Fig. 1E, and description of those elements is omitted.

[0052] Referring to Fig. 4, in another embodiment, the main components constituting the semiconductor device illustrated in Fig. 4 are generally identical to those constituting the semiconductor device illustrated in Fig. 1E. However, the difference between the two semiconductor devices mainly regards to the forms of the trenches. The gate structures 130a and 130b are disposed in the trenches 400, for example. Each trench 400 is a structure having a wide opening in the top portion, and an included angle θ_2 between a sidewall of a top 400a thereof and the surface of the dielectric layer 118 is larger than 90° , for instance. The width of a neck 400b of each trench 400 is narrower than the width of the top 400a, for example. Furthermore, the width of the neck 400b of each trench 400 substantially equals to the width of a bottom 400c, so as to form a cross-section having a wide top and a narrow bottom.

[0053] In light of the foregoing, the semiconductor device and the method of fabricating the same in the embodiments aforementioned have at least the following advantages:

1. The gate structures of the semiconductor device in the embodiments above-mentioned are disposed in the trenches each having

the width of the neck narrower than that of the top. Therefore, the metal layers filled in the trenches do not have voids, and thereby have superior device performance.

2. Each trench of the semiconductor device in the embodiments above-mentioned has the design of the width of the neck narrower or equal to that of the bottom, so that trench having a wide opening can be formed without reducing the width of the bottom. Consequently, the critical dimension (CD) of the device is not affected.

3. In the method of fabricating the semiconductor device in the embodiments above-mentioned, before the dummy patterns are formed, the N-type dopant is doped into the polysilicon layer to enhance the etching rate of the polysilicon layer regionally. As a result, the dummy patterns each having the width of the neck narrower than that of the top are formed so as to enhance the metal gap fill ability, so that voids do not form easily.

4. In the method of fabricating the semiconductor device in the embodiments above-mentioned, the doping of the N-type dopant into the polysilicon layer further compensates the P-type dopant implanted in the process, so that the dummy patterns can be removed rapidly without leaving residual polysilicon material in the trenches.

5. The method of fabricating the semiconductor device in the embodiments aforementioned can be applied in all gate last processes, especially in the gate last process for forming metal gates, and can be integrated with the existing semiconductor process. The process aforementioned is not only simple, but can also improve the reliability of the device effectively.

[0054] While the invention has been described in terms of what is

presently considered to be the most practical and preferred embodiments, it is to be understood that the invention needs not be limited to the disclosed embodiment. On the contrary, it is intended to cover various modifications and similar arrangements included within the spirit and scope of the appended claims which are to be accorded with the broadest interpretation so as to encompass all such modifications and similar structures.

WHAT IS CLAIMED IS:

1. A method of fabricating a semiconductor device, comprising:

forming a polysilicon layer on a substrate;

doping an N-type dopant into the polysilicon layer;

removing a portion of the polysilicon layer to form a plurality of dummy patterns, each of the plurality of dummy patterns having a top, a bottom, and a neck arranged between the top and the bottom, wherein a width of the neck is narrower than a width of the top;

forming a dielectric layer on the substrate, the dielectric layer covering the substrate disposed between two adjacent dummy patterns and exposing the top of each dummy pattern;

removing the plurality of dummy patterns to form a plurality of trenches in the dielectric layer; and

forming a plurality of gate structures in the trenches respectively.

2. The method of fabricating the semiconductor device as claimed in claim 1, wherein a depth of the polysilicon layer doped with a highest concentration of the N-type dopant and the neck are substantially located on the same horizontal level of height.

3. The method of fabricating the semiconductor device as claimed in claim

1, wherein a concentration of the N-type dopant doped in a bottom of the polysilicon layer is greater than a concentration of the N-type dopant doped in a top of the polysilicon layer.

4. The method of fabricating the semiconductor device as claimed in claim 1, wherein a concentration of the N-type dopant doped increases gradually from a top to a bottom of the polysilicon layer.

5. The method of fabricating the semiconductor device as claimed in claim 1, further comprising doping another N-type dopant into the polysilicon layer.

6. The method of fabricating the semiconductor device as claimed in claim 1, wherein the N-type dopant is phosphorus (P), antimony (Sb), or arsenic (As).

7. The method of fabricating the semiconductor device as claimed in claim 1, wherein when the N-type dopant is phosphorus, an energy for doping is within a range of 1 Kev to 20 KeV and a dose for doping is within a range of $1\text{E}15\text{ cm}^{-2}$ to $8\text{E}15\text{ cm}^{-2}$.

8. The method of fabricating the semiconductor device as claimed in claim 1, wherein the top and the neck have a first height therebetween, the neck and the bottom have a second height therebetween, and a ratio of the first height to the second height is substantially 2:1.

9. The method of fabricating the semiconductor device as claimed in claim 1, wherein an included angle between a sidewall of a top of each of the plurality of trenches and a surface of the dielectric layer is larger than 90°.

10. The method of fabricating the semiconductor device as claimed in claim 1, wherein the step of removing a portion of the polysilicon layer comprises performing an etching process using a halogen-containing reactant.

11. The method of fabricating the semiconductor device as claimed in claim 1, before removing the plurality of dummy patterns, further comprising forming a high dielectric constant layer between the substrate and each of the plurality of dummy patterns.

12. The method of fabricating the semiconductor device as claimed in claim 1, further comprising forming a source/drain region in the substrate

at respective sides of the gate structure.

13. The method of fabricating the semiconductor device as claimed in claim 12, wherein the step of forming the source/drain region comprises performing an ion implantation process or a selective epitaxy growth process.

14. The method of fabricating the semiconductor device as claimed in claim 1, after forming the plurality of dummy patterns and before forming the dielectric layer, further comprising forming a spacer on a sidewall of each of the plurality of dummy patterns.

ABSTRACT

A method for fabricating a semiconductor device is described. A polysilicon layer is formed on a substrate. The polysilicon layer is doped with an N-type dopant. A portion of the polysilicon layer is then removed to form a plurality of dummy patterns. Each dummy pattern has a top, a bottom, and a neck arranged between the top and the bottom, where the width of the neck is narrower than that of the top. A dielectric layer is formed on the substrate to cover the substrate disposed between adjacent dummy patterns, and the top of each dummy pattern is exposed. Thereafter, the dummy patterns are removed to form a plurality of trenches in the dielectric layer. A plurality of gate structures is formed in the trenches, respectively.

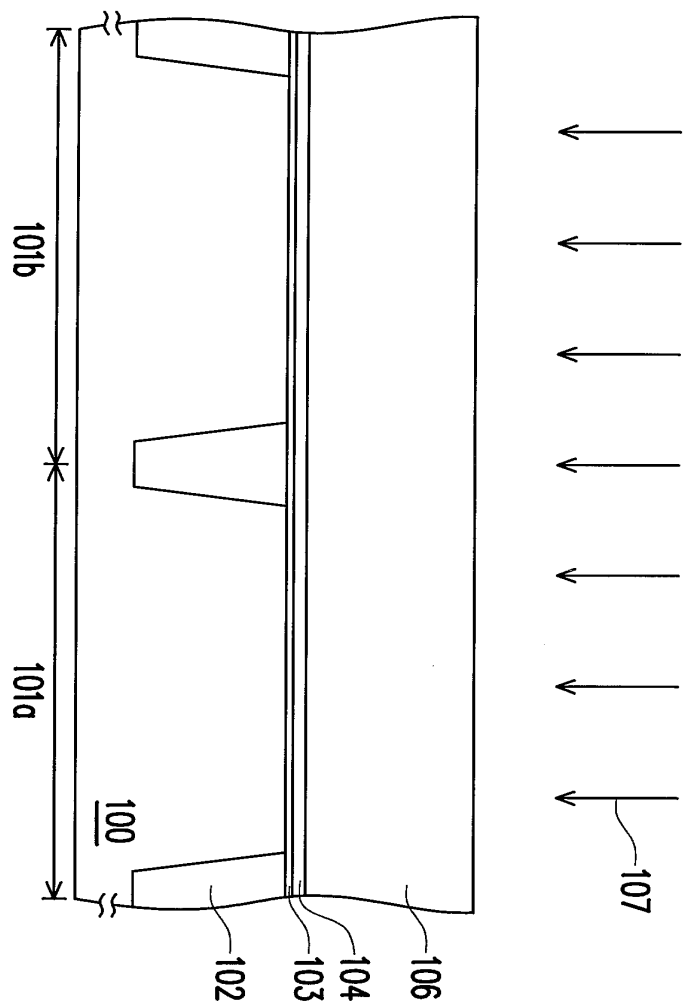


FIG. 1A

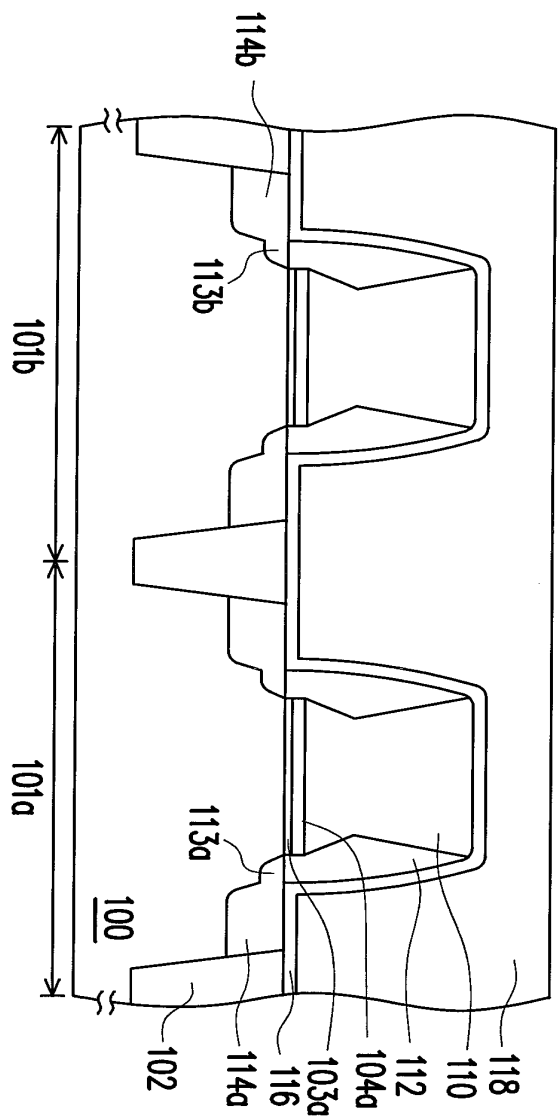


FIG. 1C

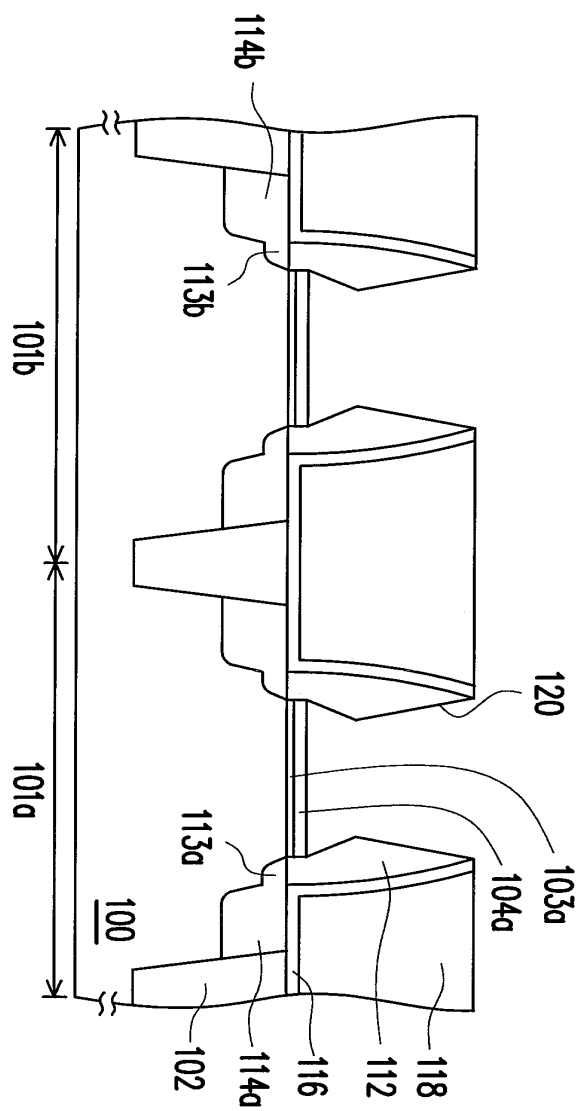


FIG. 1D

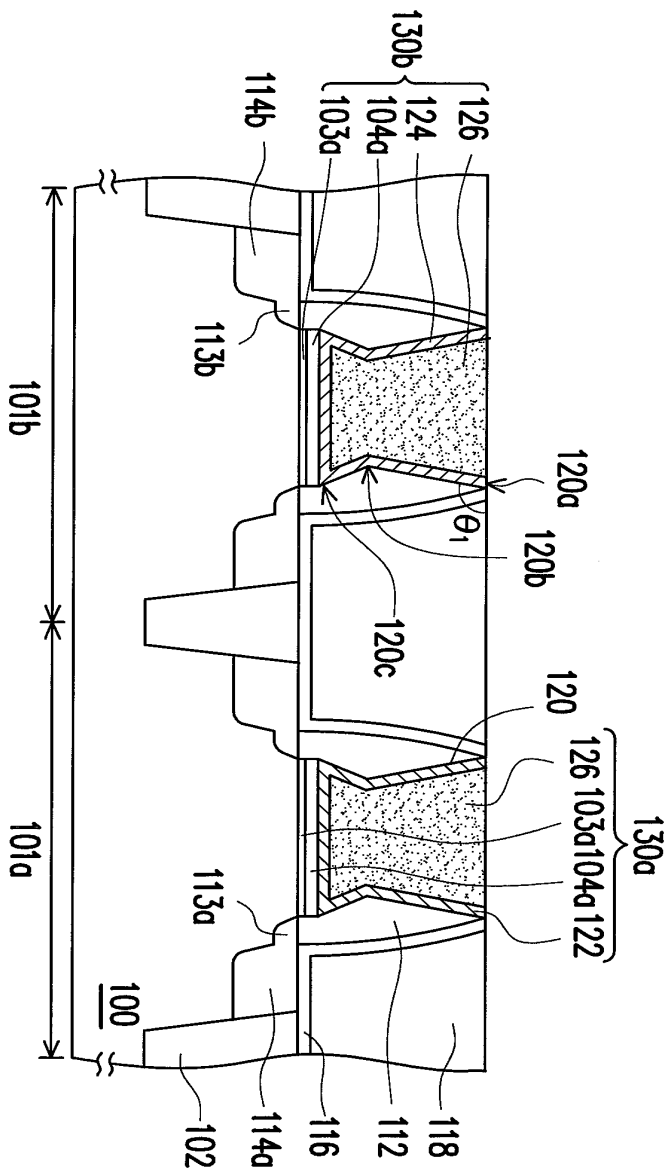


FIG. 1E

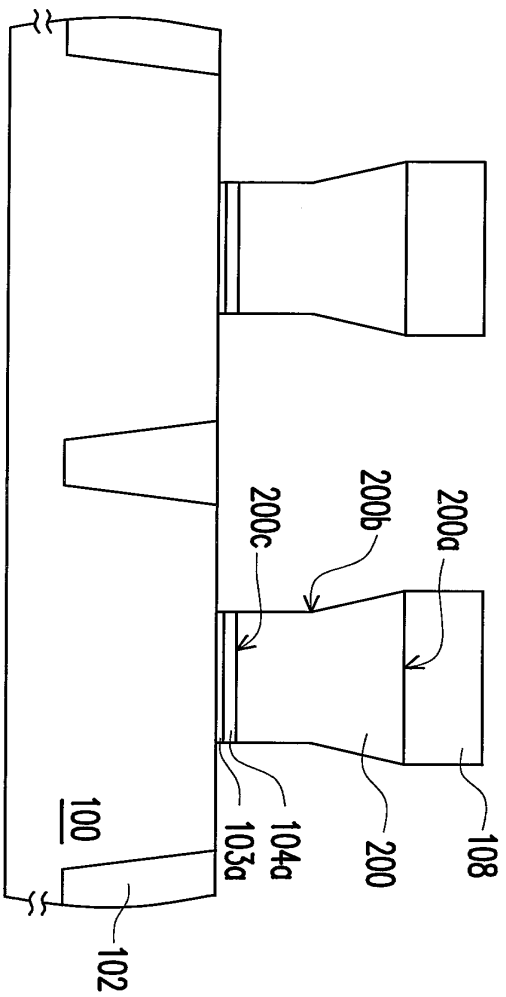


FIG. 2

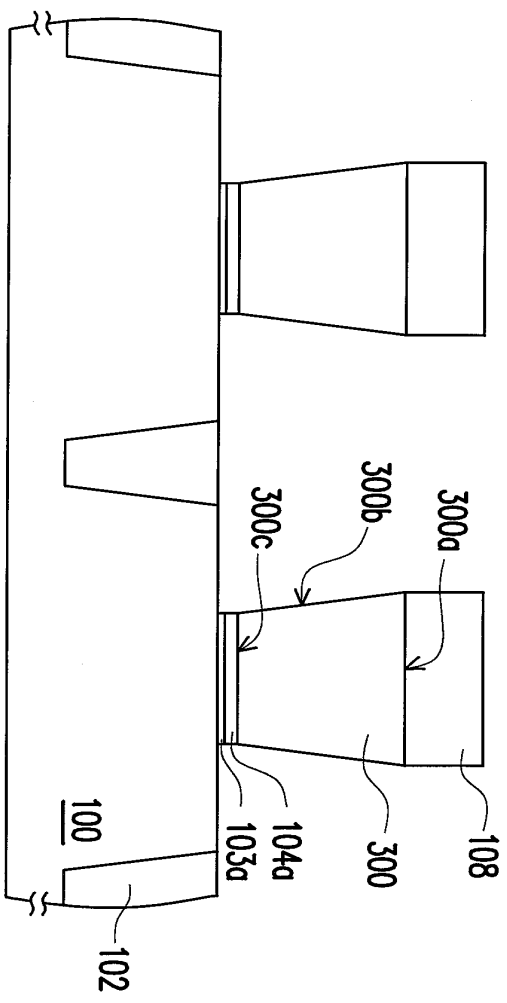


FIG. 3



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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

As the below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name and that I believe I am an 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 design or Utility patent is sought on the invention entitled

SEMICONDUCTOR DEVICE AND METHOD FOR FABRICATING THE SAME

the specification of which

 X is attached hereto.

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I hereby state that I have reviewed and understand the contents of the above-identified application, including the specification, claims and figures if any, as amended by any amendment referred to above.

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I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s) or PCT international application(s) designating The United States of America listed on the Application Data Sheet, and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulation, § 1.56 which become available between the filing date of the prior application(s) and the national or PCT international filing date of this application.

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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 design or utility patents issued thereon.

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Filing Date:
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APPLICATION DATA SHEET UNDER 37 C.F.R. 1.76

The application data sheet is a part of the provisional or non-provisional application for which it is being submitted. The following form contains the bibliographic data as outlined in 37 CFR 1.76.

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Application Information

Application Title	METHOD FOR FABRICATING SEMICONDUCTOR DEVICE
Application Type	Utility
Attorney Docket Number	66007-405DIV
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Domestic Application Information

Domestic 1

Application Number	12572498
Filing Date	2009-10-02
Continuity Type	Division of

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Country Citizenship Name	Taiwan ROC

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Name	Yu-Tai Tsai	Telephone	
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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	11232340
Application Number:	13277384
International Application Number:	
Confirmation Number:	9619
Title of Invention:	METHOD FOR FABRICATING SEMICONDUCTOR DEVICE
First Named Inventor/Applicant Name:	Chun-Hsien Lin
Customer Number:	65358
Filer:	Anthony King/Justin King
Filer Authorized By:	Anthony King
Attorney Docket Number:	66007-405DIV
Receipt Date:	20-OCT-2011
Filing Date:	
Time Stamp:	16:52:15
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	sb0096.pdf	422848	no	2
			57af9b27c5def58946ab33ee229a05795abdf4ed		

Warnings:

Information:

2	Power of Attorney	Form80.pdf	1097679 e9ac26daee1d826ca0446f0da5f9b15c37a4c50	no	2
Warnings:					
Information:					
Total Files Size (in bytes):				1520527	
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.					

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Chun-Hsien Lin

Application No./Patent No.: 13/277,384

Filed/Issue Date: 10-20-2011

Titled: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

UNITED MICROELECTRONICS CORP., a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 027093, Frame 0474, or for which a copy therefore is attached.

OR

- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

- ☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Justin King/

Signature

10-20-2011

Date

Justin King

Printed or Typed Name

Attorney on Record

Title

This collection of information is required by 37 CFR 3.73(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.**

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

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. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 13/277,384				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		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	380			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	620			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	250			
TOTAL CLAIMS (37 CFR 1.16(i))	14	minus 20 = *			OR	x 60 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1	minus 3 = *			OR	x 250 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 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).						0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
			TOTAL			TOTAL	1250			
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OTHER THAN SMALL ENTITY		
AMENDMENT A		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))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
AMENDMENT B		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))							OR		
	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 found in the appropriate box in column 1.										



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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
13/277,384	10/20/2011	2812	1250	66007-405DIV	14	1

CONFIRMATION NO. 9619

65358
WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
7225 BEVERLY ST.
ANNANDALE, VA 22003

FILING RECEIPT



OC000000050728385

Date Mailed: 11/03/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. 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 submit a written request for a Filing Receipt Correction. 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**

Applicant(s)

Chun-Hsien Lin, Tainan County, TAIWAN;

Assignment For Published Patent Application

UNITED MICROELECTRONICS CORP., Hsinchu, TAIWAN

Power of Attorney: The patent practitioners associated with Customer Number 65358

Domestic Priority data as claimed by applicant

This application is a DIV of 12/572,498 10/02/2009

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)

If Required, Foreign Filing License Granted: 11/01/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/277,384**

Projected Publication Date: 02/09/2012

Non-Publication Request: No

Early Publication Request: No

Title

METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

Preliminary Class

438

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.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

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).

LICENSE FOR FOREIGN FILING UNDER**Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

page 2 of 3

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).



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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV

CONFIRMATION NO. 9619

POA ACCEPTANCE LETTER

65358
WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
7225 BEVERLY ST.
ANNANDALE, VA 22003



Date Mailed: 11/03/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/20/2011.

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.

/nhnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV

CONFIRMATION NO. 9619

65358
WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
7225 BEVERLY ST.
ANNANDALE, VA 22003

PUBLICATION NOTICE



Title:METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

Publication No.US-2012-0034747-A1

Publication Date:02/09/2012

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.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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NOTICE OF ALLOWANCE AND FEE(S) DUE

65358 7590 05/04/2012
WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
7225 BEVERLY ST.
ANNANDALE, VA 22003

EXAMINER

WILCZEWSKI, MARY A

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 05/04/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV	9619

TITLE OF INVENTION: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	08/06/2012

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.

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)

65358 7590 05/04/2012

WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
7225 BEVERLY ST.
ANNANDALE, VA 22003

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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.

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

13/277,384 10/20/2011 Chun-Hsien Lin 66007-405DIV 9619

TITLE OF INVENTION: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	08/06/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
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WILCZEWSKI, MARY A 2822 438-587000

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, 1 _____
(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. 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.

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Date _____

Typed or printed name _____

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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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV	9619
65358	7590	05/04/2012	EXAMINER	
WPAT, PC INTELLECTUAL PROPERTY ATTORNEYS 7225 BEVERLY ST. ANNANDALE, VA 22003			WILCZEWSKI, MARY A	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 05/04/2012

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 0 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 0 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.

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. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	13/277,384	LIN, CHUN-HSIEN	
	Examiner	Art Unit	
	MARY WILCZEWSKI	2822	

-- 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 the application papers filed on 20 October 2011.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-14.

4. ☐ 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.

5. ☐ 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.

6. ☐ 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).

7. ☐ 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 Draftsperson's Patent Drawing Review (PTO-948) 3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>20 October 2011</u> 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 _____.
--	---

/M. Wilczewski/ Primary Examiner, Art Unit 2822	
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REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance:

The closest prior art of record is US Patent 7,176,090 to Brask et al. Brask et al teach to form a plurality of dummy patterns comprising silicon in which each of the patterns has a top, a bottom, and a neck arranged between the top and bottom, wherein the width of the neck is narrower than a width of the top, see figures 1a-1l. However, neither Brask et al. or any of the other cited references teach or suggest to form the plurality of dummy patterns by forming a polysilicon layer, doping an N-type dopant into the polysilicon layer; and removing a portion of the polysilicon layer to form a plurality of dummy patterns, each of the dummy patterns having a top, a bottom, and a neck arranged between the top and bottom, wherein the width of the neck is narrower than a width of the top, as recited in independent claim 1.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARY WILCZEWSKI whose telephone number is (571)272-1849. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. 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.

/M. Wilczewski/
Primary Examiner, Art Unit 2822

Notice of References Cited	Application/Control No. 13/277,384	Applicant(s)/Patent Under Reexamination LIN, CHUN-HSIEN	
	Examiner MARY WILCZEWSKI	Art Unit 2822	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2011/0237062	09-2011	Na et al.	438/592
*	B	US-2011/0079854	04-2011	Lin, Chun-Hsien	257/365
*	C	US-2011/0062520	03-2011	Brask et al.	257/348
*	D	US-8,076,735	12-2011	Lin, Chun-Hsien	257/407
*	E	US-8,048,790	11-2011	Soss et al.	438/585
*	F	US-7,176,090	02-2007	Brask et al.	438/270
*	G	US-6,127,232	10-2000	Chatterjee et al.	438/291
*	H	US-4,975,832	12-1990	Saito et al.	710/23
*	I	US-2002/0000623	01-2002	Cho et al.	257/388
*	J	US-6,617,212	09-2003	Cho et al.	438/270
*	K	US-2003/0235943	12-2003	Trivedi, Jigish D.	438/197
	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.

Receipt date: 10/20/2011

13277384 - GAU: 2822

Doc code: IDS

PTO/SB/08a (01-10)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2012. OMB 0651-0031

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2011-10-20
	First Named Inventor	Chun-Hsien Lin	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	66007-405DIV	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7208361		2007-04-24	Shah , et al.	
	2	7939895		2011-05-10	Fukasaku	
	3	5834816		1998-11-10	Jang	
	4	5879975		1999-03-09	Karlsson , et al.	
	5	6661066		2003-12-09	Kuroi , et al.	
	6	5840611		1998-11-24	Lee , et al.	
	7	6674137		2004-01-06	Nissa	
	8	6060375		2000-05-09	Owyang , et al.	

Receipt date: 10/20/2011 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13277384 - GAU: 2822	
	Filing Date		2011-10-20	
	First Named Inventor	Chun-Hsien Lin		
	Art Unit			
	Examiner Name			
	Attorney Docket Number		66007-405DIV	

	9	5685950		1997-11-11	Sato	
	10	7749911		2010-07-06	Wu , et al.	

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U.S.PATENT APPLICATION PUBLICATIONS

Remove

Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20090218603		2009-09-03	Brask; Justin K. ; et al.	
	2	20110070702		2011-03-24	Chien; Chin-Cheng ; et al.	
	3	20070126067		2007-06-07	Hattendorf; Michael L. ; et al.	
	4	20090189219		2009-07-30	SHINBORI; Atsushi ; et al.	

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	1	08055863	JP		1996-02-27	Shimizu		☐

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Receipt date: 10/20/2011 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13277384 - GAU: 2822	
	Filing Date		2011-10-20	
	First Named Inventor	Chun-Hsien Lin		
	Art Unit			
	Examiner Name			
	Attorney Docket Number		66007-405DIV	

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	SEIDEL et al., "Anisotropic Etching of Crystalline Silicon in Alkaline Solutions: I. Orientation Dependence and Behavior of Passivation Layers", Journal of the Electrochemical Society Inc, Vol. 137, No. 11, November 1990, pp3612-3626	☐
	2	SEIDEL et al., "Anisotropic Etching of Crystalline Silicon in Alkaline Solutions: II. Influence of Dopants", Journal of the Electrochemical Society Inc, Vol. 137, No. 11, November 1990, pp3622-3632	☐

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EXAMINER SIGNATURE

Examiner Signature	/Mary Wilczewski/	Date Considered	05/01/2012
--------------------	-------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

Receipt date: 10/20/2011 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13277384 - GAU: 2822
	Filing Date		2011-10-20
	First Named Inventor	Chun-Hsien Lin	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		66007-405DIV

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Justin King/	Date (YYYY-MM-DD)	2011-10-20
Name/Print	Justin King	Registration Number	50,464

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /MW/

<i>Search Notes</i> 	Application/Control No. 13277384	Applicant(s)/Patent Under Reexamination LIN, CHUN-HSIEN
	Examiner MARY WILCZEWSKI	Art Unit 2822

SEARCHED			
Class	Subclass	Date	Examiner
438	587, 595, 705, 532, 926	05/01/2012	MW
257	407; E21.444; E21.621; E21.624	05/02/2012	MW
438	197, 299	05/02/2012	MW

SEARCH NOTES		
Search Notes	Date	Examiner
Reviewed Parent Application Serial No. 12/572498 (now US 8,076,735)	05/01/2012	MW
East Search	05/01/2012	MW
East Search	05/02/2012	MW

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
	Interference Search	05/02/2012	MW

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BIB DATA SHEET

CONFIRMATION NO. 9619

SERIAL NUMBER 13/277,384	FILING or 371(c) DATE 10/20/2011 RULE	CLASS 257	GROUP ART UNIT 2822	ATTORNEY DOCKET NO. 66007-405DIV		
APPLICANTS Chun-Hsien Lin, Tainan County, TAIWAN; ** CONTINUING DATA ***** This application is a DIV of 12/572,498 10/02/2009 PAT 8,076,735 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 11/01/2011						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /MARY A WILCZEWSKI/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY TAIWAN	SHEETS DRAWINGS 8	TOTAL CLAIMS 14	INDEPENDENT CLAIMS 1
ADDRESS WPAT, PC INTELLECTUAL PROPERTY ATTORNEYS 7225 BEVERLY ST. ANNANDALE, VA 22003 UNITED STATES						
TITLE METHOD FOR FABRICATING SEMICONDUCTOR DEVICE						
FILING FEE RECEIVED 1250	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			

<i>Index of Claims</i> 	Application/Control No. 13277384	Applicant(s)/Patent Under Reexamination LIN, CHUN-HSIEN
	Examiner MARY WILCZEWSKI	Art Unit 2822

✓	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	05/02/2012								
	1	=								
	2	=								
	3	=								
	4	=								
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	7	=								
	8	=								
	9	=								
	10	=								
	11	=								
	12	=								
	13	=								
	14	=								

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1939	257/E21.444.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/02 20:11
L2	557	257/E21.621.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/02 20:16
L3	361	257/E21.624.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/02 20:16
L4	449	257/407.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/02 20:20
L5	882	2 or 3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/02 20:21
L6	69	5 and (dummy adj1 gate\$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/02 20:21
L7	3518	438/197.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/02 20:39
L8	1022	438/299.ccls.	US-PGPUB;	OR	OFF	2012/05/02

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			20:39
L9	15	((("20110062520") or ("8076735") or ("20110237062") or ("20110079854") or ("4975382") or ("6127232") or ("8048790") or ("7176090")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/02 20:50
L19	48	("20010023120" "20020000623" "20020058374" "20020086504" "20020155665" "20020187610" "20020197790" "20030032303" "20030045080" "20030143809" "20030211684" "20030228744" "20030235942" "20030235943" "20040077136" "20040108559" "6063698" "6184072" "6255698" "6365450" "6410376" "6420279" "6475841" "6475874" "6514828" "6531750" "6544873" "6544906" "6551913" "6586288" "6617209" "6617210" "6617212" "6620713" "6642131" "6667246" "6689675" "6696327" "6696345" "6709911" "6716707" "6746967" "6770568" "6855605").PN. OR ("7176090").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/05/02 21:10

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L12	7013	dummy adj1 (gate\$1 or pattern\$1)	US-PGPUB; USPAT; UPAD	OR	OFF	2012/05/02 20:59
L15	48173	(dop\$3 or implant\$3) near (polysilicon or polycrystalline)	US-PGPUB; USPAT; UPAD	OR	OFF	2012/05/02 21:00
L17	8	width with neck with dummy	US-PGPUB; USPAT; UPAD	OR	OFF	2012/05/02 21:01
L18	3	12 and 15 and 17	US-PGPUB; USPAT; UPAD	OR	OFF	2012/05/02 21:01

5/ 2/ 2012 9:30:57 PM

EAST Search History

EAST Search History (Prior Art)

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L1	1	("8076735").PN.	USPAT; USOCR	OR	OFF	2012/05/01 19:47
L2	14	("20070126067" "20090189219" "20090218603" "20110070702" "5685950" "5834816" "5840611" "5879975" "6060375" "6661066" "6674137" "7208361" "7749911" "7939895").PN. OR ("8076735").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/05/01 19:49
L3	5841	dummy near gate\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 19:53
L4	155052	narrow\$2 near2 width\$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 19:55
L5	312	3 and 4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 19:55
L6	547	(dummy near gate\$1).ti.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 20:47
L7	803	438/ 705.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 21:03
L8	4	7 and 3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2012/05/01 21:04

EAST Search History

			IBM_TDB			
L9	261	438/532.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 21:06
L10	1	9 and 3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 21:06
L11	834	438/587.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 21:07
L12	1318	438/595.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 21:07
L13	215	438/926.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/05/01 21:07
L14	5	("20040175910" "6054355" "6080615" "6204137" "7091118").PN. OR ("8048790").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/05/01 21:14

EAST Search History (Interference)

< This search history is empty >

5/ 1/ 2012 9:25:16 PM

Issue Classification 	Application/Control No. 13277384	Applicant(s)/Patent Under Reexamination LIN, CHUN-HSIEN
	Examiner MARY WILCZEWSKI	Art Unit 2822

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED							
438		587				H	0	1	L	21 / 28 (2006.0)								
CROSS REFERENCE(S)						H	0	1	L	21 / 336 (2006.0)								
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	
438	595	705	926	532														
257	E21.444	E21.624																

☒ 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														
	2														
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	11														
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	14														

NONE		Total Claims Allowed:	
		14	
(Assistant Examiner)	(Date)		
/MARY WILCZEWSKI/ Primary Examiner.Art Unit 2822	05/02/2012	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1C,1D,1E

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Request for Continued Examination (RCE) Transmittal

Address to:
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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	13/277,384
Filing Date	10-20-2011
First Named Inventor	Chun-Hsien Lin
Art Unit	2822
Examiner Name	WILCZEWSKI, MARY A
Attorney Docket Number	66007-405DIV

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.
- The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. _____.
- a. ☐ RCE fee required under 37 CFR 1.17(e)
- ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)
- iii. ☐ Other _____
- 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	/Justin King/	Date	06/01/2012
Name (Print/Type)	Justin King	Registration No.	50464

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)		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.

Instruction Sheet for RCEs

(not to be submitted to the USPTO)

NOTES:

An RCE is not a new application, and filing an RCE will not result in an application being accorded a new filing date.

Filing Qualifications:

The application must be a utility or plant application filed on or after June 8, 1995. The application cannot be a provisional application, a utility or plant application filed before June 8, 1995, a design application, or a patent under reexamination. See 37 CFR 1.114(e).

Filing Requirements:

Prosecution in the application must be closed. Prosecution is closed if the application is under appeal, or the last Office action is a final action, a notice of allowance, or an action that otherwise closes prosecution in the application (e.g., an Office action under *Ex parte Quayle*). See 37 CFR 1.114(b).

A submission and a fee are required at the time the RCE is filed. If reply to an Office action under 35 U.S.C. 132 is outstanding (e.g., the application is under final rejection), the submission must meet the reply requirements of 37 CFR 1.111. If there is no outstanding Office action, the submission can be an information disclosure statement, an amendment, new arguments, or new evidence. See 37 CFR 1.114(c). The submission may be a previously filed amendment (e.g., an amendment after final rejection).

WARNINGS:

Request for Suspension of Action:

All RCE filing requirements must be met before suspension of action is granted. A request for a suspension of action under 37 CFR 1.103(c) does not satisfy the submission requirement and does not permit the filing of the required submission to be suspended.

Improper RCE will NOT toll Any Time Period:

Before Appeal - If the RCE is improper (e.g., prosecution in the application is not closed or the submission or fee has not been filed) and the application is not under appeal, the time period set forth in the last Office action will continue to run and the application will be abandoned after the statutory time period has expired if a reply to the Office action is not timely filed. No additional time will be given to correct the improper RCE.

Under Appeal - If the RCE is improper (e.g., the submission or the fee has not been filed) and the application is under appeal, the improper RCE is effective to withdraw the appeal. Withdrawal of the appeal results in the allowance or abandonment of the application depending on the status of the claims. If there are no allowed claims, the application is abandoned. If there is at least one allowed claim, the application will be passed to issue on the allowed claim(s). See MPEP 1215.01.

See MPEP 706.07(h) for further information on the RCE practice.

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. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
Application Number:		13277384		
Filing Date:		20-Oct-2011		
Title of Invention:		METHOD FOR FABRICATING SEMICONDUCTOR DEVICE		
First Named Inventor/Applicant Name:		Chun-Hsien Lin		
Filer:		Anthony King/Justin King		
Attorney Docket Number:		66007-405DIV		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Request for continued examination	1801	1	930	930
Total in USD (\$)				930

Electronic Acknowledgement Receipt	
EFS ID:	12912178
Application Number:	13277384
International Application Number:	
Confirmation Number:	9619
Title of Invention:	METHOD FOR FABRICATING SEMICONDUCTOR DEVICE
First Named Inventor/Applicant Name:	Chun-Hsien Lin
Customer Number:	65358
Filer:	Anthony King/Justin King
Filer Authorized By:	Anthony King
Attorney Docket Number:	66007-405DIV
Receipt Date:	01-JUN-2012
Filing Date:	20-OCT-2011
Time Stamp:	12:48:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$930
RAM confirmation Number	10587
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Amendment Submitted/Entered with Filing of CPA/RCE	sb0030.pdf	304261 c4e63d3e1b63997fc36e8698ba2833faf340df3e	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30464 be43c4942d02a9c57563bc3062670ce47a4a5c48	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			334725		
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.					

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	13277384
	Filing Date	2011-10-20
	First Named Inventor	Chun-Hsien Lin
	Art Unit	2822
	Examiner Name	WILCZEWSKI, MARY A
	Attorney Docket Number	66007-405DIV

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	13277384
	Filing Date	2011-10-20
	First Named Inventor	Chun-Hsien Lin
	Art Unit	2822
	Examiner Name	WILCZEWSKI, MARY A
	Attorney Docket Number	66007-405DIV

1	K, Shikano, Alpha-Activation analysis of nitrogen in boron-doped silicon single crystal. Journal of Radioanalytical and Nuclear Chemistry, Vol. 221, Nos 1-2 (1997), 29-33.	☐
2	Implant Projection Range, MEMS, http://me.kaist.ac.kr/upload/course/MAE582_2009/Lecture-03.doc , 2009.	☐

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Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	13277384
	Filing Date	2011-10-20
	First Named Inventor	Chun-Hsien Lin
	Art Unit	2822
	Examiner Name	WILCZEWSKI, MARY A
	Attorney Docket Number	66007-405DIV

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Justin King/	Date (YYYY-MM-DD)	2012-06-01
Name/Print	Justin King	Registration Number	50,464

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	12912269
Application Number:	13277384
International Application Number:	
Confirmation Number:	9619
Title of Invention:	METHOD FOR FABRICATING SEMICONDUCTOR DEVICE
First Named Inventor/Applicant Name:	Chun-Hsien Lin
Customer Number:	65358
Filer:	Anthony King/Justin King
Filer Authorized By:	Anthony King
Attorney Docket Number:	66007-405DIV
Receipt Date:	01-JUN-2012
Filing Date:	20-OCT-2011
Time Stamp:	12:53:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	SB08.pdf	612584 f75a08d86ef1cfe98bde8bb5a4e45a07fa46e811	no	4

Warnings:

Information:

A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

2	Non Patent Literature	implantProjectionRange.pdf	716313 db8d09f982469719ed8eb15210b33e322f2955cd	no	6
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Warnings:

Information:

3	Non Patent Literature	Shikano_K.PDF	893518 533f0d1e0e6414a0a51fde7bb30da079f594cac	no	5
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Warnings:

Information:

Total Files Size (in bytes):			2222415
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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.

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 13/277,384		Filing Date 10/20/2011		☐ 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 (\$)	OR	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.										
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	06/01/2012	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 14	Minus	** 20	=	0	OR	X \$60=	0	
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	=	0	OR	X \$250=	0	
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0	
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
AMENDMENT	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	OR	X \$ =	ADDITIONAL FEE (\$)	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	OR	X \$ =	ADDITIONAL FEE (\$)	
☐ Application Size Fee (37 CFR 1.16(s))										
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					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:
/ANITA JOHNSON/

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.



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

65358 7590 08/23/2012
WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
8230 BOONE BLVD. SUITE 405
VIENNA, VA 22182

EXAMINER

WILCZEWSKI, MARY A

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 08/23/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV	9619

TITLE OF INVENTION: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	11/23/2012

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.

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)

65358 7590 08/23/2012
WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
8230 BOONE BLVD. SUITE 405
VIENNA, VA 22182

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.
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV	9619

TITLE OF INVENTION: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	11/23/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
WILCZEWSKI, MARY A	2822	438-587000

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, 1 _____
(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. 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.

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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.
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV	9619
65358	7590	08/23/2012	EXAMINER	
WPAT, PC INTELLECTUAL PROPERTY ATTORNEYS 8230 BOONE BLVD. SUITE 405 VIENNA, VA 22182			WILCZEWSKI, MARY A	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 08/23/2012

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 0 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 0 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.

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. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	13/277,384	LIN, CHUN-HSIEN	
	Examiner	Art Unit	
	MARY WILCZEWSKI	2822	

-- 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 the Request for Continued Examination (RCE) and IDS filed on 01 June 2012.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-14.

4. ☐ 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.

5. ☐ 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.

6. ☐ 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).

7. ☐ 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 <u>01 June 2012</u> 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 _____.
---	--

/M. Wilczewski/ Primary Examiner, Art Unit 2822	
--	--

Receipt date: 06/01/2012

13277384 - GAU: 2822

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13277384	
	Filing Date		2011-10-20	
	First Named Inventor	Chun-Hsien Lin		
	Art Unit	2822		
	Examiner Name	WILCZEWSKI, MARY A		
	Attorney Docket Number	66007-405DIV		

U.S. PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
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If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S. PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
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If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² j	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
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If you wish to add additional Foreign Patent Document citation information please click the Add button								Add
NON-PATENT LITERATURE DOCUMENTS							Remove	
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

Receipt date: 06/01/2012 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		13277384 13277384 - GAU: 2822
	Filing Date		2011-10-20
	First Named Inventor	Chun-Hsien Lin	
	Art Unit	2822	
	Examiner Name	WILCZEWSKI, MARY A	
	Attorney Docket Number	66007-405DIV	

/M.W./	1	K, Shikano, Alpha-Activation analysis of nitrogen in boron-doped silicon single crystal. Journal of Radioanalytical and Nuclear Chemistry, Vol. 221, Nos 1-2 (1997), 29-33.	☐
/M.W./	2	Implant Projection Range, MEMS, http://me.kaist.ac.kr/upload/course/MAE582_2009/Lecture-03.doc , 2009.	☐

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

EXAMINER SIGNATURE

Examiner Signature	/Mary Wilczewski/	Date Considered	08/20/2012
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

Receipt date: 06/01/2012 INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	13277384 13277384 - GAU: 2822
	Filing Date	2011-10-20
	First Named Inventor	Chun-Hsien Lin
	Art Unit	2822
	Examiner Name	WILCZEWSKI, MARY A
	Attorney Docket Number	66007-405DIV

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Justin King/	Date (YYYY-MM-DD)	2012-06-01
Name/Print	Justin King	Registration Number	50,464

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.W./

Issue Classification 	Application/Control No. 13277384	Applicant(s)/Patent Under Reexamination LIN, CHUN-HSIEN
	Examiner MARY WILCZEWSKI	Art Unit 2822

ORIGINAL						INTERNATIONAL CLASSIFICATION												
CLASS		SUBCLASS				CLAIMED					NON-CLAIMED							
438		587				H	0	1	L	21 / 28 (2006.01.01)								
CROSS REFERENCE(S)						H	0	1	L	21 / 336 (2006.01.01)								
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																	
438	595	705	926	532														
257	E21.444	E21.624																

☒ 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
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NONE		Total Claims Allowed:	
		14	
(Assistant Examiner)	(Date)		
/MARY WILCZEWSKI/ Primary Examiner.Art Unit 2822	08/20/2012	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1C,1D,1E

<i>Search Notes</i> 	Application/Control No. 13277384	Applicant(s)/Patent Under Reexamination LIN, CHUN-HSIEN
	Examiner MARY WILCZEWSKI	Art Unit 2822

SEARCHED			
Class	Subclass	Date	Examiner
438	197, 299, 587, 595, 705, 532, 926	08/20/2012	MW
257	407; E21.444; E21.621; E21.624	08/20/2012	MW

SEARCH NOTES		
Search Notes	Date	Examiner
Reviewed Parent Application Serial No. 12/572498 (now US 8,076,735)	08/20/2012	MW

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
	Interference Search	08/20/2012	MW

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EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3588	438/197.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:51
L3	854	438/587.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:51
L4	1334	438/595.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:51
L5	263	438/532.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:52
L6	814	438/705.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:52
L7	217	438/926.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:52
L8	456	257/407.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:52
L9	1947	257/e21.444.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:52
L10	561	257/e21.621.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:52
L11	363	257/e21.624.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:52
L13	1062	438/299.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2012/08/20 23:54

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L14	2848	(polysilicon or ((polycrystalline adj1 (silicon or si)))) with dummy	US-PGPUB; USPAT; UPAD	ADJ	ON	2012/08/21 00:02
L15	12121	gate near2 trench\$2	US-PGPUB; USPAT; UPAD	ADJ	ON	2012/08/21 00:02
L18	78628	(polysilicon or ((polycrystalline adj1 (silicon or si)))) with (dop\$3 or implant\$5)	US-PGPUB; USPAT; UPAD	ADJ	ON	2012/08/21 00:04
L20	354	((narrow\$3 or decreas\$3) near2 width) with dummy	US-PGPUB; USPAT; UPAD	ADJ	ON	2012/08/21 00:06
L22	3	14 and 15 and 18 and 20	US-PGPUB; USPAT; UPAD	ADJ	ON	2012/08/21 00:07

8/21/2012 12:09:20 AM

<i>Index of Claims</i> 	Application/Control No. 13277384	Applicant(s)/Patent Under Reexamination LIN, CHUN-HSIEN
	Examiner MARY WILCZEWSKI	Art Unit 2822

✓	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	05/02/2012	08/20/2012																																				
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☒ Practitioners associated with the Customer Number: **66749**

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used)

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☒ The address associated with Customer Number: **66749**

OR

☐ Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

Assignee Name and Address:

UNITED MICROELECTRONICS CORP
NO. 3, LI-HSIN RD. II, SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN, R. O. C.

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/88 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature		Date	AUG 17 2012
Name	Yu-Tai Tsai	Telephone	1-281-668-8988
Title	UMC Patent Prosecution Dept./ Intellectual Property Right Division Manager		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to be (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 422 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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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: LIN, CHUN-HSIEN

Application No./Patent No. 13277384 Filed/Issue Date: 10/20/2011

Titled: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

UNITED MICROELECTRONICS CORP., a corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 027093, Frame 0474 or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s) of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____ Frame _____ or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____ Frame _____ or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____ Frame _____ or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

(NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08)

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Yu-Tai Tsal Date AUG 28 2012
Signature UMC Patent Prosecution Dept. /
Intellectual Property Right Division Manager

Yu-Tai Tsal Title
Printed or Typed Name

This collection of information is required by 37 CFR 3.73(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/97 (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

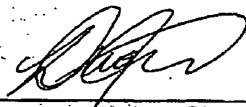
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I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office.

on August 28, 2012
Date



Signature

Ding Yu Tan

Typed or printed name of person signing Certificate

58812

281-668-8988

Registration Number, if applicable

Telephone Number

Note: Each paper must have its own certificate of transmission, or this certificate must identify each submitted paper.

This certificate of transmission is for the following submitted papers in this facsimile:

1. Power of Attorney for Application No. 13/277384
2. Statement under 37 CFR 3.73(b) for Application No. 13/277384

This collection of information is required by 37 CFR 1.8. 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 1.8 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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV

CONFIRMATION NO. 9619

POA ACCEPTANCE LETTER

66749
FORESIGHT IP
DING YU TAN
14F., No.111, Songjiang Rd
Unit B03
Taipei,
TAIWAN



Date Mailed: 09/11/2012

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/28/2012.

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.

/tkim/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV

CONFIRMATION NO. 9619

POWER OF ATTORNEY NOTICE

65358
WPAT, PC
INTELLECTUAL PROPERTY ATTORNEYS
8230 BOONE BLVD. SUITE 405
VIENNA, VA 22182



Date Mailed: 09/11/2012

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/28/2012.

- 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).

/tkim/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
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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.
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV	9619

TITLE OF INVENTION: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	11/23/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
WILCZEWSKI, MARY A	2822	438-587000

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 Ding Yu Tan
 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

UNITED MICROELECTRONICS CORP.

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

HSINCHU, TW

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 Ding Yu Tan

Registration No. 58812

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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Electronic Patent Application Fee Transmittal				
Application Number:		13277384		
Filing Date:		20-Oct-2011		
Title of Invention:		METHOD FOR FABRICATING SEMICONDUCTOR DEVICE		
First Named Inventor/Applicant Name:		Chun-Hsien Lin		
Filer:		Ding Yu Tan		
Attorney Docket Number:		66007-405DIV		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2040

Electronic Acknowledgement Receipt	
EFS ID:	13729320
Application Number:	13277384
International Application Number:	
Confirmation Number:	9619
Title of Invention:	METHOD FOR FABRICATING SEMICONDUCTOR DEVICE
First Named Inventor/Applicant Name:	Chun-Hsien Lin
Customer Number:	66749
Filer:	Ding Yu Tan
Filer Authorized By:	
Attorney Docket Number:	66007-405DIV
Receipt Date:	12-SEP-2012
Filing Date:	20-OCT-2011
Time Stamp:	21:59:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	45.pdf	62713 078fd757519e2b6d5c33c8e04f4b5bc1400875a9	no	1

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	31978 da40656e872f634db89494b1f633eba5bcd087cc	no	2
Warnings:					
Information:					
Total Files Size (in bytes):				94691	
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. <u>New Applications Under 35 U.S.C. 111</u> 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. <u>National Stage of an International Application under 35 U.S.C. 371</u> 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. <u>New International Application Filed with the USPTO as a Receiving Office</u> 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.					

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV	9619

TITLE OF INVENTION: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1740	\$300	\$0	\$2040	11/23/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
WILCZEWSKI, MARY A	2822	438-587000

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 1 Ding Yu Tan
 2
 3

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(A) NAME OF ASSIGNEE

UNITED MICROELECTRONICS CORP.

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

HSINCHU, TW

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.
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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)

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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 Ding Yu Tan

Registration No. 58812

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Electronic Patent Application Fee Transmittal				
Application Number:		13277384		
Filing Date:		20-Oct-2011		
Title of Invention:		METHOD FOR FABRICATING SEMICONDUCTOR DEVICE		
First Named Inventor/Applicant Name:		Chun-Hsien Lin		
Filer:		Ding Yu Tan		
Attorney Docket Number:		66007-405DIV		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2040

Electronic Acknowledgement Receipt	
EFS ID:	13729384
Application Number:	13277384
International Application Number:	
Confirmation Number:	9619
Title of Invention:	METHOD FOR FABRICATING SEMICONDUCTOR DEVICE
First Named Inventor/Applicant Name:	Chun-Hsien Lin
Customer Number:	66749
Filer:	Ding Yu Tan
Filer Authorized By:	
Attorney Docket Number:	66007-405DIV
Receipt Date:	12-SEP-2012
Filing Date:	20-OCT-2011
Time Stamp:	22:28:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$2040
RAM confirmation Number	10139
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Issue Fee Payment (PTO-85B)	45.pdf	62713 078fd757519e2b6d5c33c8e04f4b5bc1400875a9	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31978 39405898eb6a53e9961ca32694f05ab88453ff9a	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			94691		
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(Depositor's name)
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/277,384	10/20/2011	Chun-Hsien Lin	66007-405DIV	9619

TITLE OF INVENTION: METHOD FOR FABRICATING SEMICONDUCTOR DEVICE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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EXAMINER	ART UNIT	CLASS-SUBCLASS
WILCZEWSKI, MARY A	2822	438-587000

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1 Ding Yu Tan

2

3

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

HSINCHU, TW

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Authorized Signature

Ding Yu Tan

Date

Sep. 11, 2012

Typed or printed name Ding Yu Tan

Registration No. 58812

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V. Fin

09/13/2012 INTEFSW 13277384 00010139

01-FC-1501

02-FC-1504



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/277,384	10/16/2012	8288262	66007-405DIV	9619

66749 7590 09/26/2012
FORESIGHT IP
DING YU TAN
14F., No.111, Songjiang Rd
Unit B03
Taipei,
TAIWAN

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 0 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):

Chun-Hsien Lin, Tainan County, TAIWAN;

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