

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.**

**Before the Honorable Monica Bhattacharyya
Administrative Law Judge**

In the Matter of

**CERTAIN POWER SEMICONDUCTORS, AND
MOBILE DEVICES AND COMPUTERS
CONTAINING SAME**

Inv. No. 337-TA-1308

**COMPLAINANT ARIGNA TECHNOLOGY LIMITED'S
OPENING CLAIM CONSTRUCTION BRIEF**

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I. U.S. PATENT NO. 7,183,835

This action concerns a single patent: U.S. Patent No. 7,183,835 (the “’835 Patent”). The ’835 Patent discloses a “semiconductor device which realizes a short-circuit protection function” for an insulated gate transistor. ’835 Patent at 1:49-50. The invention provides a novel approach to detecting and protecting against a short-circuit state.

One way in which the invention accomplishes this goal is by monitoring a control output signal that a driver outputs. ’835 Patent at 11:41. To identify a short-circuit condition, the invention compares “a detecting voltage of said control output signal” to a “predetermined reference voltage.” *Id.* at 11:44-48, 11:55-60. If the detecting voltage exceeds the reference voltage within a predetermined period, a short-circuit protection circuit controls and forces the “driver to stop said control output signal.” *Id.* at 11:43-48.

The ’835 Patent provides some examples of such operation. As shown in Figure 2 below, which describes an exemplary embodiment, the claimed semiconductor device contains a driver (in orange) that supplies a control output signal (S3, in red) to an insulated gate transistor (12, in blue). A detecting voltage of the control output signal is inputted to a comparator (2, in green) in the short-circuit protection circuit (SP, in purple), which performs a comparison with a reference voltage (V1). If the detecting voltage of the control output signal exceeds the reference voltage within a certain amount of time after the insulated gate transistor first starts to conduct, the driver is turned off and stops producing the control output signal.

[illegible]

II. LEVEL OF ORDINARY SKILL IN THE ART

The pertinent field of art for the '835 Patent is semiconductor devices with short-circuit protection functionality. The date the level of ordinary skill in the art is to be measured is at least on or around January 6, 2004, which is the filing date of the Japanese patent application from which the '835 Patent claims priority. A person of ordinary skill in the art as of that date (a "POSITA") would have had (1) a bachelor's degree in electrical engineering or a similar field, and approximately two years of industry or academic experience designing or analyzing power semiconductor devices or (2) a master's degree or Ph.D. in electrical engineering or an equivalent field, with coursework, thesis, or dissertation work, or research experience in power semiconductor devices.

III. DISPUTED CONSTRUCTIONS

A. Claim preamble (Claim 1)

Complainant	Respondents	Staff
Non-limiting in part	Limiting	Limiting

The dispute regarding this term is whether the preamble to claim 1 is limiting in its entirety. It is not. The Federal Circuit has made clear that a preamble is not limiting except to the extent it “recites essential structure or steps, or if it is ‘necessary to give life, meaning, and vitality’ to the claim.” *TomTom, Inc. v. Adolph*, 790 F.3d 1315, 1323 (Fed. Cir. 2015). Generally speaking, a preamble thus is not limiting unless there is “clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art.” *Id.* Moreover, “a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.” *Id.* (internal quotation marks omitted). Further, “[i]f the preamble is reasonably susceptible to being construed to be merely duplicative of the limitations in the body of the claim (and was not clearly added to overcome a [prior art] rejection),” it likewise remains non-limiting. *Id.* at 1324 (internal quotation marks omitted) (second alteration in original).

While a preamble “may be limiting to the extent it is necessary to provide antecedent basis for the body of the claim,” *Cochlear Bone Anchored Sols. AB v. Oticon Med. AB*, 958 F.3d 1348, 1355 (Fed. Cir. 2020) (citation omitted), the Federal Circuit has held that each portion of the preamble must be examined independently. Thus, even if a portion of the preamble may be limiting because it provides antecedent basis for subsequent claim terms, it does not follow that the entire preamble (or any other portion of it) is limiting. *TomTom*, 790 F.3d at 1323 (holding that the

“district court erred in determining that it had to construe the entire preamble if it construed a portion of it”).

Applying these principles here makes clear that the first portion of the preamble—the phrase, “A semiconductor device controlling a drive of”—is non-limiting.

First, this phrase is non-limiting because it only states an intended use for the invention disclosed in Claim 1. “[P]reambles describing the use of an invention generally do not limit the claims because the patentability of apparatus or composition claims depends on the claimed structure, not on the use or purpose of that structure.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 809 (Fed. Cir. 2002). Here, the claim language following the preamble recites a structurally complete invention, consisting of a driver outputting a control output signal and a short-circuit protection circuit, the structural elements of which are specified in detail. The first phrase of the preamble does not include any structural elements, but rather makes clear that the invention recited in the claim is intended to be used for “controlling a drive of” an insulated gate transistor. ’835 Patent at 11:38-39. This statement of intended use is not limiting.

Second, the first preamble phrase does not provide antecedent basis for any claim language that follows. It is only subsequent portions of the preamble, as shown below, that recite structural elements that provide antecedent basis for ensuing claim terms.

1. A semiconductor device controlling a drive of an insulated gate transistor by generating a control output signal on a basis of a control input signal, comprising:

- a driver outputting said control output signal and
- a short-circuit protection circuit detecting said control output signal and controlling and forcing said driver to stop said control output signal when a detecting voltage of said control output signal exceeds a predetermined reference voltage before a predetermined period passes after said control output signal indicates a conduction of said insulated gate transistor, wherein said short-circuit protection circuit includes:
 - pulse generation circuit receiving said control input signal and outputting a first pulse signal being significant only in said predetermined period according to a timing when said control input signal indicates the conduction of said insulated gate transistor;
 - a comparator receiving the detecting voltage of said control output signal, performing a comparison with said reference voltage and outputting a second pulse signal being significant during a period when the detecting voltage of said control output signal exceeds said reference voltage; and
 - a logical circuit receiving said first and second pulse signals and outputting a stop signal forcing said driver to stop said control output signal when said second pulse signal becomes significant during a period when said first pulse signal is significant.

While these subsequent (underlined) portions of the preamble (i.e., “insulated gate transistor,” “control output signal,” and “control input signal”) may be limiting, that does not alter the presumptively non-limiting status of the first preamble phrase. The Federal Circuit has made this clear. In *TomTom*, for example, the Federal Circuit emphasized that the first portion of a preamble, which stated an intended use for the disclosed invention, was not limiting even though subsequent preamble language provided antecedent bases for claim terms. 790 F.3d at 1323 (“That the phrase in the preamble ‘destination tracking system of at least one mobile unit’ provides a necessary structure for claim 1 does not necessarily convert the entire preamble into a limitation, particularly one that only states the intended use of the invention.”).

Third, the patentee did not rely on the preamble during prosecution to distinguish any prior art. “Without such reliance, . . . a preamble generally is not limiting when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention.” *Catalina Mktg.*, 289 F.3d at 809. Such is the case here. Claim 1 is structurally complete standing alone. It discloses a driver outputting a control output signal and a short circuit protection circuit. ’835 Patent at 11:41-65. The structural elements of

both the driver and the short-circuit protection circuit are recited in the claim, and the preamble merely duplicates that disclosure. If the preamble were deleted, the disclosed invention—the driver outputting a control output signal and short-circuit protection circuit monitoring the control output signal—would still be structurally complete. Because the patentee did not rely on the preamble during prosecution—let alone rely on the first preamble phrase specifically—to overcome prior art, there is no basis for finding that the first preamble phrase is limiting.

The ALJ should hold that the first phrase of the preamble—“A semiconductor device controlling a drive of”—is non-limiting because it does not provide antecedent basis for any claim terms that follow and only states an intended use for the invention.

B. “insulated gate transistor” (Claims 1 and 2)

Complainant	Respondents	Staff
a transistor whose gate is electrically insulated from the channel	Plain meaning, <i>i.e.</i> IGBT (insulated gate bipolar transistor)	a transistor whose gate is electrically insulated from the channel

The dispute regarding this term is whether “insulated gate transistor” should be given its plain and ordinary meaning—which Complainant and Staff agree is “a transistor whose gate is electrically insulated from the channel”—or whether it should be given the far narrower construction of “IGBT (insulated gate bipolar transistor)” that Respondents propose.

By seeking to limit the meaning of “insulated gate transistor” to IGBTs, Respondents improperly seek to impose an extremely narrow limitation that appears nowhere in the claims or specification. Indeed, although the specification identifies IGBTs as one type of insulated gate transistor, nothing in the specification or prosecution history states—much less clearly—that the invention is limited to IGBTs. “Absent such language, we do not import limitations from the specification into the claims.” *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372-73 (Fed. Cir. 2014); *see also Interactive Gift Exp., Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1339 (Fed. Cir.

2001) (holding that claims required “a central device, such as an ICM, but the device need not be restricted to an ICM” because, “[w]hile this device takes the form of an ICM in the preferred embodiment, there is nothing in the specification that would suggest to a person skilled in the art that [the invention] would only work with the particular ICM defined in the specification”).

Indeed, the intrinsic record makes clear that the claim term “insulated gate transistor” is not limited to IGBTs. The specification explicitly describes IGBTs as one kind of insulated gate transistor, making clear that the term “insulated gate transistor” is broader than just IGBTs. For example, the specification discloses “a short-circuit protection function of an insulated gate-type switching device ***such as*** an IGBT (Insulated Gate Bipolar Transistor) ***and so on.***” ’835 Patent at 1:14-15; *see also id.* at 1:17-19 (“A semiconductor device in which the insulated gate type switching device ***such as*** the IGBT ***and so on . . .***”).¹

Given these disclosures, there is no basis for Respondents’ limitation. The Federal Circuit has repeatedly “cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification.” *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1328 (Fed. Cir. 2002). Here, the specification’s reference to IGBTs as one example of an insulated gate-type switching device cannot be read into the claims as limiting the invention. *Constant v. Advanced Micro-Devices Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988) (“Although the specification may aid the court in interpreting the meaning of disputed language in the claims, particular embodiments and examples appearing in the specification will not generally be read into the claims.”); *see also Hill-Rom*, 755 F.3d at 1372-73 (“The specification gives one example of periodic polling, but does not suggest that the inventor intended this embodiment to limit the invention claimed.”).

¹ Unless otherwise noted, all emphasis is added.

The patentee was evidently aware of IGBTs and consciously decided not to limit the claims to IGBTs in the claim language. Notwithstanding the references to IGBTs in the specification, the patentee instead included the broader term “insulated gate transistor” in the claims. The Federal Circuit has emphasized that “[t]he patentee is free to choose a broad term and expect to obtain the full scope of its plain and ordinary meaning, unless the patentee explicitly redefines the term or disavows its full scope.” *Thorner v. Sony Computer Ent. Am. L.L.C.*, 669 F.3d 1362, 1367 (Fed. Cir. 2012). There is no such re-definition or disavowal here.

Extrinsic evidence also makes clear that the plain and ordinary meaning of the term “insulated gate transistor” is broader than just IGBTs, and includes other transistors with insulated gates, such as insulated gate field effect transistors (also known as metal-oxide-silicon field effect transistors or MOSFETs). For example, the Authoritative Dictionary of IEEE Standards Terms defines an “insulated gate field-effect transistor” as “[a] field-effect transistor that has one or more gate electrodes that are electrically insulated from the channel.” *Authoritative Dictionary of IEEE Standards Terms*, Seventh Edition (2000); Decl. of Kemper Diehl (“Diehl Decl.”), Ex. 1.

For any of these reasons, the ALJ should reject Respondents’ construction and instead construe the term to mean “a transistor whose gate is electrically insulated from the channel” as Complainant and Staff propose.

C. “controlling a drive of an insulated gate transistor” (Claim 1)

Complainant	Respondents	Staff
Non-limiting preamble Alternatively, plain and ordinary meaning	controlling the voltage supplied to the gate of an insulated gate transistor to switch the transistor between ON and OFF states	controlling the voltage supplied to the gate of an insulated gate transistor to switch the transistor between ON and OFF states

The dispute regarding this term is two-fold. First, the parties dispute whether this preamble phrase is limiting. Second, if it is held to be limiting, the parties dispute whether it should be

construed to have its plain and ordinary meaning as Complainant proposes or be given the construction Respondents and Staff advance.

As discussed above, the preamble phrase “controlling a drive of an insulated gate transistor” is non-limiting. Given that the construction of the term “insulated gate transistor” (discussed above) is itself disputed, the language that Respondents actually seek to construe here is “controlling a drive of an.” This phrase appears only in the preamble and provides no antecedent basis for anything in the claim language. Instead, it represents a statement of intended use for the invention specified in the claim. Such language is understood to be non-limiting. *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006) (“Preamble language that merely states the purpose or intended use of an invention is generally not treated as limiting the scope of the claim.”).

There is no reason to depart from this rule here. The intended use for the driver outputting a control output signal and the short-circuit protection circuit disclosed in claim 1 is to “control[] a drive of an insulated gate transistor” in a manner that protects the transistor from a short-circuit condition. ’835 Patent at 1:53-54. As a statement of intended use that provides no antecedent basis for subsequent claim language, this portion of the preamble is non-limiting.

Should the ALJ determine that this preamble phrase is limiting, however, she should reject the construction advanced by Respondents and Staff and construe the term as having its plain and ordinary meaning. “The specification and prosecution history compel departure from the plain meaning in only two instances: lexicography and disavowal.” *Pacing Techs., LLC v. Garmin Int’l, Inc.*, 778 F.3d 1021, 1024 (Fed. Cir. 2015). Neither exists here. Nothing in the ’835 Patent’s specification or prosecution history expressly defines “controlling a drive of an insulated gate transistor” as something other than its plain and ordinary meaning, nor is there any disavowal of the plain and ordinary meaning in the intrinsic record. There is also no reason to depart from the

plain and ordinary meaning because the phrase “controlling a drive of an insulated gate transistor” is not ambiguous and would reasonably have been understood by a skilled artisan at the time of invention.

In contrast, Respondents’ and Staff’s proposed construction adds unnecessary limitations that improperly restrict the plain and ordinary meaning of “controlling a drive of an insulated gate transistor.” *First*, there is no reason to add the limitation “to switch the transistor between ON and OFF states.” To do so would add unnecessary language to the preamble. The phrase “controlling a drive of an insulated gate transistor” properly concludes with the term “insulated gate transistor” as that is the circuit element whose drive is being controlled. There is no basis for appending an additional limiting phrase after the term “insulated gate transistor.”

Moreover, the phrase “to switch the transistor between ON and OFF states” does not appear in the specification. While the specification indicates that the insulated gate transistor can exist in an ON state or an OFF state, *e.g.*, ’835 Patent at 6:5, 7:18, 7:43, it nowhere suggests that those are the only two possible states. Respondents’ and Staff’s proposed construction would mean that “controlling a drive of an insulated gate transistor” narrowly entails **switching** a transistor from ON to OFF, or OFF to ON, rather than controlling it in a manner that maintains a single state or multiple states. The specification makes clear that controlling a drive of a transistor can consist of maintaining an ON condition in appropriate circumstances. *See, e.g.*, ’835 Patent at 6:47-49 (“Accordingly, the control output signal S3 is maintained, too, and **the ON state** in the transistor 12 **is maintained**.”). Because “controlling” can consist of switching a transistor between states **or** maintaining a state, it should not be construed in a manner that would limit “controlling” to **only** mean switching a transistor between ON and OFF states. Respondents’ and Staff’s additional

language imposes a limitation that does not exist in the claims, is unsupported in the intrinsic record, and should be rejected.

Second, there is no reason to construe the term “a drive of” in this preamble phrase as meaning “the voltage supplied to the gate of.” This aspect of Respondents’ and Staff’s construction again imposes limitations that do not exist in Claim 1. Notably, Respondents’ and Staff’s construction includes the word “voltage” even though the specification teaches that a “control output *signal*” is applied to an insulated gate transistor. For example, in many cases in integrated circuit design, a current can be a controlling signal. The specification repeatedly indicates that a signal is applied. *See, e.g.*, ’835 Patent at 3:3-5 (“control output *signal* is supplied to respective gate electrodes of the transistors 11, 21 and 31”); *id.* at 4:28-33 (“an output *signal* of a gate driver GD . . . is supplied as a control output signal S3 to the gate electrode of the transistor 12”). A signal is not necessarily a voltage, yet Respondents’ and Staff’s construction would limit it as such.

Inserting the word “voltage” into the preamble also conflicts with the claim language that follows, where the patentee specifically used the word “voltage” in various places. That the patentee used the word “voltage” in the claim language makes clear that its exclusion from the preamble was no accident. It is improper to add it now. The same is true of Respondents’ and Staff’s addition of the limitation “to the gate of.” No such limitation is found in the claim language and to import it from the specification is improper. *Hill-Rom*, 755 F.3d at 1372-73. The invention is not so limited.

The ALJ should find that this preamble phrase is non-limiting because it merely states an intended use for the invention in Claim 1. However, should the ALJ find that it is limiting, the ALJ should reject Respondents’ and Staff’s narrow construction and give this term its plain and ordinary meaning.

D. “indicates a conduction of said insulated gate transistor” (Claim 1)

Complainant	Respondents	Staff
Plain and ordinary meaning, e.g., indicates that said insulated gate transistor is turned on	indicates that said insulated gate transistor is in the ON state	indicates that said insulated gate transistor is in the ON state

The dispute regarding this term is whether it should be given its plain and ordinary meaning as Complainant proposes or be construed to have the meaning Respondents and Staff advance.

There is no basis in the intrinsic record to depart from the plain and ordinary meaning for this term. A skilled artisan would understand what it means for a transistor to “indicate a conduction” of a transistor because conduction is a fundamental concept in electrical engineering. *See, e.g.,* Rudolf F. Graf, *Modern Dictionary of Electronics*, Sixth Edition (1997) (defining “conduction” as “[t]he transmission of heat or electricity through or by means of a conductor”); Diehl Decl., Ex. 2. For example, a POSITA would understand conduction to mean that significantly non-zero current is flowing through the transistor. Because the meaning of this claim term is apparent on its face and there is no express lexicography or disavowal in the intrinsic record that would support giving this claim term a construction other than its plain and ordinary meaning, no construction is necessary or appropriate. *Pacing Techs.*, 778 F.3d at 1024.

Notwithstanding Complainant’s position that no construction is necessary or appropriate, the exemplary plain and ordinary meaning that Complainant ascribes to this term is not wholly dissimilar from the construction Respondents and Staff propose. The fundamental difference is whether to use the phrase “is turned on” (which Complainant submits is correct) or “is in the ON state” (as Respondents and Staff propose). Respondents’ and Staff’s construction is problematic because it would introduce further ambiguity into the claim language by suggesting that there must be a specific “ON state” condition in the transistor. The existence of such a state is not a

requirement disclosed in the claim language, and there is no need to impose an ambiguous and potentially limiting addition to the claim language that itself requires further definition.

To the extent that Respondents and Staff rely on the inclusion of language referencing “the ON state” in the specification, there is no basis for importing a limitation from the specification into the claims. The Federal Circuit has repeatedly rejected such efforts. *E.g.*, *Hill-Rom*, 755 F.3d at 1372-73 (“we do not import limitations from the specification into the claims”).

E. “significant” (Claims 1 and 2)

Complainant	Respondents	Staff
No construction necessary. To the extent a construction is necessary, then the plain and ordinary meaning, e.g., active	Plain meaning, <i>i.e.</i> large or important enough to have a meaningful effect, <i>e.g.</i> a HIGH potential state	active-high or active-low state indicating a condition is met

The dispute regarding this term is whether “significant” needs any construction at all. The Respondents and the Staff believe that the word needs some definition but cannot agree on what it should be and thus complicate the term.

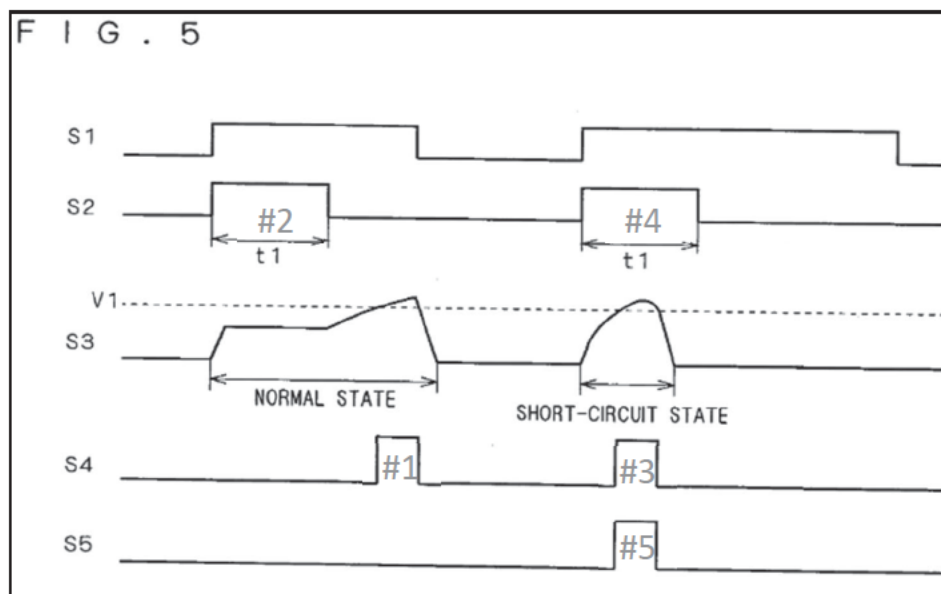
There is no need for such complication. The specification provides many examples of what constitutes “significant,” including each of the following:

Specification Quotation	Interpretation
Here, the control output signal S3 is supplied to the comparator 2, too, and compared with the reference voltage V1, and the comparator 2 makes the comparison result signal S4 which is the output of the comparator 2 be in a significant condition and a high potential “H” state in this case, when the voltage of the control output signal S3 exceeds the reference voltage V1. (col. 6:11-17)	The output of the comparator (S4) is “significant” when $S3 > V1$ (#1 in below annotated FIG. 5) Here, “significant” is also “a high potential ‘H’ state”
In this manner, in case that the transistor 12 normally operates, the comparison result signal S4 outputted from the comparator 2 after the voltage of the control output signal S3 passes the clamp period comes to be in the significant condition. (col. 6:27-31)	The output of the comparator (S4) is “significant” when S3 “passes the clamp period” (#1 in below annotated FIG. 5)

Specification Quotation	Interpretation
Here, the one-shot pulse generation circuit 1 outputs the pulse signal S2 which comes to be in the <i>significant</i> condition according to the building up of the control input signal S1, and a period t1 in the <i>significant</i> condition, in the “H” state in this case, is set to be almost equal to a period when the control output signal S3 is clamped to a certain voltage. (col. 6:35-40)	Pulse signal S2 is “significant” for “a period t1” after S1 goes high (a better translation of Japanese 立ち上がり is “rising” rather than “building,” see col. 7:4-5, which translates same Japanese word as “rising”) (#2 in below annotated FIG. 5)
Accordingly, when the transistor 12 normally operates, the pulse signal S2 and the comparison result signal S4 outputted by the comparator 2 do not come to be in the <i>significant</i> condition synchronously, thus the signal S5 supplied to the setting input of the RS flip-flop circuit 3 maintains the low potential (“L”) state, and the Q output of the RS flip-flop circuit 3 maintains the “L” state, too. Accordingly, the control output signal S3 is maintained, too, and the ON state in the transistor 12 is maintained. (col. 6:41-49)	In normal mode, S2 and S4 are not both “significant” at the same time (compare #1 to #2 in below annotated FIG. 5).
As shown in FIG. 5, when the transistor 12 is short-circuited, the voltage of the control output signal S3 rises rapidly and exceeds the reference voltage V1 of the comparator 2, and the comparison result signal S4 outputted from the comparator 2 comes to be in the <i>significant</i> condition. (col. 6:65 to 7:3)	When the transistor is short-circuited, comparator output S4 becomes “significant” when S3 > V1 (#3 in below annotated FIG. 5)
In this time, the pulse signal S2 is outputted from the one-shot pulse generation circuit 1 according to the rising of the control input signal S1, and the comparison result signal S4 also comes to be in the <i>significant</i> condition during the period when the pulse signal S2 is in the <i>significant</i> condition, thus a period when the pulse signal S2 and the comparison result signal S4 are in the <i>significant</i> condition synchronously exists, and the signal S5 supplied to the setting input of the RS flip-flop circuit 3 comes to be in the “H” state during that period. (col. 7:4-13)	S2 and S4 are both “significant” at the same time (compare #3 to #4 below annotated FIG. 5), triggering S5 (#5 in below annotated FIG. 5) to be high.

Specification Quotation	Interpretation
As a result, the Q output of the RS flip-flop circuit 3 changes to be in the “H” state, the P channel MOS transistor 4 of the gate driver GD comes to be in OFF state, the N channel MOS transistor 5 comes to be in ON state, the control output signal S3 comes to be in the “L” state and the transistor 12 is forced to be in OFF state. Besides, there is a case that the signal S5 is called as a stop signal, too, by reason that it stops a <i>significant</i> output of the control output signal S3 of the gate driver GD. (col. 7:13-21)	When S4 and S2 are high at the same time, S5 goes high and triggers the driver to go low to turn S3 off to turn off the transistor. So S5 is called a “stop signal,” because it stops a “significant” output of S3 (that is, it causes it to go low in this example).

The Patent also depicts each of these in Figure 5 (red annotations added).



These references all show that a signal is significant when it is “active” or not at the default status. In the patent embodiment, active is “high,” but some systems are active at “low.” The key is that the signals are significant when they depart in some way from their usual status.

The Staff’s definition, “active-high or active-low state indicating a condition is met” attempts to capture this meaning, but the last clause, “indicating a condition is met,” is not necessary because it is unclear what a “condition” is or when it is met. For example, in FIG. 5, S2

is “significant” because it is high (*see, e.g.*, col. 6:35-40), but it is not clear exactly what “condition” is met.

The Respondents’ definition, “large or important enough to have a meaningful effect, *e.g.* a HIGH potential state,” also attempts to capture this meaning, but the “significant” condition does not have to be “large” or “important.” Respondents’ inclusion of the word “meaningful” is closer, but perhaps “has meaning” is better. In addition, although the specification does describe “significant” sometimes as being in a “HIGH potential state,” *e.g.*, col. 6:11-17 (S4 is “in a *significant* condition and a high potential ‘H’ state in this case”), it is not always High.

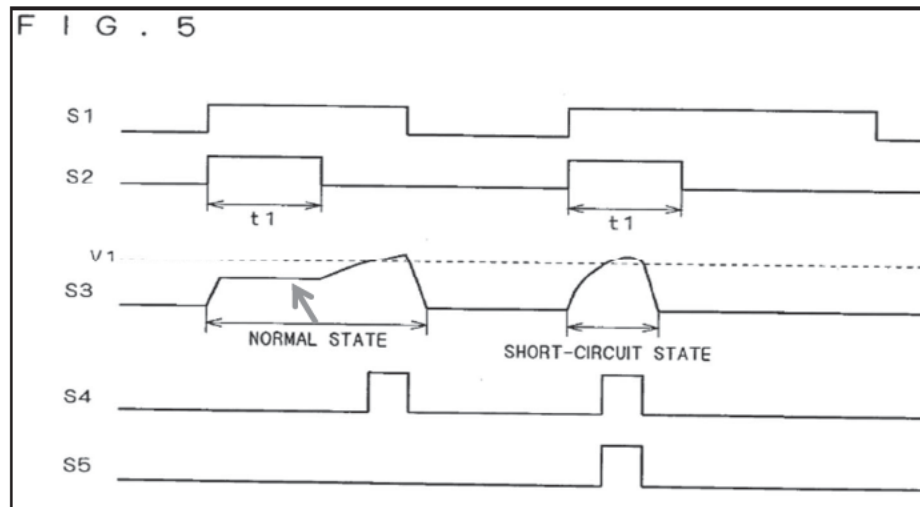
In sum, Complainant’s definition, “active” or “having meaning,” conveys what “significant” means in the examples above.

F. “clamped constantly” (Claim 2)

Complainant	Respondents	Staff
held at a constant voltage	clamped to a certain voltage for a determined period by a Miller effect	held at a constant voltage

The dispute regarding this term is whether “clamped constantly” should be construed simply as “held at a constant voltage” as proposed by Complainant and Staff or construed very narrowly as proposed by Respondents.

FIG. 5 shows what “clamped constantly” means. Signal S3, the “control output signal,” is held at a constant voltage for a period of time, as shown by the RED arrow below:



The figure is discussed as follows:

Accordingly, as shown in FIG. 5, the control output signal S3 outputted from the gate driver GD rises according to the building up of the control input signal S1. Moreover, when a voltage of the control output signal S3 exceeds a threshold value of the transistor 12, the transistor 12 comes to be in ON state, and a collector-emitter voltage of the transistor 12 drops, thus a voltage of the control output signal S3 is clamped to a certain voltage for a determined period by a mirror effect, however, the voltage of the control output signal S3 rises to be a value almost equal to the drive voltage VCC of the gate driver GD after that. Moreover, it falls according to a trailing edge of the control input signal S1, and makes the transistor 12 be OFF.

'835 Patent at 5:60-6:5. While this description does state that the “control output signal S3 is clamped to a certain voltage for a determined period by a mirror effect,” the fact that the Applicants did not need to recite in the claims how or why S3 is “clamped to a certain voltage” or “clamped constantly” “to a certain voltage” in order to overcome the prior art or for any other reason means that there is no need to add words to the claim that are not there.² See, e.g., *Hill-Rom*, 755 F.3d at 1372-73 (courts ordinarily do not import limitations from the specification into the claims).

² The patent says, “mirror effect,” but it is possible that the original Japanese should be translated as “Miller effect” (as Respondents argue). Whether it is “mirror effect” or “Miller effect,” the claim does not mention the term at all, so the presumption is that the effect is not necessary to construe the term.

As for the rest of Respondents’ construction, the phrase “for a determined period” is unnecessary, because the claim itself recites how long the voltage is clamped:

2. The semiconductor device according to claim 1, wherein

said predetermined period when said first pulse signal is significant is set on a basis of *a period when a voltage of said control output signal is clamped constantly* when said insulated gate transistor normally operates.

The claim mentions both “predetermined period” and “a period when a voltage of said control output signal is clamped constantly,” so the Respondents’ addition of “for a determined period” is unnecessary and confusing.

Complainant thus requests that the ALJ adopt its construction as “held at a constant voltage.”

G. “control output signal” (Claim 1)

Complainant	Respondents	Staff
No construction necessary. To the extent a construction is necessary, then the plain and ordinary meaning, e.g., output signal that is controlling an insulated gate transistor	signal supplied to the gate of an insulated gate transistor to switch the transistor between ON and OFF states	signal supplied to the gate of an insulated gate transistor to switch the transistor between ON and OFF states

The dispute regarding this term is whether “control output signal” needs any construction at all. The term “control output signal” is clear on its face and thus needs no construction. To the extent a definition is required, it is an “output signal used for controlling.” The Respondents’ and the Staff’s definitions improperly import limitations from the specification.

To understand the term, it is instructive to read it in the context of the claims, where the term “control output signal” appears nine times in Claim 1, as follows:

A semiconductor device controlling a drive of an insulated gate transistor by generating a *control output signal* on a basis of a control input signal . . .

a driver outputting said *control output signal* . . .

a short-circuit protection circuit detecting said *control output signal* and controlling and forcing said driver to stop said *control output signal* when a detecting voltage of said *control output signal* exceeds a predetermined reference voltage before a predetermined period passes after said *control output signal* indicates a conduction of said insulated gate transistor . . .

* * *

a comparator receiving the detecting voltage of said *control output signal*, performing a comparison with said reference voltage and outputting a second pulse signal being significant during a period when the detecting voltage of said *control output signal* exceeds said reference voltage . . .

a logical circuit receiving said first and second pulse signals and outputting a stop signal forcing said driver to stop said *control output signal* when said second pulse signal becomes significant during a period when said first pulse signal is significant.

From these passages, the “control output signal” has the following qualities:

- it is generated on the basis of a control input signal;
- it is outputted by a driver;
- it is detected by a short-circuit protection circuit;
- it may be stopped by the driver under certain conditions; and
- it has a detecting voltage.

Nothing more is needed to define the “control output signal.”

The Respondents’ and Staff’s constructions (which are the same) add terminology that is not found anywhere in the claims. Such terminology includes “to switch the transistor between ON and OFF states.” Adding this phrase unduly complicates the claim and introduces two terms (“ON state” and “OFF state”) that need further defining. *See Biedermann Techs. GmbH & Co. KG v. K2M, Inc.*, No. 2:18CV585, 2020 WL 1933918, at *13 (E.D. Va. Apr. 22, 2020) (determining no construction is needed and rejecting defendant’s “proposed additional language” that fails to clarify).

Complainant thus requests that the ALJ not construe this term or else adopt its construction as “output signal that is controlling an insulated gate transistor.”

H. “short-circuit protection circuit” (Claim 1)

Complainant	Respondents	Staff
No construction necessary. To the extent a construction is necessary, then the plain and ordinary meaning, e.g., circuit that performs function of short-circuit protection	circuit that performs short-circuit protection without a shunt resistor	circuit that performs short-circuit protection without a shunt resistor

The dispute regarding this term is whether “short-circuit protection circuit” needs any construction at all. The Respondents and the Staff believe that the claim’s definition is not complete enough.

“It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). In this case, the claim itself provides the full definition of “short-circuit protection circuit,” as follows:

a short-circuit protection circuit detecting said control output signal and controlling and forcing said driver to stop said control output signal when a detecting voltage of said control output signal exceeds a predetermined reference voltage before a predetermined period passes after said control output signal indicates a conduction of said insulated gate transistor, wherein

said short-circuit protection circuit includes:

pulse generation circuit receiving said control input signal and outputting a first pulse signal being significant only in said predetermined period according to a timing when said control input signal indicates the conduction of said insulated gate transistor;

a comparator receiving the detecting voltage of said control output signal, performing a comparison with said reference voltage and outputting a second pulse signal being significant during a period when the detecting voltage of said control output signal exceeds said reference voltage; and

a logical circuit receiving said first and second pulse signals and outputting a stop signal forcing said driver to stop said control output signal when said second pulse signal becomes significant during a period when said first pulse signal is significant.

'835 Patent, Claim 1 (emphases added).

Thus, the “short-circuit protection circuit” performs the following functions:

- detecting a control output signal; and
- controlling and forcing a driver to stop the control output signal.

Further, it includes the following components:

- a pulse generation circuit;
- a comparator; and
- a logical circuit.

As for the functions, the claim further defines the “controlling and forcing” function of the short-circuit protection circuit to operate “when a detecting voltage of said control output signal exceeds a predetermined reference voltage before a predetermined period passes after said control output signal indicates a conduction of said insulated gate transistor.”

As for the components, the claim further defines the “pulse generation circuit” of the short-circuit protection circuit to “receiv[e] said control input signal and output[] a first pulse signal being significant only in said predetermined period according to a timing when said control input signal indicates the conduction of said insulated gate transistor.” The claim further defines the “comparator” of the short-circuit protection circuit to “receiv[e] the detecting voltage of said control output signal, perform[] a comparison with said reference voltage and output[] a second pulse signal being significant during a period when the detecting voltage of said control output signal exceeds said reference voltage.” Finally, the claim further defines the logical circuit of the short-circuit protection circuit to “receiv[e] said first and second pulse signals and output[] a stop

signal forcing said driver to stop said control output signal when said second pulse signal becomes significant during a period when said first pulse signal is significant.”

Nothing more is needed to define “short-circuit protection circuit.”

The Respondents’ and Staff’s constructions would import the words “without a shunt resistor” from the title, which is not appropriate. Over a strong dissent by Judge Newman, the Federal Circuit recently reiterated that if it is improper to “read limitations into the claims from the specification that are not found in the claims themselves, then [it is improper to] read limitations into the claims from the patent title.” *Ethanol Boosting Sys., LLC v. Ford Motor Co.*, No. 2021-1949, 2022 WL 2798395, at *3 (Fed. Cir. July 18, 2022) (non-precedential) (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1312 (Fed. Cir. 1999)).

While using a shunt resistor may be disfavored because it would make the module larger, *see, e.g.*, ’835 Patent at 7:34-35, a shunt resistor can still be used. The specification calls a shunt resistor “not necessary,” *id.* at 7:33, but the specification does not say that a shunt resistor is “prohibited” or eliminated. And the Examiner did not refer to the absence of a shunt resistor in allowing the claims. *See* Diehl Decl., Ex. 3 (Non-Final Rejection); *id.*, Ex. 4 (Notice of Allowance). Thus there was no “clear and unmistakable disavowal of” a circuit with a shunt resistor and “the title[’s] reference to [‘without a shunt resistor’] is not” one either. *Ethanol Boosting*, 2022 WL 2798395, at *3; *GE Lighting Solutions, LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) (“[D]isavowal requires that ‘the specification [or prosecution history] make[] clear that the invention does not include a particular feature.’”).

Complainant thus requests that the ALJ not construe this term or else adopt its construction as “circuit that performs function of short-circuit protection.”

IV. CONCLUSION

For the reasons explained above, Complainant respectfully asks the ALJ to adopt each of the Complainant's proposed constructions.

Dated: August 5, 2022

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**UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.**

**Before the Honorable Monica Bhattacharyya
Administrative Law Judge**

In the Matter of

**CERTAIN POWER SEMICONDUCTORS,
AND MOBILE DEVICES AND
COMPUTERS CONTAINING SAME**

Investigation No. 337-TA-1308

DECLARATION OF KEMPER P. DIEHL

I, Kemper P. Diehl, hereby declare as follows:

1. I am an attorney in the law firm of Susman Godfrey, LLP. I am counsel for Complainant Arigna Technology Limited (“Arigna”) in the above-referenced Investigation. I have personal knowledge of the matters set forth herein. If called as a witness, I could and would testify competently thereto.

2. I submit this declaration in support of Arigna’s Opening Claim Construction Brief.

3. Attached as **Exhibit 1** is a true and correct copy of excerpts of the Authoritative Dictionary of IEEE Standards Terms, Seventh Edition (2000).

4. Attached as **Exhibit 2** is a true and correct copy of excerpts of the Modern Dictionary of Electronics, Sixth Edition (1997).

5. Attached as **Exhibit 3** is a true and correct copy of an excerpt from the prosecution history for U.S. Patent 7,183,835, produced by Arigna in this Investigation at Bates range ARIGNA-1308_00000203 to ARIGNA-1308_00000213.

6. Attached as **Exhibit 4** is a true and correct copy of an excerpt from the prosecution history for U.S. Patent 7,183,835, produced by Arigna in this Investigation at Bates range ARIGNA-1308_00000245 to ARIGNA-1308_00000252.

I declare under penalty of perjury that the foregoing is true and correct.

Signed this 5th day of August, 2022, at Seattle, Washington.

/s/ Kemper P. Diehl
Kemper P. Diehl

EXHIBIT 1

IEEE 100
The Authoritative Dictionary of
IEEE Standards Terms

Seventh Edition



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00-050601

insulated bearing (rotating machinery) A bearing that is insulated to prevent the circulation of stray currents. *See also:* bearing. (PE) [9]

insulated bearing housing (rotating machinery) A bearing housing that is electrically insulated from its supporting structure to prevent the circulation of stray currents. *See also:* bearing. (PE) [9]

insulated bearing pedestal (rotating machinery) A bearing pedestal that is electrically insulated from its supporting structure to prevent the circulation of stray currents. *See also:* bearing. (PE) [9]

insulated bolt A bolt provided with insulation.

(EEC/PE) [119]

insulated cap (separable insulated connectors) An accessory device designed to electrically insulate and shield and mechanically seal a bushing insert or integral bushing.

(T&D/PE) 386-1995

insulated-case circuit breaker (ICCB) A circuit breaker that is assembled as an integral unit in a supporting and enclosing housing of insulating material and with a stored energy mechanism. (IA/PSP) 1015-1997

insulated conductor (1) A conductor covered with a dielectric (other than air) having a rated insulating strength equal to or greater than the voltage of the circuit in which it is used.

(NESC/T&D) C2-1997, C2.2-1960

(2) A conductor encased within material of composition and thickness that is recognized by this Code as electrical insulation. (NESC/NEC) [86]

insulated coupling (rotating machinery) A coupling whose halves are insulated from each other to prevent the circulation of stray current between shafts. *See also:* rotor. (PE) [9]

insulated flange (piping) Element of a flange-type coupling, insulated to interrupt the electrically conducting path normally provided by metallic piping. *See also:* rotor.

(PE) [9]

insulated-gate field-effect transistor (IGFET) (1) (metal-nitride-oxide field-effect transistor) A four-terminal device consisting of two separate areas of one conductivity type called source and drain with a terminal each, separated from each other by a substrate of opposite conductivity type with its terminal and straddled by an electrode with terminal called gate, which is insulated from the silicon by a layer of insulator material, frequently silicon dioxide, called gate.

(ED) 581-1978w

(2) A field-effect transistor that has one or more gate electrodes that are electrically insulated from the channel.

(ED) 1005-1998, 641-1987w

insulated-gate field-effect transistor symbols (metal-nitride-oxide field-effect transistor) IGFET types may be categorized as memory—nonmemory, enhancement mode—depletion mode, and *n*-channel—*p*-channel. Standard symbols for memory transistors do not exist. The diagram below presents the standard electrical symbols for the nonmemory transistors and the symbols used in this standard for memory transistors. The symbols used for the memory transistors must be considered provisional until specific standards have been finalized. (ED) 581-1978w

insulated ground stick An insulated rod, fabricated from fiberglass reinforced plastic, with specialized connection hardware, operating mechanism, and of sufficient length to allow for safe gripping and installation of grounding clamps.

(T&D/PE) 524a-1993r

insulated image guide A planar dielectric waveguide composed of one or more dielectric strips of finite width affixed to an extended dielectric layer of lower dielectric constant and finite thickness, attached in turn to an extended conducting ground plane. (MTT) 1004-1987w

insulated joint (1) A coupling or joint used to insulate adjacent pieces of conduits, pipes, rods, or bars.

(VT/CON/LT) 16-1955w

(2) (cable) A device that mechanically couples and electrically insulates the sheath and armor of contiguous lengths of cable. *See also:* tower. (T&D/PE) [10]

insulated-neutral terminal type voltage transformer One that has the neutral end of the primary winding insulated from the case or base and connected to a terminal that provides insulation for a lower voltage than required for the line terminal. (The neutral may be connected to the case or mounting base in a manner intended to facilitate temporary disconnection for dielectric testing.) (PE/TR) C57.13-1993

insulated parking bushing An accessory device designed to electrically insulate and shield and mechanically seal a power cable terminated with an elbow. (T&D/PE) 386-1995

insulated rail joint A joint used to insulate abutting rail ends electrically from one another. (EEC/PE) [119]

insulated splice (power cable joints) A splice with a dielectric medium applied over the connected conductors and adjacent cable insulation. (PE/IC) 404-1986s

insulated static wire An insulated conductor on a power transmission line whose primary function is protection of the transmission line from lightning and one of whose secondary function is communications. (PE) 599-1985w

insulated supply system *See:* ungrounded system.

insulated tool or device (A) (power line maintenance) A tool or device that has conductive parts and is either coated or covered with a dielectric material. (B) A tool or device designed primarily to provide insulation from an energized part or conductor. It can be composed entirely of insulating materials. *Examples:* conductor cover; stick; insulating tape. (T&D/PE) 458-1985, 516-1995

insulated turnbuckle An insulated turnbuckle is one so constructed as to constitute an insulator as well as a turnbuckle. *See also:* tower. (T&D/PE) [10]

insulating (covering of a conductor, or clothing, guards, rods, and other safety devices) A device that, when interposed between a person and current-carrying parts, protects the person making use of it against electric shock from the current-carrying parts with which the device is intended to be used: the opposite of conducting. *See also:* insulation; insulated. (T&D) C2.2-1960

insulating cell (rotating machinery) An insulating liner, usually to separate a coil-side from the grounded surface at a slot. *See also:* stator; rotor. (PE) [9]

insulating clothing Clothing made of natural or synthetic material that is designed primarily to provide insulation from an energized part or conductor. (T&D/PE) 516-1995

insulating envelope An envelope of inorganic or organic material such as a ceramic or cast resin placed around the energized conductor and insulating material.

(PE/TR) C57.19.03-1996

insulating (isolating) joint (power cable joints) A cable joint which mechanically couples and electrically separates the sheath, shield, and armor on contiguous lengths of cable.

(PE/IC) 404-1986s

insulating material (1) (rotating machinery) (insulant) A substance or body, the conductivity of which is zero or, in practice, very small. *See also:* asynchronous machine; direct-current commutating machine. (PE) [9], [84]

(2) A material that cannot conduct electricity under normal conditions. *Contrast:* conducting material; semiconducting material. (C) 610.10-1994w

insulating-material classifications For the purpose of establishing temperature limits, insulating materials shall be classified as follows:

Class 90. Materials or combinations of materials such as cotton, silk, and paper without impregnation. Other materials, or combinations of materials may be included in this class if, by experience or accepted tests, they can be shown to be capable of operation at 90°C.

Class 105. Materials or combinations of materials such as cotton, silk and paper when suitably impregnated or coated or when immersed in a dielectric liquid such as oil. Other materials or combinations of materials may be included in this class if, by experience or accepted tests, they can be shown to be capable of operation at 105°C.

EXHIBIT 2

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ELECTRONICS**

**SIXTH EDITION
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Rudolf F. Graf

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conducted interference—Any unwanted electrical signal conducted on the power lines supplying the equipment under test, or on lines supplying other equipment to which the one under test is connected.

conducted signals—Electromagnetic or acoustic signals propagated along wirelines or other conductors.

conducted spurious transmitter output—A spurious output of a radio transmitter that is conducted over a tangible transmission path such as a power line, control circuit, radio-frequency line, waveguide, etc.

conductimeter—See Conductivity Meter.

conduction—The transmission of heat or electricity through or by means of a conductor.

conduction band—A partially filled energy band in which electrons can move freely, allowing the material to carry an electric current (with electrons as the charge carriers).

conduction current—The power flow parallel to the direction of propagation, expressed in siemens per meter.

conduction-current modulation—1. Periodic variations in the conduction current passing a point in a microwave tube. 2. The process of producing such variations.

conduction electrons—The electrons which are free to move under the influence of an electric field in the conduction band of a solid.

conduction error—The error in a temperature transducer due to heat conduction between the sensing element and the mounting to the transducer.

conduction field—Energy which surrounds a conductor when an electric current is passed through the conductor, and which, because of the difference in phase between the electrical field and magnetic field set up in the conductor, cannot be detached from the conductor.

conductive adhesive—An adhesive material that has metal powder added to increase electrical conductivity.

conductive epoxy—An epoxy material (polymer resin) that has been made conductive by the addition of a metal powder, usually gold or silver.

conductive gasket—A special highly resilient gasket used to reduce rf leakage in shielding which has one or more access openings.

conductive level detector—A device with single or multiple probes. A change in level completes an electrical circuit between the container and/or probes.

conductive material—A material in which a relatively large conduction current flows when a potential is applied between any two points on or in a body constructed from the material. Metals and

strong electrolytes are examples of conductors.

conductive pattern—1. The arrangement or design of the conductive lines on a printed-circuit board. 2. The configuration or design of the conductive material on the base material. Includes conductors, lands, and through connections when these connections are an integral part of the manufacturing process.

conductive plastic potentiometer—A potentiometer in which the resistive element consists of a blend of resin (epoxy, polyester, etc.) and processed carbon powder applied to a plastic or ceramic substrate.

conductivity—1. The conductance between opposite faces of a unit cube of material. The volume conductivity of a material is the reciprocal of the volume resistivity. 2. The ability of a material to conduct electric current. It is expressed in terms of the current per unit of applied voltage. It is the reciprocal of resistivity. 3. The ability to conduct or transmit heat or electricity. 4. The ability of a material to allow electrons to flow, measured by the current per unit of voltage applied. It is also the reciprocal of resistivity. 5. Synonym for conductance. 6. The parameter of a material which indicates the extent to which it permits a net electrical current, and which is normally measured in terms of the conductance in reciprocal ohms (siemens) between opposite faces of a cube of the material measuring one centimeter on each side. The conductivity of a material is the reciprocal of its resistivity.

conductivity meter—Also called conductimeter. An instrument that measures and/or records electrical conductivity.

conductivity modulation—1. The change in conductivity of a semiconductor as the charge-carrier density is varied. 2. The process whereby the effective electrical conductivity of a semiconductor region is modified by the injection of excess carriers. Thus excess majority carriers injected into a lightly doped region can cause the effective conductivity to be increased, simply by providing further carriers for current conduction. Conversely, excess minority carriers injected into a heavily doped region can cause the effective conductivity to be reduced, by increasing the incidence of recombination and hence reducing the number of carriers available for conduction.

conductivity-modulation transistor—A transistor in which the active properties are derived from minority-carrier modulation of the bulk of resistivity of the semiconductor.

conductor—1. A bare or insulated wire or combination of wires not insulated from one another, suitable for carrying an

EXHIBIT 3



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EXAMINER

ENGLUND, TERRY LEE

ART UNIT PAPER NUMBER

2816

DATE MAILED: 07/07/2006

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

Office Action Summary	Application No.	Applicant(s)	
	11/023,590	SAKATA ET AL.	
	Examiner	Art Unit	
	Terry L. Englund	2816	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
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A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2004 and 05 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-9 is/are rejected.
- 7) ☒ Claim(s) 2 and 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) ☐ Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>20041229/20060405</u> . | 6) ☐ Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “11” has been used to designate both a level shift device, and a transistor in Fig. 6; and reference character “12” has been used to designate both a SR flip-flop, and a transistor in Fig. 6. It is suggested the level shift device and SR flip-flop have their reference characters changed, along with corresponding changes to the disclosure, since “11” also identifies a transistor in Fig. 1, and “12” also identifies a transistor in Figs. 1 and 2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign mentioned in the description: The one-shot circuit in Fig 2 lacks the reference character “1” cited on at least lines 4 and 5 of page 8. Corrected

drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character not mentioned in the description: Therefore, it is suggested "ND1" (shown in Fig. 6) be added after "point" on line 9 of page 14. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to because Fig. 9's "S1" should be --S10-- (e.g. see page 17, lines 10 and 21). Also related to Fig. 9, clarification is required on why S14 is not shown in a

high state when S13 goes above V1 during the normal state, although that state is implied by lines 16-19 of page 18. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The present title “Semiconductor Device and Semiconductor Device Module” of the invention is generic in nature, and therefore is not descriptive enough. A new title is required that is indicative of the invention to which the claims are directed. It is suggested the title indicate a short-circuit protection, or control, circuit for an insulated gate transistor.

The abstract of the disclosure is objected to because “the transistor which is an insulated gate transistor” within the first sentence implies a transistor that had not been previously identified. Therefore, it is suggested the “the transistor which is” phrase be deleted. It is also

suggested “With employing this, the” on line 7 be changed to --The--. Otherwise, it is not clear what “With employing this” actually refers back to. Corrections are required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informality: Page 17, line 4 “champed” should be --clamped-- to correct a typo. An appropriate correction is required.

Claim Objections

Claims 2-9 are objected to because of the following informalities: Since claim 1 cites “a conduction of said insulated gate transistor” on lines 7-8, and “a detecting voltage” on lines 5-6, it is suggested “a conduction” on line 5 of claim 2 be changed to --said conduction--, and “a detecting” on both lines 6 and 8 of claim 2 be changed to --said detecting--. Claim 2, line 11 “stop an output of said control output signal” should have the phrase --an output of-- deleted to more clearly relate the “stop...signal” back to the phrasing cited on line 5 of claim 1. On lines 6 and 8 of each of claims 4, 8 and 9, it is suggested an --a-- be added prior to “high” and “low”, respectively to improve word flow. Claim 5, line 5 “a conduction” should be --said conduction-- to clearly refer back to line 7 of claim 1. For similar reasons, it is suggested “a predetermined” (line 14), “a detecting” (lines 6, 16 and 18), and “a period” (line 17) of claim 5 have the article “a” changed to --said-- since each voltage (or period) had been previously recited. To improve word flow, it is suggested only --significant-- be used instead of “be significant” on line 18 of claim 5. Claim 5, lines 20-21 “stop an output of said control output signal” should have the phrase --an output of-- deleted to more clearly relate the “stop...signal” phrase back to the phrasing used on line 5 of claim 1. Claim 6, line 2 “a detecting” should be --said detecting-- to clearly relate back to the voltage cited previously in both claims 1 and 5. Dependent claims

carry over any objection(s) from any claim(s) upon which they depend. Appropriate corrections are required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the invention. It is not clear in claim 5 which output “said output” on line 11 refers to. For example, the driver of claim 1 outputs a “control output signal”, and the pulse generation circuit, signal selective part, and comparator of claim 5 all output their own corresponding signal (i.e. “a first pulse signal” (lines 3-4), “outputting one of them” (lines 7-8), and “a second pulse signal” (line 10), respectively). It is not understood how “a reference potential” on lines 3-4 of claim 6 relates to “a predetermined voltage lower than said reference voltage” cited on line 7 of claim 5.

Claims 4, 8 and 9 are each rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are how the first/second insulated gate transistors of each of claims 4, 8 and 9 relate to the insulated gate transistor of claim 1. For example, are these two additional transistors with respect to the transistor already cited in claim 1?

Dependent claims carry over any rejection(s) from any claim(s) upon which they depend.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Sasaki et al. (Sasaki).

One of ordinary skill in the art would understand Sasaki's Fig. 1 shows a semiconductor device for controlling the drive of insulated gate transistor 1 by generating control output signal GATE VOLTAGE (i.e. the output of drive circuit 3) on a basis of a control input signal (i.e. not shown, but identified as "an ON command signal from the outside" in the first sentence of paragraph 0041). The device comprises driver 3 for outputting control output signal GATE VOLTAGE, and short-circuit protection circuit COMP1-COMP2, V1-V2, AND, 2, M1, Rsf for detecting the control output signal and controlling/forcing driver 3 to stop when a detecting voltage of the control output signal exceeds a predetermined reference voltage (e.g. see paragraphs 0037-0038, 0044, and 0048-0049; and Fig. 2). From Fig. 2, one of ordinary skill in the art would know that control output signal GATE VOLTAGE indicates conduction of transistor 1 once the signal has reached the terraced voltage (e.g. see paragraph 0042). Since driver 3 is forced to stop before a predetermined period passes (e.g. the time it would take before transistor 1 would be damaged due to the short circuit (e.g. see the last sentence of paragraph 0051)), claim 1 is anticipated.

Claim 1 is also rejected under 35 U.S.C. 102(e) as being anticipated by Ohi et al. (Ohi), wherein this reference corresponds to reference DE10334832 cited on the Apr 5th IDS. Ohi

shows a semiconductor device (in at least Fig. 6) for controlling the drive of insulated gate transistor 11 by generating a control output signal (i.e. the unlabeled signal applied to the gate of transistor 11) on the basis of a control input signal (i.e. the TURN-ON and TURN-OFF INSTRUCTIONS). The device comprises driver 12-14 for outputting the control output signal, and short-circuit protection circuit 16-17 for detecting the control output signal and controlling/forcing driver 12-14 to stop when a detecting voltage of the control output signal exceeds a predetermined reference voltage (e.g. the gate voltage causes the voltage between resistors 34 and 35 to become greater than the voltage between resistors 36 and 37) before a predetermined period passes (i.e. before transistor 33 has time to turn on; e.g. see column 10, lines 14-26, and Fig. 7). This anticipates claim 1.

No claim is allowable as presently written.

Allowable Subject Matter

However, claims 2-3 are only objected to as being dependent upon a rejected base claim, but would be allowable if satisfactorily rewritten in independent form including all of the limitations of the base claim and any intervening claims. There is presently no motivation to modify or combine any prior art reference(s) to ensure the short-circuit protection circuit includes the relationships between the pulse generation circuit, comparator, and logical circuit as recited within claim 2, upon which claim 3 depends. [Note: The objections to claim 2, described under the section of Claim Objections should also be satisfactorily addressed/corrected.]

Also, claims 4-9 would be allowable if rewritten to satisfactorily overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Claim 4 depends on claim 2

described above, and there is presently not motivation to modify or combine any prior art reference(s) to ensure the short-circuit protection circuit includes the relationships between the pulse generation circuit, signal selective part, and comparator as recited within claim 5, upon which claims 6-9 depend.

Prior Art

The other two prior art references cited on the accompanying PTO-892 are deemed relevant to at least sections of the claimed invention. Both of these references show a device controlling the drive of an insulated gate transistor, wherein the device comprises a driver for outputting a control output signal driving the transistor, and a short-circuit protection circuit that detects the control output signal and effectively stops the control output signal (e.g. by pulling it low). Therefore, these references should be reviewed and considered.

The six prior art references cited on the IDS forms submitted Dec 29, 2004 and Apr 5, 2006, have been reviewed and considered. Although the various circuits will stop conduction of a transistor if an over current (or some type of abnormality) occurs, five of these references do not clearly show or disclose the specific relationships with respect to when the detecting voltage exceeds a reference voltage, before a predetermined period passes after the control output signal indicates conduction, as recited within claim 1. Although reference DE10334832 was not specifically cited in any formal rejection described above, it corresponds to U.S. Patent 6,906,574 by Ohi et al. that is cited above in one of the rejections of claim 1.

Any inquiry concerning this communication from the examiner should be directed to Terry L. Englund whose telephone number is (571) 272-1743. The examiner can normally be reached Monday-Friday from 7 AM to 3 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Callahan, can be reached on (571) 272-1740.

The new central official fax number is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1562.

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).

TLE

Terry L. Englund

15 June 2006



TIMOTHY P. CALLAHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

EXHIBIT 4



UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 10/19/2006
MCDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER	
ENGLUND, TERRY LEE	
ART UNIT	PAPER NUMBER
2816	

DATE MAILED: 10/19/2006

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/023,590	12/29/2004	Hiroshi Sakata	50099-304	1789

TITLE OF INVENTION: SEMICONDUCTOR DEVICE WHICH REALIZES A SHORT-CIRCUIT PROTECTION FUNCTION WITHOUT SHUNT RESISTOR, AND SEMICONDUCTOR DEVICE MODULE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$0	\$1700	01/19/2007

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)

7590 10/19/2006

MCDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/023,590	12/29/2004	Hiroshi Sakata	50099-304	1789

TITLE OF INVENTION: SEMICONDUCTOR DEVICE WHICH REALIZES A SHORT-CIRCUIT PROTECTION FUNCTION WITHOUT SHUNT RESISTOR, AND SEMICONDUCTOR DEVICE MODULE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$0	\$1700	01/19/2007

EXAMINER	ART UNIT	CLASS-SUBCLASS
ENGLUND, TERRY LEE	2816	327-434000

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

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

2. For printing on the patent front page, list

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

1 _____

2 _____

3 _____

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

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

(A) NAME OF ASSIGNEE

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

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

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

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

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

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

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

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

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

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

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

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/023,590	12/29/2004	Hiroshi Sakata	50099-304	1789

EXAMINER	
ENGLUND, TERRY LEE	

ART UNIT	PAPER NUMBER
2816	

DATE MAILED: 10/19/2006

7590 10/19/2006
MCDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

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 126 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 126 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.

21

Notice of Allowability	Application No.	Applicant(s)	
	11/023,590	SAKATA ET AL.	
	Examiner	Art Unit	
	Terry L. Englund	2816	

-- 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 Amdt/Dwgs (Oct 10, 2006).
2. ☒ The allowed claim(s) is/are 2-9 (now renumbered as 1-8, respectively for printing purposes).
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

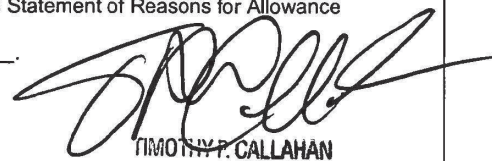
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| <ol style="list-style-type: none"> 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 _____ 4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 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 _____ |
|---|---|


 TIMOTHY P. CALLAHAN
 SUPERVISORY PATENT EXAMINER
 TECHNOLOGY CENTER 2800

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Page 7 of the Oct 10th amendment (with respect to line 1 of "the first full paragraph on page 17"); changed "11" to --110--;

Page 8 of the Oct 10th amendment (with respect to line 1 of "the fourth full paragraph on page 20"); changed "11" to --110--;

Claim 5, line 20: changed "a detecting" to --the detecting--;

lines 22-23: changed "the period" to --a period--; and

lines 24-25: changed "a period" to --the period--.

All the changes made above relate to minor type oversights, wherein none of them affect the scope of the claims. The amended paragraphs were changed to correct an oversight with respect to one of the reference designators, that had not been changed in all related occurrences, to ensure the disclosure corresponds to the new reference designators "110" and "120" now shown in Fig. 6. Claim 5 was amended to help ensure the "detecting voltage" and "period" phrasings are consistent with related phrasing, thus minimizing possible confusion within the claim. The phrase "a detecting voltage" on lines 20-21 of claim 5 was changed to clearly refer it back to the phrases "a detecting voltage" and "the detecting voltage" cited on lines 6 and 14, respectively. It is believed the applicants' change from "a period" to "the period" on lines 22-23

should have actually been made to “a period” on lines 24-25 instead. Therefore, lines 22-23 and 24-25 were amended to address this oversight, and to minimize possible confusion with respect to which “period” is being referred to. For example, since no specific “period” had been clearly identified previously with respect to “the period when said first pulse signal is not significant” within claim 5, lines 22-23 had “the period” changed back to --a period--. However, “a period” on lines 24-25 was changed to --the period-- to relate it back to “a period when said first pulse signal is significant” already cited on line 21.

RESPONSE TO AMENDMENT/DRAWINGS

The amendment and drawings submitted on Oct 10, 2006 were reviewed and considered with the following results:

The Replacement Sheets overcame the various drawing objections described on pages 2-4 of the previous Office Action. Therefore, those sheets have been approved, and the drawing objections have been withdrawn.

The new title and abstract overcame their respective objections, which have also been withdrawn.

The amended paragraphs overcame the disclosure’s objection described on page 5 of the previous Office Action, and/or provided reference characters that correspond to changes within the figures. Therefore, the previous Office Action’s objection has been withdrawn. Although two minor objections were noted within the paragraphs with respect to the changed reference characters, those oversights were addressed/corrected by the Examiner’s Amendment described above.

Amended claims 2, and 5-6 overcame the objections to claims 2-9 as described on pages 5-6 of the previous Office Action, and those claim objections were all withdrawn. However, when all the claims were carefully reviewed, several other objections were noted within claim 5. These objections were also addressed/corrected by the Examiner's Amendment described above.

Amended claims 4-6, and 8-9, along with comments on page 15, overcame the rejections of claims 4-9 under 35 U.S.C. 112 as described on page 6 of the previous Office Action. Therefore, all those claim rejections have now been withdrawn.

The cancellation of claim 1 rendered its rejections under 35 U.S.C. 102(e) moot.

Therefore, there is no known objection or rejection remaining within the present application.

REASONS FOR ALLOWANCE

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

None of the prior art references reviewed and considered shows or discloses a semiconductor device comprising the driver and short-circuit protection circuit as recited within independent apparatus claims 2 and 5. More specifically, none of the references clearly shows or discloses the specific relationships between the pulse generation circuit, comparator, and: 1) the logical circuit as recited within claim 2, wherein the logical circuit forces the driver to stop the control output signal when the second pulse signal (from the comparator) becomes significant during the same period the first pulse signal (from the pulse generation circuit) is significant; or 2) the signal selective part that selectively outputs either the received detecting voltage, or a predetermined voltage, based on the first pulse signal (from the pulse generation circuit), and then using the second pulse signal (from the comparator) to force the driver to stop the control

output signal as recited within claim 5. Claims 3-4 depend on claim 2, and claims 6-9 depend on claim 5. Since there is no motivation to modify or combine any prior art reference(s) to ensure those specific limitations (e.g. with respect to the first and second pulse signals) are met, the claims are deemed patentably distinct over the prior art of record.

Claims 2-9 are allowed, and have been renumbered as 1-8, respectively for printing purposes. The renumbering takes into account the cancellation of claim 1.

Any comments considered necessary by the applicants 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."

Any inquiry concerning this communication, or previous communications, from the examiner should be directed to Terry L. Englund whose telephone number is (571) 272-1743. The examiner can normally be reached Monday-Friday from 7 AM to 3 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Callahan, can be reached on (571) 272-1740.

The new central official fax number is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1562.

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).


Terry L. Englund
12 October 2006

**UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.**

**Before the Honorable Monica Bhattacharyya
Administrative Law Judge**

In the Matter of

**CERTAIN POWER SEMICONDUCTORS,
AND MOBILE DEVICES AND
COMPUTERS CONTAINING SAME**

Inv. No. 337-TA-1308

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing has been served on August 5, 2022, as indicated, on the following:

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/s/ Amy Hall

Amy Hall