



UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MONOLITHIC POWER SYSTEMS, INC.,
Petitioner,

v.

GREENTHREAD, LLC,
Patent Owner.

IPR2024-00550
Patent 10,510,842 B2

Before JON B. TORNQUIST, MONICA S. ULLAGADDI, and
JULIA HEANEY, *Administrative Patent Judges*.

ULLAGADDI, *Administrative Patent Judge*.

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

I. INTRODUCTION

Monolithic Power Systems, Inc. (“Petitioner” or “MPS”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1, 2, 4–9, and 12–18 (“the challenged claims”) of U.S. Patent No. 10,510,842 B2 (Ex. 1001, “the ’842 patent”), accompanied by the supporting Declaration of Stephen Campbell, Ph.D. (Ex. 1003). Greenthread, LLC (“Patent Owner”) filed a Preliminary Response. Paper 11 (“Prelim. Resp.”).

With our authorization, Petitioner filed a Preliminary Reply (Paper 17, “Prelim. Reply”), and Patent Owner filed a Preliminary Sur-reply (Paper 18, “Prelim. Sur-reply”).

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2023). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless the Director determines . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Having considered the parties’ arguments and the evidence of record, we determine that, for the reasons discussed herein, Petitioner demonstrates a reasonable likelihood that it would prevail with respect to at least one of the challenged claims. We thus institute an *inter partes* review on all challenged claims on all asserted grounds. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1354, 1359–60 (2018).

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies Monolithic Power Systems, Inc. as the real party in interest. Pet. 1.

Patent Owner identifies Greenthread, LLC as the real party-in-interest.
Paper 4, 1.

B. Related Matters

The parties indicate that the '842 patent is involved in the following district court cases:

Greenthread, LLC v. Cirrus Logic, Inc., No. 1:23-cv-00369 (W.D. Tex.);

Greenthread, LLC v. OmniVision Technologies, Inc., No. 2:23-cv-00212 (E.D. Tex.);

Greenthread, LLC v. OSRAM GmbH et al., No. 2:23-cv-00179 (E.D. Tex.);

Greenthread, LLC v. ON Semiconductor Corp., No. 1:23-cv-00443 (D. Del.)

Greenthread, LLC v Texas Instruments Incorporated, No. 2:23-cv-00157 (E.D. Tex.); and

Greenthread, LLC v. Monolithic Power Systems, Inc., No. 1:23-cv-00579 (D. Del.).

Pet. 1–2; Paper 4, 2–3.

C. The '842 Patent

The '842 Patent issued December 17, 2019, and claims the benefit of a series of continuation applications, the earliest of which was filed September 3, 2004. Ex. 1001, codes (45), (60). The '842 patent is titled “Semiconductor Devices with Graded Dopant Regions” and “relates to all semiconductor devices and systems.” *Id.* at code (54), 1:32–33.

The '842 patent explains that, in bipolar junction transistors, minority carriers are the principal device conduction mechanism, but notes that majority carriers also play a small but finite role in modulating the

conductivity in such devices. *Id.* at 1:43–47. The '842 patent further explains that “[e]fforts have been made in graded base transistors to create an aiding drift field to enhance the diffusing minority carrier’s speed from emitter to collector.” *Id.* at 1:55–57. According to the '842 patent, this improvement has not been implemented in most semiconductor devices, including various power MOSFETs and IGBTs, which “still use a uniformly doped ‘drift epitaxial’ region in the base.” *Id.* at 1:57–62. The invention of the '842 patent implements a graded dopant concentration in these devices, which the '842 patent contends results in two important performance enhancements: “electrons can be swept from source to drain rapidly, while at the same time holes can be recombined closer to the n⁺ buffer layer,” thereby improving “t_{on} and t_{off} in the same device.” *Id.* at 3:38–43.

Figure 1 of the '842 patent is reproduced below.

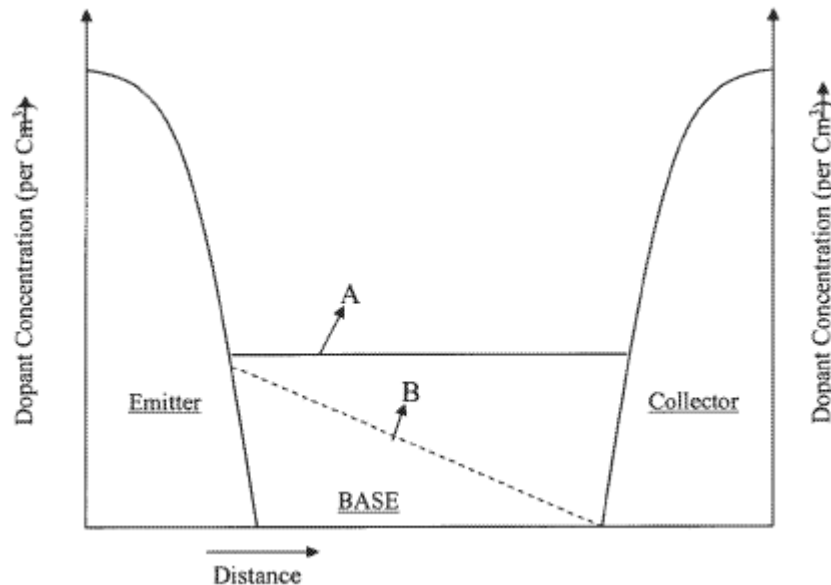


Figure 1 is labeled “Prior Art” and shows a plot of dopant concentration versus distance. Ex. 1001, Fig. 1. According to the '842 patent, Figure 1 “illustrates the relative doping profiles of emitter, base and collector for the

two most popular bipolar junction transistors: namely, uniform base ('A') and graded base ('B')." *Id.* at 2:35–38

Figure 3A of the '842 patent is reproduced below.

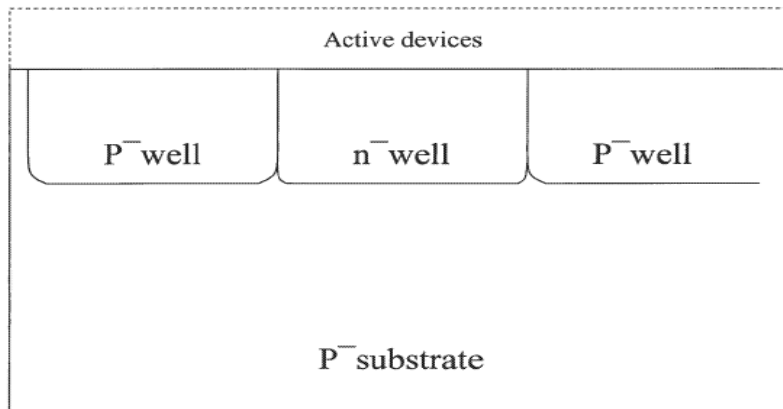


Figure 3A is labeled "Prior art (Twin well CMOS) for a CMOS integrated circuit" ("IC"), and shows a "typical" complementary metal-oxide semiconductor ("CMOS") very large-scale integrated circuit ("VLSI") device that employs "a twin well substrate, on which active devices are subsequently fabricated." *Id.* at 2:16–18, Fig. 3A; *see also id.* at 2:41–46 (explaining that Figure 3A shows a "commonly used prior art CMOS silicon substrate[]" having "a typical prior art IC with two wells (one n-well in which p-channel transistors are subsequently fabricated and one p-well in which n-channel transistors are subsequently fabricated)").

Figure 5A of the '842 patent is reproduced below.

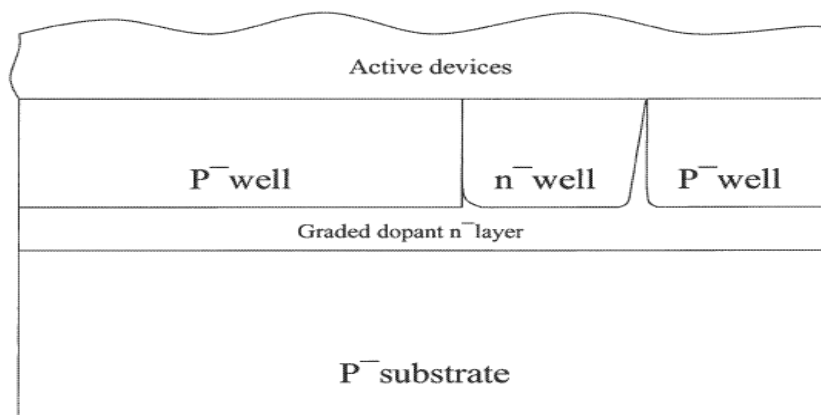


Figure 5A illustrates a cross section of a CMOS silicon substrate with two wells and an underlying layer using embodiments of the invention. *Id.* at 2:54–56. Figure 5A is labeled “[a] CMOS Substrate for digital, mixed[] signal, and sen[s]or[] IC’s.” Ex. 1001, Fig. 5A. The figure illustrates “a CMOS silicon substrate with two wells and an underlying layer,” which is labeled “Graded dopant n–layer.” *Id.* at 2:54–58, Fig. 5A.

According to the ’842 patent, “[s]purious minority carriers can be generated by clock switching in digital VSLI logic and memory ICs.” Ex. 1001, 3:47–48. The ’842 patent states that these “unwanted carriers” degrade performance of various types of devices, including digital imaging ICs. *Id.* at 3:49–55. According to the ’842 patent, “a novel technique is described” in which “a drift field [is used] to sweep these unwanted minority carriers from the active circuitry at the surface into the substrate in a monolithic die as quickly as possible.” *Id.* at 3:60–64. For example, “[i]n a preferred embodiment, the subterranean n–layer has a graded donor concentration to sweep the minority carriers deep into the substrate.” *Id.* at 3:64–66.

D. Illustrative Claim

Of the challenged claims, claims 1 and 9 are independent. Claim 1 is illustrative and reproduced below.

1. A semiconductor device, comprising:

[1.1] a substrate of a first doping type at a first doping level having first and second surfaces;

[1.2] a first active region disposed adjacent the first surface of the substrate with a second doping type opposite in conductivity to the first doping type and within which transistors can be formed;

[1.3] a second active region separate from the first active region disposed adjacent to the first active region and within which transistors can be formed;

[1.4] transistors formed in at least one of the first active region or second active region; and

[1.5] at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to aid carrier movement from the first surface to the second surface of the substrate.

Ex. 1001, 4:45–60 (bracketed designations added by Petitioner (*see* Pet. 13–25)).

E. Asserted Grounds

Petitioner presents the following challenges. Pet. 5.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 2, 4–9, 12–18	103(a) ¹	Kawagoe ²
1, 2, 4–9, 12–18	103(a)	Onoda ³
1, 2, 4–9, 12–18	103(a)	Onoda, Nishizawa ⁴

Petitioner relies on the Declaration of Dr. Stephen Campbell. Ex. 1003.

III. ANALYSIS

A. Legal Standards

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. §§ 102 and 103 that became effective after the effective filing date of the challenged claims. *See* Ex. 1001, codes (22), (60). Therefore, we apply the pre-AIA versions of 35 U.S.C. §§ 102 and 103(a).

² U.S. Patent No. 6,043,114, filed September 22, 1997, issued March 28, 2000, to Kawagoe et al. (Ex. 1007, “Kawagoe”).

³ Japanese Unexamined Patent Application Publication No. H8-279598, published Oct. 22, 1996 (Ex. 1043, “Onoda”). A certified translation, to which we cite, is provided. Ex. 1042.

⁴ U.S. Patent No. 5,384,476, filed June 9, 1987 and issued January 24, 1995, to Nishizawa et al. (Ex. 1046, “Nishizawa”).

the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.⁵ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Discretionary Denial Under 35 U.S.C. § 314(a)

Patent Owner argues that the Board should deny institution under 35 U.S.C. § 314(a) based on the factors set forth in *General Plastic Co., Ltd. v. Canon Kabushiki Kaisha*, Case IPR2016-01357, Paper 19 (PTAB Sept. 6, 2017) (precedential as to § II.B.4.i) (“*General Plastic*”). Prelim. Resp. 13–20.

Patent Owner argues that Petitioner “MPS may not wait until related entities have initiated IPR proceedings to file its own IPR petition of the same patent claims with the advantage derived from having already seen [Patent Owner] Greenthread’s arguments.” Prelim. Resp. 13 (citing IPR2016-01357, Paper 19 at 11 (PTAB Sept. 6, 2017) (precedential)). Patent Owner supports its position by asserting that Petitioner “MPS has filed [a] modified version of the IPRs [of] [Petitioner] MPS’s co-defendants” and that Petitioner “MPS . . . is coordinating invalidity positions with these entities, because MPS, [Cirrus Logic Inc.] CL, [Omnivision Technologies Inc.] OV,

⁵ Patent Owner presents no objective evidence of nonobviousness at this stage of the proceeding.

and another defendant/petitioner, Texas Instruments Inc. ('TI') have filed virtually identical invalidity contentions." *Id.* at 14.

More particularly, Patent Owner contends Petitioner "MPS is a party to a Joint Defense Group ('JDG') in the current district court litigations in Delaware and Texas that shared and copied the same invalidity contentions." *Id.* at 16. Accordingly, Patent Owner contends that Petitioner "MPS is so closely aligned with the other members of the JDG, which previously filed IPR petitions of the '842 Patent, that the Board should consider them the same entity for the purposes of a *General Plastic* analysis." *Id.* at 18 (citing *Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11 at 2 (PTAB Apr. 2, 2019) (precedential) ("Valve")). Patent Owner further argues that, "not only are the members of the JDG accused of infringing the same patent in district court cases; they are actively coordinating their defense and sharing purportedly highly confidential information with competitors." *Id.*

Petitioner responds that it "has not previously filed a petition challenging the '842 patent," and that it "does not have a 'significant relationship' with any entities that have," in part because Petitioner "MPS and the other component manufacturer petitioners are *competitors* with *different accused products* sued in different district court proceedings." Prelim. Reply 1 (emphasis added). Petitioner also argues that it "did not contribute to any other petitioner's IPR filings," "no other petitioner contributed to [Petitioner] MPS on the [present] Petition," there is "no licensing relationship" with any member of the Joint Defense Group, and that Petitioner "did not copy the prior petitions or coordinate with the other petitioners on the IPRs." *Id.* at 1–3 (emphasis omitted). Petitioner notes that "the majority of the grounds [it] asserted in its Petition are based on entirely new prior art references not present in any of the other petitions." *Id.* at 3

(citing Pet. 5, 76 (setting forth challenges based on Onoda and Nishizawa)). Petitioner also notes that Patent Owner “filed all its *preliminary responses under seal* outside of [Petitioner’s] access, so any alleged benefit gained from successive petitions is wholly illusory.” *Id.* at 4 (emphasis added).

The Director’s decisions in *Ford Motor Co. v. Neo Wireless LLC*, IPR2023-00763, Paper 28 (Vidal Mar. 22, 2024) (“*Ford*”) and *Videndum Prod. Sols., Inc v. Rotolight Ltd.*, IPR2023-01218, Paper 12 (Vidal Apr. 19, 2024) (“*Videndum*”) clarified the Board’s application of the frameworks set forth in *General Plastic* and *Valve*. In *Ford*, the Director explained that “[u]nder existing Office policy and precedent, the Board does not recognize a ‘significant relationship’ between parties [i.e., serial petitioners] having *different accused products* that merely engage in court-ordered pretrial coordination.” *Ford*, at 3 (emphasis added). In *Videndum*, the Director further explained that where “the first and second petitioners are neither the same party, nor possess a significant relationship under *Valve*, *General Plastic* factor one necessarily outweighs the other *General Plastic* factors.” *Videndum*, at 6–7. Thus, per *Ford* and *Videndum*, we will not discretionarily deny a later petition in view of an earlier petition where the earlier and later petitioners are neither the same party nor have a “significant relationship.”

Based on the current record, we find that no significant relationship exists between Petitioner and any other member of the Joint Defense Group to justify application of the *Valve* framework. In *Valve*, both petitioners were accused of infringing the same patent based upon the same product for which they had an ongoing licensing relationship. *Valve*, at 9–10.

Notwithstanding Patent Owner’s assertions about the voluntarily “shared and copied . . . invalidity contentions” (*see* Prelim. Resp. 16) among Petitioner and co-defendants in Texas and Delaware district court

proceedings, the relevant facts and circumstances here are more akin to those in *Ford*.

In the present proceeding, there is no evidence of any entity having a licensing relationship with Petitioner. Prelim. Reply 5–7. And any relationship between Petitioner MPS and the other petitioners is premised on the allegation that they each infringe the same patent, but with different allegedly infringing products and in different district court proceedings. Pet. 81; Prelim. Reply 1, 3.⁶ We note that Patent Owner does not dispute Petitioner’s assertion that Petitioner and other members of the Joint Defense Group are competitors. *See, e.g.*, Prelim. Sur-reply 1. None of the defendants against Patent Owner’s lawsuits were sued on the same accused product. Pet. 81; Prelim. Reply 1, 3; *supra* n.6. Moreover, as was the case with the serial petitioners in *Ford*, there is no evidence of record in the present proceeding that Petitioner has “had any interactions or agreements regarding . . . [the] accused products” that might rise to the level of “relevant or extenuating facts or circumstances” indicative of a significant relationship. *Ford*, at 10–11; *cf. Valve*, at 10 (“Valve represented that ‘HTC’s [accused] VIVE devices incorporate certain Valve technologies under a technology license from Valve”).

⁶ *See Greenthread, LLC v. Cirrus Logic, Inc.*, No. 1-23-cv-00369 (W.D. Tex. Mar. 31, 2023) (accusing Cirrus Logic CLI1793B1 power management integrated circuit); *Greenthread, LLC v. Texas Instruments, Inc.*, No. 2-23-cv-00157 (E.D. Tex. April 6, 2023) (accusing Texas Instruments BQ25123); *Greenthread, LLC v. ON Semiconductor Corporation et al.*, No. 1-23-cv-00443 (D. Del. Apr. 21, 2023) (accusing ON Semiconductor AR0820AT); *Greenthread, LLC v. OmniVision Technologies, Inc.*, No. 2-23-cv-00212 (E.D. Tex. May 10, 2023) (accusing OmniVision OV24A1Q); *Greenthread, LLC v. Monolithic Power Systems, Inc.*, No. 1-23-cv-00579 (D. Del. May 26, 2023) (accusing MPS MP86905 monolithic halfbridge).

We agree with Petitioner that, “[u]nder the *General Plastics/Valve* analysis, any pretrial coordination between [it] and the other component manufacturers on invalidity contentions in the district court litigations” without more, “would not establish a significant relationship.” Prelim. Reply 3 (citing *Ford*, at 10 (holding that jointly filed invalidity contentions did not create a significant relationship); *Qualcomm Inc. v. Monterey Research*, IPR2020-01493, Paper 11 at 15–16 (PTAB Mar. 8, 2021); *Sony Mobile Commc’ns. AB v. Ancora Tech., Inc.*, IPR2021-00663, Paper 17 at 10 (PTAB June 10, 2021) (“A common desire to challenge the validity of the asserted patent without more is insufficient to establish that Petitioner Sony has a significant relationship with the other prior petitioners.”)). We further agree with Petitioner that Patent Owner does not point us to any authority to the contrary. *See, e.g.*, Prelim. Reply 3. Thus, we disagree with Patent Owner’s argument that “[t]he determining factor is not the accused product, but rather, the same claims of the same patent under challenge.” Prelim. Sur-reply 3

For the foregoing reasons, we determine that Petitioner has neither previously challenged the ’842 patent, nor does the record sufficiently support a finding that Petitioner has or had a significant relationship with any petitioner that has challenged the ’842 patent under the framework set forth in *Valve*. In view of this determination, *General Plastic* factor one necessarily outweighs the other *General Plastic* factors. Accordingly, we do not discretionarily deny the present Petition.

C. Timeliness of Petition Under 35 U.S.C. § 315(b)

Patent Owner argues that the Petition should be dismissed because it is untimely. Prelim. Resp. 20. Specifically, Patent Owner argues that

Petitioner is in privity with Intel Corp. (“Intel”) and [REDACTED]⁷
[REDACTED] Patent Owner refers to Intel and [REDACTED] collectively as
“Licensees”—who Patent Owner asserts are time-barred under 35 U.S.C.
§ 315(b) and licensed under Greenthread patents, including the ’842 patent.
Id. at 22.

Patent Owner advances several theories supporting its privity arguments, including that Petitioner serves as an “agent” of Licensees by exercising their “have made” rights under the license, that “Ppetitioner supplies the accused goods to Licensees,” that Petitioner is a beneficiary of the Licensee’s agreements related to accused products, that Petitioner and Licensees “are ‘preceding and succeeding owners of’ the licensed and/or infringing products,” and that Petitioner’s licensed sales encumber otherwise infringing articles. Prelim. Resp. 32–37 (emphasis omitted).

1. *Legal Standard*

Patent Owner does not assert that Petitioner was a party to, or named as a real party in interest in, any prior lawsuit involving the ’842 patent. “A person who is not a party to a suit generally has not had a ‘full and fair opportunity to litigate’ the claims and issues settled in that suit.” *Taylor v. Sturgell*, 553 U.S. 880, 892 (2008). Thus, in general, Petitioner should not be precluded from addressing the unpatentability of a patent based on the filing of previous lawsuits involving Intel or [REDACTED]. *See id.* (explaining that, in general, one is not bound by a judgment “in which he is not designated as a party or to which he has not been made a party by service of process”);

⁷ Because Patent Owner does not identify a particular [REDACTED] entity in the Preliminary Response, we understand the reference to [REDACTED] to refer to [REDACTED] which is named in Exhibits [REDACTED]. *See, e.g.*, Prelim. Resp. 21–22.

WesternGeco LLC v. ION Geophysical Corp., 889 F.3d 1308, 1319 (Fed. Cir. 2018) (noting the “general rule against nonparty preclusion”). This rule is deeply rooted in the “historic tradition that everyone should have his own day in court.” *Taylor*, 553 U.S. at 892–93 (quoting *Richards v. Jefferson Cty., Ala.*, 517 U.S. 793, 798 (1996)).

An exception to this deeply-rooted rule exists for parties that are in privity with a defendant in an earlier litigation. *See WesternGeco*, 889 F.3d at 1319 (noting that “the standards for the privity inquiry must be grounded in due process”). The Supreme Court in *Taylor* identified considerations where nonparty preclusion would be justified, including:

- (1) an agreement to be bound; (2) pre-existing substantive legal relationships between the person to be bound and a party to the judgment (e.g., “preceding and succeeding owners of property”); (3) adequate representation by someone with the same interests who was a party (e.g., “class actions” and “suits brought by trustees, guardians, and other fiduciaries”); (4) assumption of control over the litigation in which the judgment was rendered; (5) where the nonparty to an earlier litigation acts as a proxy for the named party to relitigate the same issues; and (6) a special statutory scheme expressly foreclosing successive litigation by nonlitigants.

Id. (citing *Taylor*, 553 U.S. at 894–95).

As this list of considerations indicates, “the mere existence of some relationship between a petitioner and another entity is not sufficient” to place that petitioner in privity with that entity. *Google LLC v. DDC Tech., LLC*, IPR2023-00707, Paper 27 at 37 (PTAB Oct. 25, 2023). Instead, “that relationship must be related to [an earlier] lawsuit and be sufficiently close that it can be fairly said the petitioner had a full and fair opportunity to litigate the validity of the patent in that lawsuit,” or the evidence must demonstrate “that petitioner is simply serving as a proxy to allow another

party to litigate the patent validity question that the other party raised in an earlier filed litigation.” *Id.*; *WesternGeco*, 889 F.3d at 1319; *see also Ventex Co. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00651, Paper 148, at 10, 12 (PTAB Jan. 24, 2019) (precedential) (finding privity where the two parties “had a specially structured, preexisting, and well-established business relationship with one another, including indemnification and exclusivity arrangements”).

A petitioner’s “initial identification of the real parties in interest [and privies] should be accepted unless and until disputed by a patent owner.” *Worlds Inc. v. Bungie, Inc.*, 903 F.3d 1237, 1244 (Fed. Cir. 2018). In order to raise such a dispute, “a patent owner must produce *some* evidence that tends to show that a particular [time-barred] third party should be named a [privity].” *Id.* The amount of evidence a patent owner must produce does not rise to the level of that required to overcome a burden of production. *Id.* at 1244 n.8. One potential formulation of the amount of evidence required is “evidence that ‘reasonably brings into question the accuracy of a petitioner’s’” assertion that it is not time-barred. *Id.* (quoting *Atlanta Gas Light Co. v. Bennett Regulator Guards, Inc.*, IPR2013-00453, Paper 88 (PTAB Jan. 6, 2015) (addressing the amount of evidence required from a patent owner to question a petitioner’s identification of the real parties-in-interest)). Although the “burden remains with the petitioner to establish” the timeliness of its petition, it need not respond until the patent owner reasonably brings into question the accuracy of its assertion that it is not time-barred. *Id.* at 1242.

2. *The Effect of the Earlier Suit on the Timeliness of the Present Petition*

Patent Owner alleges that “Intel and [REDACTED] were served with a complaint alleging infringement of the Challenged Patent on [REDACTED] [REDACTED]” and that “[REDACTED] was an [real party in interest] to the First Amended Complaint against [REDACTED] (served by [Electronic Case Files] on [REDACTED] [REDACTED]).” Prelim. Resp. 28 (citing Ex. 2002, 2, 4; Ex. 2001; Ex. 2003; Ex. 2008, 7). Thus, according to Patent Owner, “the Petition is untimely if Petitioner is in privity with Intel or [REDACTED].” *Id.*

Patent Owner argues that because [REDACTED] [REDACTED] [REDACTED] were served with an infringement complaint early enough to create a time bar, and because [REDACTED] was a real party-in-interest of [REDACTED] in that infringement case, [REDACTED] is time-barred under § 315(b). Prelim. Resp. 18–19 (arguing that [REDACTED] is time-barred because it was a real party-in-interest to the [REDACTED] litigation). Patent Owner presents no authority, however, for extending Section 315(b)’s time bar alleged to bar [REDACTED] as a real party in interest to [REDACTED] litigation, to further bar Petitioner in this proceeding as a conjectured privy of Petitioner. Thus, Patent Owner has produced no evidence that [REDACTED] is time-barred under § 315(b).

3. *Licensees as Alleged Privies*

In the subsections below, we address Patent Owner’s arguments that Licensees are privies of Petitioner under § 315(b).

a) *Agency*

Patent Owner argues that “Petitioner acts as the Licensees” “agent” by making accused products on their behalf under the “have made” clause of the license. Prelim. Resp. 35–37 (emphasis omitted). We disagree.

First, Patent Owner’s agency argument is not based on the applicable legal standard. For purposes of privity under § 315(b), the relevant question is whether Petitioner is acting as an agent for Licensees in filing a petition for *inter partes* review. *See Taylor*, 553 U.S. at 895 (“preclusion is appropriate when a nonparty later brings suit as an agent for a party who is bound by a judgment”). As the Federal Circuit explains, the rationale behind § 315(b)’s time bar is “to prevent successive challenges to a patent by those who previously have had the opportunity to make such challenges in prior litigation.” *WesternGeco*, 889 F.3d at 1319. Here, Patent Owner does not assert that Petitioner is acting as an agent for Licensees in this proceeding. Any such assertion would be appropriate only based on evidence that any of these entities is controlling Petitioner’s conduct in the proceeding. *See Taylor*, 553 U.S. at 906 (cautioning that “preclusion is appropriate only if the putative agent’s conduct of the suit is subject to the control of the party who is bound by the prior adjudication”). No such evidence is in this record.

Patent Owner argues that to be in privity with the Licensees, what matters is whether prior action concerned a matter within the agency. Prelim. Resp. 35 (citing *Herrion v. Children’s Hosp. Nat. Med. Ctr.*, 786 F. Supp. 2d 359 (D.D.C.), *aff’d*, 448 F. App’x 71 (D.C. Cir. 2011); *see id.* at 35–36 (citing *John Street Leasehold, LLC v. Cap. Mgmt. Res., L.P.*, 283 F.3d 73, 75 (2d Cir. 2002); *Fiumara v. Fireman’s Fund Ins. Cos.*, 746 F.2d 87 (1st Cir. 1984)). This conclusion, however, would significantly expand the analysis set forth in *Taylor*, which noted that preclusion is only appropriate if the putative agent’s conduct “is subject to the control of the party who is bound by the prior adjudication.” *Taylor*, 553 U.S. at 906 (explaining that “courts should be cautious about finding preclusion” on the basis of agency).

Moreover, the privity inquiry must take into account the rationale behind the preclusion provision in § 315(b), which “is to prevent successive challenges to a patent by those who previously have had the opportunity to make such challenges in prior litigation.” *WesternGeco*, 889 F.3d at 1319. Patent Owner’s broad interpretation would be inconsistent with this purpose.

Even if Patent Owner’s argument that a general agency relationship is sufficient to demonstrate privity for purposes of nonparty preclusion were on solid legal footing, it lacks factual support in the record. An “essential element[] of agency” is “the principal’s ‘right to direct or control the agent’s actions.’” *In re Google LLC*, 949 F.3d 1338, 1345 (Fed. Cir. 2020) (quoting *Meyer v. Holley*, 537 U.S. 280, 286 (2003)). Patent Owner does not argue in the Preliminary Response that either of Licensees has or had such a right with respect to Petitioner, or vice versa, much less direct us to any evidence that would tend to prove the existence of such a right. *See generally* Prelim. Resp.

b) Preceding and Succeeding Owners of Property

Patent Owner argues that Petitioner and Licensees are “preceding and succeeding owners” of “licensed and/or infringing products that Petitioner makes and supplies to Licensees.” Prelim. Resp. 32 (citing *Taylor*, 553 U.S. at 894). It is true that entities who are “preceding and succeeding owners of property” can be in privity with one another. *Taylor*, 553 U.S. at 894. This rule, however, is based on property law and “is extended or denied in an effort to protect conflicting property interests rather than an effort to implement concepts of participation or representation.” 18A C. Wright, A. Miller, & E. Cooper, *Federal Practice and Procedure* § 4448 (3d. ed. 2023); *see also id.* § 4462 (“Successive Property Relationships”) (“There is no independent reason to treat the defeated litigant as the representative of his

transferee. Preclusion is limited to the property involved in the judgment.”). As noted above, our relevant analysis is based on the relationships between the parties with respect to the prior proceedings or the Petition (e.g., participation or representation), not on property interests. *See WesternGeco*, 889 F.3d at 1319 (noting that the privity requirement is used “to prevent successive challenges to a patent by those who previously have had the opportunity to make such challenges in prior litigation”).

Moreover, the rule related to preceding and succeeding owners of property does not extend to the point where all manufacturers of allegedly infringing goods are in privity with the customers who buy those goods. *See, e.g., id.* at 1319–22 (the parties “had a contractual and fairly standard customer-manufacturer relationship regarding the accused product,” which “does not necessarily suggest that the relationship is sufficiently close that both” parties should be considered to be in privity); *Wi-Fi One, LLC v. Broadcom Corp.*, 887 F.3d 1329, 1340–41 (Fed. Cir. 2018) (same); *Samsung Elecs. Co. v. Netlist Inc.*, IPR2022-00615, Paper 64 at 22–26 (PTAB June 30, 2023) (same).

Patent Owner’s evidence that Petitioner’s products are components of Licensees’ products does not come close to suggesting that “it can be fairly said that the petitioner had a full and fair opportunity to litigate the validity of the patent” in the prior lawsuit, or that petitioner is serving as a proxy to allow any Licensee to again challenge the patent. *WesternGeco*, 889 F.3d at 1319; *see* Prelim. Resp. 5, 24. Thus, Patent Owner does not present evidence that lends support to a finding that Petitioner’s and Licensees’ status as preceding and succeeding owners of allegedly infringing products renders them privies for purposes of § 315(b).

c) Beneficiaries of License Agreement

Patent Owner argues that Petitioner and Licensees are privies because Petitioner is a “beneficiary” of Patent Owner’s licenses to [REDACTED] and Intel, which Patent Owner asserts are “directly related to” the accused products. Prelim. Resp. 33 (citing *Ventex*, IPR2017-00651, Paper 148 at 12). We disagree. Unlike the agreements in *Ventex*, Patent Owner’s licenses to Licensees are not evidence of a privity relationship between Petitioner and Licensees because Petitioner is not a party to the license agreements. Nor is there any argument that Petitioner is a third-party beneficiary of the licenses.

d) Patent Exhaustion

Patent Owner argues that the doctrine of patent exhaustion gives rise to privity because “after Petitioner sells products under the license, any downstream user of the article sold would have an exhaustion defense against [Patent Owner] Greenthread.” Prelim. Resp. 34. According to Patent Owner, “Petitioner is effectively providing rights to third-parties under the license and, therefore, is in privity with Licensees.” *Id.* at 35. We disagree. It is true that downstream purchasers and users of Licensees’ products that incorporate products made by Petitioner may have a license (or exhaustion) defense against any claim of infringement by Patent Owner. The relevant question, however, is ultimately whether the relationship between Petitioner and the Licensees is sufficiently close to justify denying Petitioner its day in court. *See Taylor*, 553 U.S. at 892. Patent Owner does not sufficiently explain why a license defense supports such a privity relationship between Petitioner and Licensees.

e) Conclusion as to Timeliness of the Petition

As noted above, privity concerns “whether the petitioner and the prior litigant’s relationship—as it relates to the [earlier] lawsuit—is sufficiently

close that it can be fairly said that the petitioner had a full and fair opportunity to litigate the validity of the patent in that lawsuit,” or “whether the petitioner is simply serving as a proxy to allow another party to litigate the patent validity question that the other party raised in an earlier filed litigation.” *WesternGeco*, 889 F.3d at 1319. A petitioner’s “initial identification of the real parties in interest [and privies] should be accepted unless and until disputed by a patent owner.” *Worlds*, 903 F.3d at 1244. In order to raise such a dispute, “a patent owner must produce *some* evidence that tends to show that a particular [time-barred] third party should be named a [privy].” *Id.* Here, Patent Owner argues that it has produced such evidence in several respects, but, on the present record, none of the evidence in question tends to show that any time-barred Licensee is a privy of Petitioner for purposes of § 315(b). As such, we find the evidence of record does not tend to suggest that Petitioner is time-barred under 35 U.S.C. § 315(b), or call into question Petitioner’s assertion that the Petition is timely-filed.

D. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey–Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986).

According to Petitioner,

[a] person of ordinary skill in the art (“POSITA”) of the subject matter of the ’842 Patent would have had a Bachelor’s degree in electrical engineering, material science, applied physics, or a related field, and four years of experience in semiconductor

design and manufacturing or equivalent work experience. Additional education might compensate for a deficiency in experience, and vice-versa.

Pet. 5 (citing Ex. 1003 ¶ 18).

Patent Owner does not dispute Petition's definition of level of ordinary skill. *See generally* Prelim. Resp.

For the purposes of this Decision, we adopt Petitioner's proposal regarding the level of one of ordinary skill in the art. The level of ordinary skill in the art is also reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

E. Claim Construction

In *inter partes* review proceedings such as this one, we construe claims using the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), as articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. *See* 37 C.F.R. § 42.100(b).

Petitioner states that it “does not propose any claim terms to be construed but reserves the right to respond to any claim constructions that may arise subsequent to the filing of this Petition.” Pet. 7. Petitioner provides a table showing the claim constructions adopted by the Western District of Texas in *Greenthread, LLC v. Cirrus Logic, Inc.*, No. 1-23-cv-00369-DC-DTG. *Id.* at 6–7.

Patent Owner does not dispute Petitioner's assertions. *See generally* Prelim. Resp.

At this stage of the proceeding, we determine that we do not need to expressly construe any terms to resolve the parties' disputes on the current

record.⁸ *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

F. Ground 1—Asserted Obviousness over Kawagoe

Petitioner argues that claims 1, 2, 4–9, and 12–18 would have been obvious in view of Kawagoe. Pet. 12–36. Patent Owner presents arguments for this ground. Prelim. Resp. 9–11. For the reasons that follow, at this stage of the proceeding, we are persuaded that Petitioner sufficiently demonstrates a reasonable likelihood that it would prevail in showing that at least independent claim 1 would have been obvious in view of Kawagoe.

1. Overview of Kawagoe (Ex. 1007)

Kawagoe discloses a process for manufacturing a semiconductor integrated circuit device using an epitaxial wafer, i.e., a semiconductor wafer having a semiconductor single crystal epitaxial layer grown over a polished semiconductor substrate. Ex. 1007, 1:13–27, 2:31–35. According to Kawagoe, “[t]he epitaxial wafer is advantageous in that it is excellent in suppressing the soft errors and resisting to the latchup,” as well as

⁸ If either party intends to argue claim construction at trial, including what is the plain and ordinary meaning of a term, they should do so in a clearly designated section of their briefing so as to expressly identify such arguments. *See, e.g.*, 37 C.F.R. § 42.104(b)(3) (content of petition); *see also* Patent Trial and Appeal Board Consolidated Trial Practice Guide (“CTPG”), 84 Fed. Reg. 64,280, at 46, 48–45 (Nov. 2019) (available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>). Claim construction arguments should not be relegated to patentability arguments on the facts.

“drastically reduc[ing] the defect density of the gate insulating film” of a semiconductor integrated device. *Id.* at 1:33–40.

Kawagoe discloses various “representative” processes, including processes in which the single crystal (epitaxial) layer contains an impurity of the same type and in the same concentration as the substrate body. Ex. 1007, 2:55–3:9. According to Kawagoe, the impurity concentration of the substrate body can be made higher than that of epitaxial layer “so that the resistance of the semiconductor substrate body can be relatively lowered to improve the resistance to the latchup.” *Id.* at 4:1–8. Kawagoe discloses a process for manufacturing a semiconductor integrated circuit device including a step of forming a semiconductor region (well) extending below the epitaxial layer and having an impurity concentration that decreases with increasing depth below the epitaxial layer. *Id.* at 3:10–25. According to Kawagoe, the well can be used for forming a complementary Metal-Oxide-Semiconductor.Field-Effect-Transistor (“MOS.FET”) circuit. *Id.* at 3:32–38.

Kawagoe describes seven embodiments, including Embodiment 1 (Ex. 1007, 6:41–12:40, Figs. 1–8) and Embodiment 4 (*id.* at 14:46–19:64, Figs. 16–25). According to Embodiment 1, a semiconductor integrated circuit device includes semiconductor substrate body 2S, epitaxial layer 2E, and gettering layer 2G. *Id.* at 6:51–56, Fig. 1. Substrate body 2S and epitaxial layer 2E are doped with p-type impurity in equal concentrations. *Id.* at 6:60–7:3, 10:51–55, 11:12–16. Embodiment 1 includes n-channel MOS.FET (“nMOS”) 4N and p-channel MOS.FET (“pMOS”) 4P, the latter being formed in n-well 6, which is doped with n-type impurity and extends below the epitaxial layer. *Id.* at 8:46–52, 9:32–40, 11:18–24, 11:43–50, Figs. 1, 5, 7.

According to Embodiment 4, substrate body 2S and epitaxial layer 2E are doped with p-type impurity, and the impurity concentration of substrate body 2S is higher than that of epitaxial layer 2E “to improve the resistance to the latchup.” Ex. 1007, 14:64–15:6, 15:13–17, 16:16–21, 19:59–63, Fig. 17. Embodiment 4 includes p-well 6p formed with nMOS 4N and n-well 6n formed with pMOS 4P. *Id.* at 15:26–40, 17:40–18:35, Figs. 16, 21–23. In Embodiment 4, the impurity concentration in p-well 6p and n-well 6n decreases with increasing depth below the epitaxial layer. *Id.* at 15:62–16:15, 17:55–61, Fig. 17. Kawagoe discloses that the concentration gradient reduces soft errors by attracting carriers (electrons) to the substrate and preventing them from entering the p-well. *Id.* at 16:2–11.

Petitioner relies on Kawagoe Figure 17, reproduced below, and which illustrates Embodiment 4 and its properties.

FIG. 17

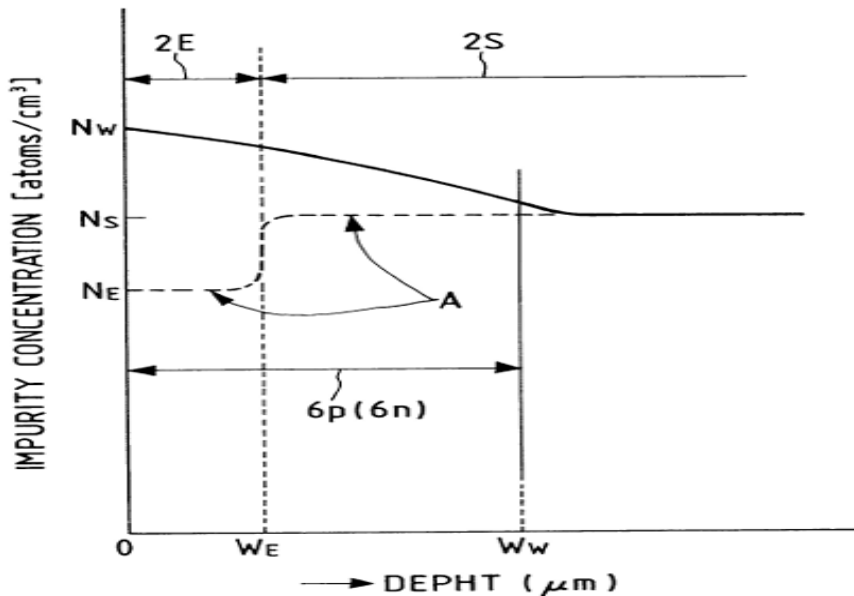


Figure 17 is a plot of impurity concentration as a function of depth in a semiconductor integrated circuit device, which shows “the p-well 6p and

n-well 6n have their impurity concentrations gradually lowered in the depthwise direction from the principal surface (having an impurity concentration N_w) of the epitaxial layer 2E.” Ex. 1007, 5:41–45, 15:62–16:40. Petitioner also relies on Kawagoe Figure 23, reproduced below, and which also illustrates Embodiment 4 and its properties.

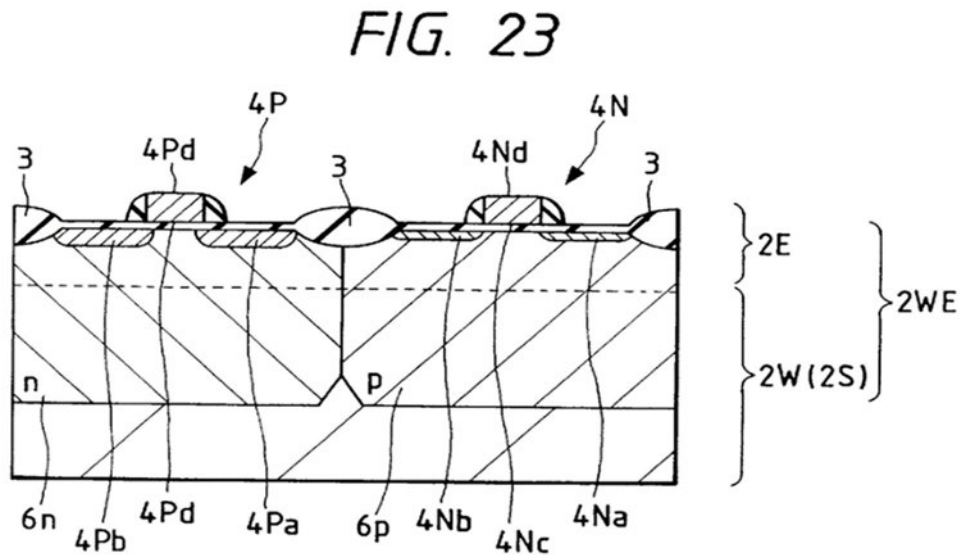


Figure 23 shows a step in a process for manufacturing a semiconductor integrated circuit device, including p-well 6p formed with nMOS 4N and n-well 6n formed with pMOS 4P. *Id.* at 6:1–4, 15:26–32, 18:3–35.

2. *Petitioner’s Initial Contentions for Claim 1*

[preamble] A semiconductor device, comprising:

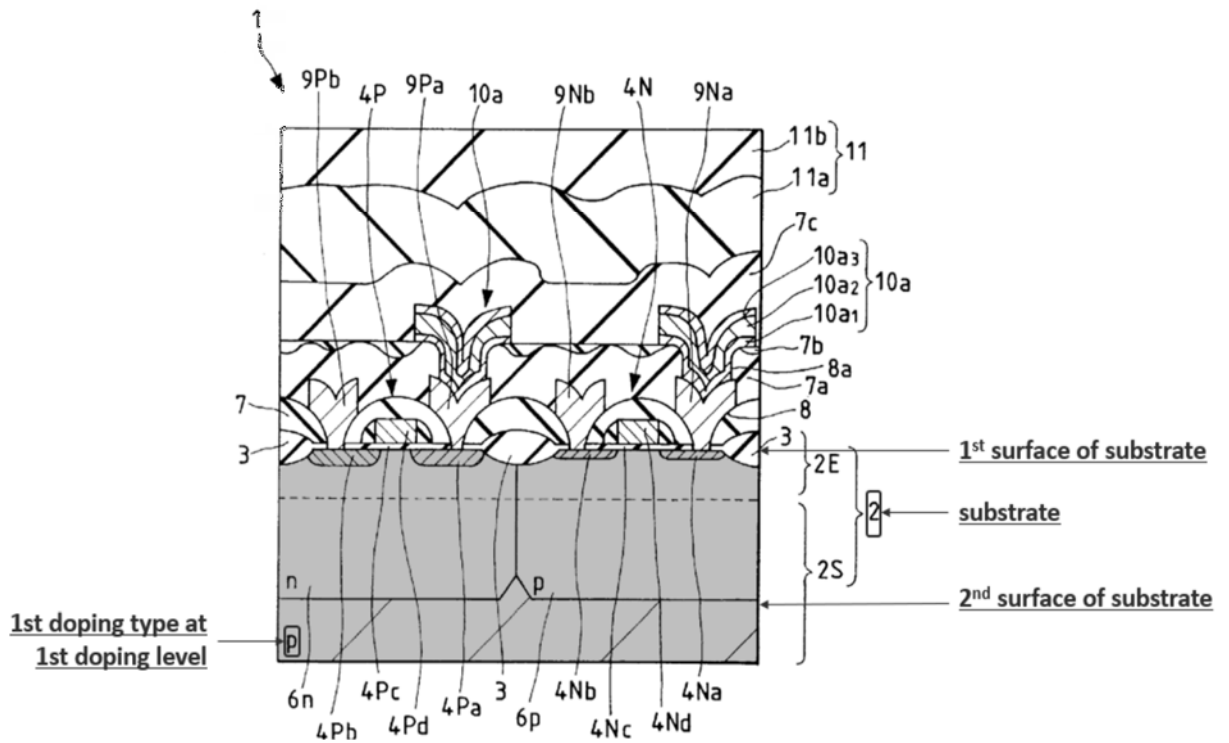
Without taking a position as to whether the preamble is limiting, Petitioner contends that “Kawagoe discloses a semiconductor device” and “teaches that the disclosed semiconductor integrated circuit devices (including MOSFET circuits and various VLSI circuits) can be used in various applications, including memory devices such as DRAM, SRAM, ROM, and semiconductor devices with logic circuits such as the so-called

‘microcomputer.’” Pet. 13 (citing Ex. 1007, 1:13–17, 24:21–31; Ex. 1003 ¶ 151).⁹

[1.1] a substrate of a first doping type at a first doping level having first and second surfaces;

According to Petitioner, “Kawagoe discloses a p-type substrate 2, *i.e.*, the claimed ‘a substrate of a first doping type at a first doping level.’” Pet. 13. In Petitioner’s annotated version of Kawagoe’s Figure 16, reproduced below, “p-type substrate 2 include[es] a p-type Si single crystal substrate body 2S and a p-type Si single crystal epitaxial layer 2E.” *Id.* (citing Ex. 1007, 14:61–15:12, 15:11, 15:26).

FIG. 16



⁹ At this stage of the proceeding, we need not determine whether the preamble of claim 1 is limiting because the applied reference teaches the subject matter set forth therein.

Petitioner's annotated version of Kawagoe's Figure 16 shows different surfaces of substrate 2. Pet. 14. According to Petitioner,

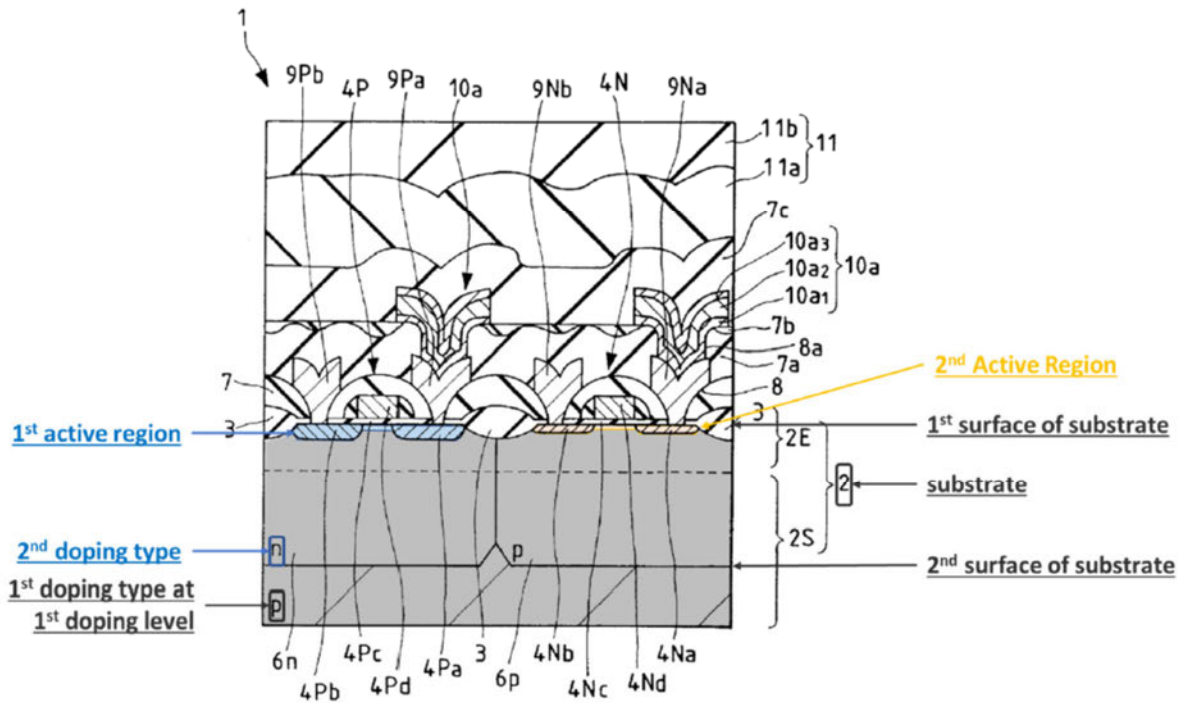
substrate 2 has various surfaces between different layers or components, and the claimed first and second surface of the substrate 2 are annotated below where the first surface is the top surface of epitaxial layer 2E of the substrate 2 and the second surface is the bottom surface of the N well 6n and the P well 6p.

Id. at 13–14 (footnote omitted). Thus, Petitioner contends, “Kawagoe’s substrate 2 [] satisfies the claimed ‘a substrate of a first doping type at a first doping level having first and second surfaces.’” *Id.* at 14 (citing Ex. 1003 ¶ 153); *see id.* at 13 (citing Ex. 1003 ¶¶ 152–157).

[1.2] a first active region disposed adjacent the first surface of the substrate with a second doping type opposite in conductivity to the first doping type and within which transistors can be formed;

Pointing to another annotated version of Kawagoe's Figure 16, reproduced below, Petitioner contends that “Kawagoe provides an n-well 6n that includes an active region (annotated blue, below), forming the source, drain, and channel of PMOS transistor 4P.” Pet. 16 (citing Ex. 1007,; 9:41–54; 15:26–36).

FIG. 16



Petitioner’s annotated version of Kawagoe’s Figure 16 illustrates first and second active regions of substrate 2. According to Petitioner, “[t]he claimed ‘first active region’ is in the n-type region-well 6n that is opposite in conductivity to the first doping type of the substrate 2 (*i.e.*, p-type).” *Id.* at 16 (citing Ex. 1007, 14:61–15:12, 15:26–28, 15:30–43). Petitioner contends that:

A POSITA would have understood that the active region’s channel region depicted in Kawagoe’s FIG. 16 . . . would remain n-type after forming the source and drain, and the claimed ‘a first active region . . . with a second doping type opposite in conductivity to the first doping type’ is satisfied by the PMOS formed in the n-well.

Id. at 16–17 (citing Ex. 1003 ¶ 161) (footnote omitted).

Petitioner further contends that “a POSITA would understand that the above-annotated ‘active region’ comprises a source, channel region, and

drain, that provides for conductivity and thusly is an active region.” Pet. 18. “The active region of a MOS transistor is known to be “[its] channel and [its] heavily doped source and drain regions.” *Id.* (citing Ex. 1003 ¶ 162; Ex. 1008, 299). According to Petitioner,

[t]his is also confirmed by Patent Owner’s arguments, where when discussing the term “active region . . . within which transistors can be formed” it argued that “this term means exactly what it says: an active region (*i.e.*, a doped region at the surface of a semiconductor device) where a transistor can be formed.”

Id. (citing Ex. 1030, 31). Petitioner accordingly contends that “Kawagoe [] discloses the claimed ‘active region.’” *Id.*

Petitioner further contends that

a POSITA would have understood that ‘a first active region disposed adjacent the first surface of the substrate’ means the first active region is disposed vertically adjacent the first surface of the substrate because the first active region in which transistors can be formed is below the top surface of the substrate to include the source, the drain and the channel region of a transistor.

Id. at 18–19 (citing Ex. 1003 ¶¶ 163–164); *see id.* at 16 (citing Ex. 1003 ¶¶ 158–165).

[1.3] a second active region separate from the first active region disposed adjacent to the first active region and within which transistors can be formed;

Petitioner contends that “Kawagoe’s FIG. 16 discloses a second active region . . . separate from, and adjacent to, the first active region.” Pet. 19 (citing Ex. 1007, 15:26–28). According to Petitioner, “[t]he p-well 6p is doped with a p-type impurity such as boron’ and ‘formed with the nMOS 4N.’” *Id.* (citing Ex. 1007, 15:28–30). Petitioner further contends “Kawagoe discloses that the semiconductor regions 4Na and 4Nb are regions for

forming the source-drain regions of the nMOS 4N.” *Id.* (citing Ex. 1007, 8:55–9:6, 18:9–38).

Petitioner further contends

[a]s discussed above in Element [1.2], a POSITA would understand that the claimed second active region encompasses a source, drain, and channel region. This is depicted in Kawagoe’s FIG. 16 where the NMOS transistor, having the claimed “second active region,” is formed.

In the context of Element [1.3], a POSITA would have understood “a second active region separate from the first active region disposed adjacent to the first active region” to mean a lateral adjacency between the first and second active regions because the first and second active regions are regions “in which transistors can be formed.” Similarly, in Kawagoe, the first active region in the n-well 6n associated with the PMOS transistor 4P and the second active region in the p-well 6p associated with the NMOS transistor 4N are adjacent to each other based on a lateral adjacency.

Pet. 20 (citing Ex. 1003 ¶ 168).

[1.4] transistors formed in at least one of the first active region or second active region; and

Petitioner relies on its arguments for limitations 1.2 and 1.3 for teaching limitation 1.4. Pet. 22 (citing Pet. §§ VII.A.1.c–d; Ex. 1003 ¶¶ 38–45, 168, 170).

[1.5] at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to aid carrier movement from the first surface to the second surface of the substrate.

Petitioner contends that Kawagoe’s “FIGS. 16 and 17 illustrate the claimed ‘at least a portion of at least one of the first and second active regions having at least one graded dopant concentration.’” Pet. 23. Petitioner further contends that

[Kawagoe's] FIG. 17 illustrates dopant concentration as a function of depth of the physical device depicted in FIG. 16. The first and second active regions (annotated in blue and tan) are at the first surface of the semiconductor device and have a graded dopant gradient so that carriers (*e.g.*, minority carriers, *i.e.*, electrons in the p-well 6p and holes in the n-well 6n, whose movement is annotated with the purple arrow) are attracted to the substrate to reduce errors.

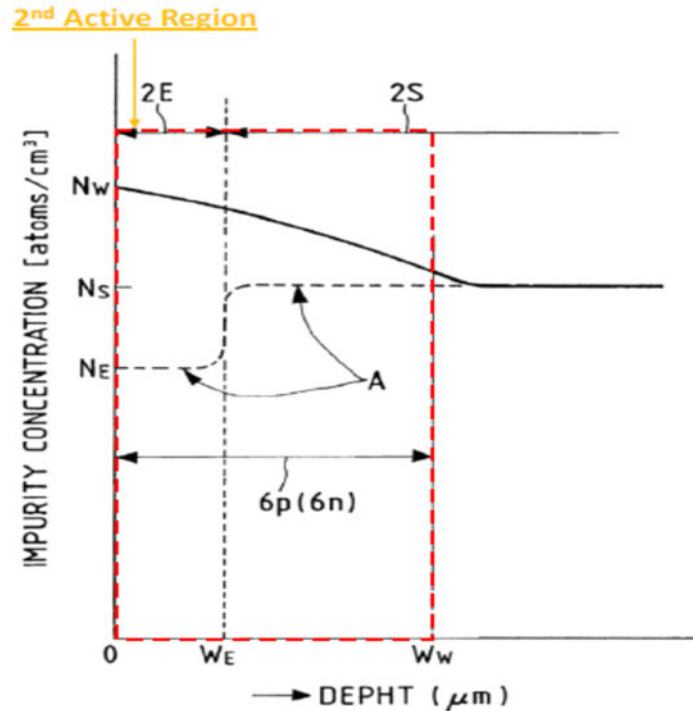
Id. (citing Ex. 1007, 14:46–67, 15:62–16:15).

Petitioner further contends that, “[a]s can be seen from FIGS. 16 and 17, the ‘second active region’ at the top surface of the p-well 6p in the substrate is where the downward dopant gradient begins, and it levels off shortly after the well 6p (red-dashed annotation).” Pet 23 (footnote omitted).

Pointing to its annotated version of Figure 17 of Kawagoe, reproduced below, Petitioner contends that

Kawagoe’s downward graded dopant concentration for each of the p-well 6p and n-well 6n is present from the top surface to the bottom surface of each well to generate a drift electric field to move their respective minority carriers downward to the bottom surface of each well, which the is second surface of the substrate 2 in Kawagoe.

Id. at 25 (citing Ex. 1003 ¶¶ 173–178).



Petitioner’s annotated version of Kawagoe’s Figure 17 depicts dopant concentration at the second active region. Pet. 24. “Therefore,” according to Petitioner “Kawagoe’s downward graded dopant concentration meets the claimed ‘to aid carrier movement from the first surface to the second surface of the substrate.’” *Id.* at 25.

Petitioner contends that

Kawagoe states that the impurity concentration of the p-well 6p is given such a gradient that it is gradually lowered in the depthwise direction from the surface of the epitaxial layer 2E, so that the influence to be caused by the carriers (or electrons) due to the α -ray is lowered . . . [Petitioner also contends that] the electrons produced by the α -ray are attracted to the substrate body 2S by that concentration gradient and prevented from entering the p-well 6p so that the soft errors can be reduced in case the MIS memory of the DRAM or the like is formed in the p-well 6p.

Id. at 25–26 (citing Ex. 1007, 16:2–11).

Accordingly, Petitioner contends, that “Kawagoe’s graded concentration at the active regions (and into the wells) thusly meets the claimed ‘to aid carrier movement from the first surface to the second surface of the substrate.’” *Id.* at 26.

Petitioner also contends that

[t]o the extent that the claimed second surface of the substrate in Element [1.5] is construed to be the outer bottom surface of the body substrate 2S in Kawagoe as described in Element [1.1], Kawagoe’s disclosure nonetheless renders obvious Element [1.5] because the downward graded dopant concentration in the first or second active region causes the minority carriers to move downward in the well region towards the bottom surface of the body substrate 2S of the substrate 2. This understanding is consistent with Patent Owner’s court-adopted claim construction arguments that the limitation only requires that the carriers be aided downward and not reach the end of the substrate.

Id. (citing Ex. 1003 ¶ 179; Ex. 1049, 25; Ex. 1050, 13).

3. Patent Owner’s Arguments for Claim 1

Patent Owner argues that the asserted references do not teach the limitations of “aid carrier movement” or “from the first surface to the second surface” as recited in claim 1. Prelim. Resp. 6. With respect to the prosecution history statement cited by Petitioner—that “[a downward-sloping] ‘graded dopant concentration were known and created an ‘inherent ‘built-in’ unidirectional electric field’”—Patent Owner asserts that Petitioner’s quotation of this statement is incomplete. *Id.* at 3 (citing Pet. 9; Ex. 1002, 286, 289–290). Patent Owner takes the position that it also argued “that the movement of carriers ‘[d]epend[s] on the particular slope of the graded concentration of dopant[s]’” and that this statement was made in response “to an Office Action regarding a claim that required a ‘single static unidirectional electric drift field to aid the movement of carriers.’” *Id.*

Pointing to the Examiner’s findings during prosecution of U.S. Patent Application No. 11/622,496, filed on Jan. 12, 2007, which matured into parent U.S. Patent No. 8,421,195 (“the ’195 patent”),¹⁰ Patent Owner contends that Dr. Campbell “offers no opinion about the strength of the force created by the dopant gradients, Dr. Campbell necessarily cannot not compare it to other forces acting on carriers” and that, “[t]o the extent Dr. Campbell identifies those other forces at all, he likewise does not assess their magnitude.” *Id.* at 12. “Consequently,” Patent Owner contends, “Dr. Campbell’s analysis fails to determine whether the force exerted by the specific dopant gradients would actually aid carrier movement, or be overwhelmed by other forces in the device.” *Id.* at 12–13.

Patent Owner contends that “Petitioner’s own references confirm that graded dopant concentrations do not necessarily *aid* carrier movement, because they teach using a graded concentration to *impede* carrier movement.” Prelim. Resp. 5. According to Patent Owner,

Nishizawa and Kawagoe are both concerned with naturally occurring α -rays striking a semiconductor device and generating free electrons in the substrate. These free electrons can disrupt the operation of the device during a “single event upset” (“SEU”). Nishizawa says that “*to prevent [the] flow of electrons, [during an α -ray strike] it is only necessary to form an impurity concentration gradient in the p+ type buried region....*” Kawagoe likewise describes a “concentration gradient” to “*prevent[] [these SEU-generated carriers] from entering the p-well.*”

¹⁰ Patent Owner contends that “during prosecution, the examiner said that in ‘a complex electronic device, movement of minority carriers is affected by multiple forces and fields’ and that a ‘drift field may attempt to apply a force on all minority carriers in a specific direction’ but that ‘without knowing other parameters of the device’ one cannot say whether the field would aid the movement of carriers.” Prelim. Resp. 4 (citing Ex. 1002, 270).

Id. (citing Ex. 1046, 28¹¹; Ex. 1007, 28¹² (“[T]he electrons produced by the α -ray are attracted to the substrate body 2S by that concentration gradient and *prevented from entering the p-well 6p* so that the soft errors can be reduced in case the MIS memory of the DRAM or the like is formed in the p-well 6p.”)).

In view of these disclosures, Patent Owner contends that “Petitioner’s own references confirm that graded dopant concentrations do not necessarily *aid* carrier movement, because they teach using a graded concentration to *impede* carrier movement,” and that “sometimes the ‘concentration gradient’ can ‘prevent[]’ carrier movement.” *Id.* (alteration in the original).

Patent Owner contends that:

The carriers Kawagoe describes are below “the p-well 6p”—the region that Petitioner identifies as the single drift layer—because Kawagoe says that they are “prevented from entering” 6p which is Petitioner’s drift layer . . . Kawagoe’s 6p extends to the very top of the device. Therefore, carriers travelling vertically could only enter 6p from below. Even if carriers could be located above 6p, those carriers would not satisfy the claim limitation. Those carriers would be in what Petitioner identifies as the active region. Since they are “prevented from entering” 6p, they would remain above 6p and Kawagoe’s gradient would not aid their movement downward. Nishizawa also confirms that Kawagoe is discussing carriers outside what Petitioner maps to the active region. Both Nishizawa and Kawagoe adopt dopant gradients as a solution to SEUs caused by α -ray strikes. Nothing in Kawagoe describes α -rays generating electrons in the active region of a

¹¹ Patent Owner appears to be quoting from column 18, lines 47 through 50 of Nishizawa.

¹² Patent Owner appears to be quoting from column 16, lines 7 through 11 of Kawagoe.

device and Nishizawa says that possibility can be “disregarded.”
The carriers Kawagoe addresses are all below 6p.

Prelim. Resp. 10; *id.* at n.5 (citing Ex. 1046, 29).

During prosecution of the ’195 patent, the Examiner rejected claims under the pre-AIA version of 35 U.S.C. § 112, first paragraph and found that “movement of minority carriers is affected by multiple forces and fields” and that “it does not appear that simply the presence of ‘a unidirectional drift field’ in itself can achieve ‘drawing all minority carriers from said surface layer to said substrate.’” Ex. 1002, 270. Patent Owner responded with following argument:

[A] unidirectional drift (electric) field necessarily affects all the present minority carriers in the same way - moving all minority carriers in the same direction because of the unidirectional drift due to the existence of the electric field. *See* “Physics and Technology of Semiconductor Devices,” A.S. Grove, pp. 224–225, John Wiley and Sons, Inc., New York, 1st Edition 1967 (“This same electric field will then be of such direction as to aid the motion of injected holes. Thus the injected minority carriers will now move not only by diffusion but also by drift due to the existence of this electric field.”). Depending on the particular slope of the graded concentration of dopant, all minority carriers are either swept “down” (from the surface layer to the substrate) or “up” (from the substrate to the surface layer). *See* Applicant’s Figs. 5(b) and 5(c).

Id. at 289.

Patent Owner further argued that the Examiner’s finding

appears to not consider that the graded dopant concentration itself creates a “built-in” electrical field that forces the movement of carriers into a particular direction, whereby the “direction” of the electrical field and the resulting direction of the carrier movement depends solely on the slope of the graded concentration of dopant. With regard to the existence of a “built-in” electric field created by a graded dopant density, . . . *this inherent “built-in” unidirectional electric field is the additional*

parameter for ensuring that all minority carriers are being moved in one direction and which parameter the Office Action deemed to be missing from the disclosure.

Id. at 289–290 (emphases added). Also, “without conceding Applicant’s position on this issue,” Patent Owner amended claims to eliminate reference to “all carriers” and instead, refer to “carriers.”¹³ *Id.*

4. *Analysis of Claim 1*

After considering the parties’ arguments and evidence, on the present record, we determine that Petitioner has shown sufficiently as supported by Dr. Campbell’s testimony that the cited portions of Kawagoe teach or suggest the subject matter of the preamble and limitations 1.1 through 1.5 of independent claim 1.

At this stage of the proceeding, we determine that the statements made by Patent Owner during prosecution of the ’195 patent contradict its arguments in the present proceeding. *See generally* Prelim. Resp. Based on the present record, Patent Owner’s statements during prosecution support a preliminary finding that a graded dopant concentration is enough to teach aiding carrier movement in a particular direction. Patent Owner does not dispute that Kawagoe has a graded dopant concentration in the active region at this stage of the proceeding. *See generally* Prelim. Resp; Prelim. Sur-reply. Patent Owner also does not dispute that Kawagoe’s transistor has carriers in the active region. *Id.*

¹³ The examined claims of the ’195 patent generally recited “a unidirectional drift field drawing all minority carriers from said surface layer to said substrate.” Ex. 1002, 251. Patent Owner amended the claims of the ’195 patent to recite “maintain[ing] a single static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate.” *Id.* at 286.

Petitioner presents evidence demonstrating that a graded dopant concentration results in an electric field, which exerts a force on charged particles that will move, or aid movement, of the carriers in a specific direction. *See, e.g.*, Pet. 23–26. Contrary to Patent Owner’s assertions, Petitioner is not arguing or assuming that “*any* ‘graded dopant concentration’ would *necessarily* ‘aid carrier movement,’” nor is Petitioner attempting to read out the “aid the movement of minority carriers” element. Prelim. Resp. 1–2.

Additionally, Patent Owner does not direct us to any discussion in the ’842 patent regarding a specific slope value that is necessary to “aid the movement of minority carriers,” either in isolation or in the presence of other forces that may act upon the carriers. Nor does Patent Owner direct us to any authority suggesting that we should demand more from the prior art disclosure in Kawagoe than is provided in the disclosure of the ’842 patent.

As to Patent Owner’s argument that Kawagoe does not disclose aiding the movement of carriers, but rather inhibiting carrier movement (*see* Prelim. Resp. 10–11, 10, n.5; Ex. 1007, 16:7–11), we preliminarily agree with Petitioner’s contention that the electric field in Kawagoe both helps carriers move from the active regions to the substrate (*see* Pet. 25 (citing Ex. 1007, 15:62–16:40)) and prevents carriers moving from the substrate to the p-well (*see id.* at 25–26 (citing Ex. 1007, 16:2–11)). Kawagoe expressly teaches that carriers (or electrons) will be created by alpha-ray strikes. Ex. 1007, 16:2–7. Moreover, there appears to be no real dispute that carriers will naturally be present in the active regions of Kawagoe, regardless of alpha-ray strikes, and Kawagoe discloses that the downward graded-dopant concentration will direct carriers into the substrate. *Id.* at 16:7–11.

At this stage of the proceeding, Petitioner has the better-supported position— Kawagoe more closely supports Petitioner’s position because it states that carriers are “attracted to the substrate body . . . by that concentration gradient.” Ex. 1007, 16:7–9.

In view of the above, we determine Petitioner’s assertion that Kawagoe teaches “at least a portion of at least one of the first and second active regions having at least one graded dopant concentration *to aid carrier movement from the first surface to the second surface of the substrate*” as recited in limitation 1.5 because Kawagoe has a graded dopant concentration is sufficient for purposes of institution. There is insufficient evidence on this record that any other additional parameter is necessary, present, or acting upon the carriers in Kawagoe’s system. At this stage of the proceeding, we credit Dr. Campbell’s testimony that Kawagoe teaches limitation 1.5. Ex. 1003 ¶¶ 171–180. Dr. Campbell’s testimony is consistent with, and supported by, other evidence in the record.

At this stage of proceeding, Patent Owner’s arguments are not supported by objective evidence. *See In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984) (lawyer arguments and conclusory statements which are unsupported by factual evidence are entitled to little probative value). The parties, however, are invited to further develop the evidence and arguments relevant to the above-identified issues during the course of this proceeding.

5. *Remaining Claims*

Petitioner relies on its showing for independent claim 1 to teach the limitations recited in independent claim 9. *See* Pet. 34–35. Petitioner also identifies where it contends the subject matter of dependent claims 2, 4–8, and 12–18 is disclosed in Kawagoe. *Id.* at 27–36.

In view of our determination that Petitioner establishes a reasonable likelihood for claim 1, and because Petitioner’s arguments and evidence for remaining claims 2, 4–9, and 12–18 (Pet. 27–36) are similar to Petitioner’s arguments and evidence for claim 1 (*id.* at 12–26) and are unopposed at this stage by Patent Owner (except for the issues discussed above with respect to independent claim 1), we determine that it is not necessary to provide an explicit analysis of Petitioner’s challenges to the remaining claims in order to provide guidance to the parties for the upcoming trial. CTPG at 64; *see* 37 C.F.R. § 42.108(a) (“When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”); *see SAS*, 138 S. Ct. at 1359–60 (holding that 35 U.S.C. § 314 forbids the Board’s prior “partial institution” practice).

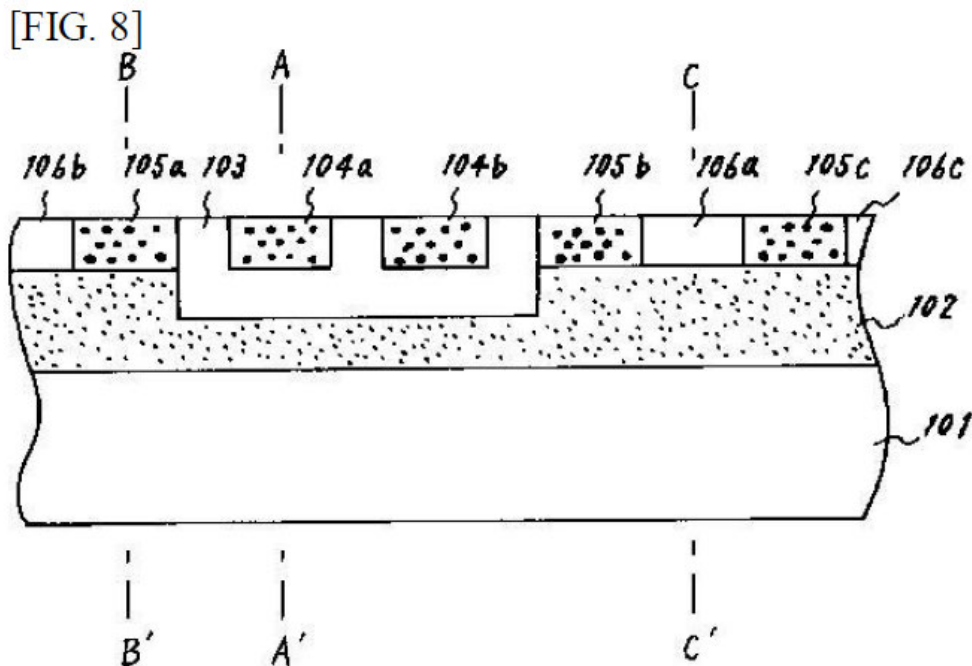
G. Ground 2—Asserted Obviousness over Onoda

Petitioner argues that claims 1, 2, 4–9, and 12–18 would have been obvious in view of Onoda. Pet. 5, 36–69. Patent Owner presents arguments for this ground. *See* Prelim. Resp. 6–9. For the reasons that follow, at this stage of the proceeding, we are persuaded that Petitioner sufficiently demonstrates that at least independent claim 1 would have been obvious in view of Onoda.

1. Overview of Onoda (Ex. 1042, 1043)

Onoda is titled “Semiconductor Integrated Circuit Device, Nonvolatile Semiconductor Storage Device, and Manufacturing Method” and describes “a nonvolatile semiconductor storage device with improved latch-up resistance and punch-through breakdown voltage and improved junction breakdown voltage between the well regions and the semiconductor substrate.” Ex. 1042, codes (54), (57). Onoda “relates to a semiconductor

integrated circuit device, to a nonvolatile semiconductor storage device, and to methods of manufacturing thereof, and, in particular, relates to a nonvolatile semiconductor storage device wherein a triple-well structure is formed in an epitaxial substrate.” *Id.* ¶ 1. Figure 8 of Onoda, reproduced below, “is a cross-sectional drawing illustrating, in step order [in conjunction with Figures 4–7], manufacturing of a semiconductor substrate 100 to which the first embodiment according to the present invention is applied.” *Id.* at 28.



Onoda’s Figure 8, in conjunction with Figures 4–7, depicts a method for manufacturing a flash memory structured as shown. *Id.* ¶ 46. Figure 8 depicts first semiconductor layer 101, which comprises a heavily-doped P-type silicon substrate (silicon wafer) with a dopant concentration of $1 \times 10^{19}/\text{cm}^3$ (*id.*) and lightly-doped P-type second semiconductor layer 102 wherein epitaxial layer 102a, as a whole, is between 1×10^{16} and $1 \times 10^{18}/\text{cm}^3$ (*id.* ¶ 47). Figure 8 also depicts N-type first well region 103 with a depth of about $3 \mu\text{m}$ and a dopant concentration of between 1×10^{15} and $1 \times$

$10^{18}/\text{cm}^3$. *Id.* ¶ 48. Also shown in Figure 8 are boron implantation layers 104A, 104B, 105A, 105B, and 105C, and phosphorus implantation layers 106A through 106C. *Id.* ¶ 49.

2. Petitioner’s Initial Contentions for Claim 1

[preamble] A semiconductor device, comprising:

Petitioner contends that Onoda discloses “a nonvolatile semiconductor storage device with improved latch-up resistance and punch-through breakdown voltage.” Pet. 38 (citing Ex. 1042, code (57), ¶¶ 6, 8–11). According to Petitioner, “Onoda’s semiconductor device discloses PMOS and NMOS transistors and fabrication methods.” *Id.* (citing Ex. 1042, claims 1, 7, and 8–12, ¶¶ 6, 7, 12–17); *see id.* (citing Ex. 1003 ¶ 70); *see supra* n.9 (declining to determine whether preamble is limiting).

[1.1] a substrate of a first doping type at a first doping level having first and second surfaces;

Pointing to its annotated version of Onoda’s Figure 3, Petitioner contends that “Onoda teaches a substrate that has a first and second surface” and that “Onoda’s ‘semiconductor substrate 100’ includes a first and second semiconductor layers 101/102.” Pet. 39 (citing Ex. 1003 ¶ 71; Ex. 1042 ¶ 43, Figs. 2, 3). Petitioner further contends that

Onoda’s “semiconductor substrate 100” (Onoda at [0043]) is doped to be p-type, and this satisfies the claimed “a substrate of a first doping type at a first doping level.” Onoda’s “semiconductor substrate 100” is made of “a first semiconductor layer made from a heavily-doped [] P-type silicon substrate” labeled as 101 and a p-type doped second semiconductor layer 102 on the top of the first semiconductor layer 101.

Id. (citing Ex. 1042 ¶¶ 41, 43).

[1.2] a first active region disposed adjacent the first surface of the substrate with a second doping type

opposite in conductivity to the first doping type and within which transistors can be formed;

Petitioner contends that “[t]he top portion of each n-well region 106a, 106b, 106c have PMOS transistors, and each of those transistors have an active region.” Pet. 41–42 (citing Ex. 1042 ¶¶ 43 (“106a, 106b, and 106c are N-type [] well regions”), 44 (“plurality of P-channel MOS transistors is formed in fourth well regions 106a, 106b, and 106c”). Petitioner further contends that “Onoda’s first active region is also where ‘within which transistors can be formed’” and that “[t]he top portion of each n-well (*i.e.*, 106a, 106b, or 106c), which has the claimed ‘first active region,’ also contains a transistor.” *Id.* at 42 (citing Ex. 1042 ¶¶ 41–45). Pointing to an annotated version of Onoda’s Figure 3, Petitioner contends that “a PMOS transistor (with its gate/source/drain annotated in red and a channel region remains annotated in blue) is formed in the first active region.” *Id.* (citing Ex. 1042 ¶¶ 29 (“a floating electrode formed over a channel region that is positioned between the source region and the drain region”), 41–45); *see id.* at 43–44; *see* Ex. 1003 ¶¶ 80–187).

[1.3] a second active region separate from the first active region disposed adjacent to the first active region and within which transistors can be formed;

Petitioner contends that “Onoda discloses a second active region formed in p-type wells 105a, 105b, and 105c, one of which is annotated tan below.” Pet. 45 (citing Ex. 1042 ¶¶ 43 (“105a, 105b, and 105c are P-type [] well regions”), 44, Claim 2 (“floating gate electrode formed over the second well region, positioned between the source region and the drain region”).

Pointing to an annotated version of Onoda’s Figure 3, Petitioner contends that “the second active region (tan) is ‘separate from the first active region’

(blue) and is ‘disposed adjacent to the first active region.’” *Id.* at 46.

Petitioner further contends that “the 2nd active region is a part of p-type well 105c and forms an NMOS transistor, while the 1st active region is a part of n-type well 106a and forms a PMOS transistor.” *Id.* (citing Ex. 1042 ¶¶ 29 (“a floating electrode formed over a channel region that is positioned between the source region and the drain region”), 44 (“the plurality of N-channel MOS transistors is formed in the third well regions 105a, 105b, and 105c, and the plurality of P-channel MOS transistors is formed in the fourth well regions 106a, 106b, and 106c”)); *see id.* at 47–48; Ex. 1003 ¶¶ 88–91).

[1.4] transistors formed in at least one of the first active region or second active region; and

Petitioner points to its showing for limitations 1.2 and 1.3 and contends that “Onoda discloses transistors that are formed in the first active region and the second active region, where the ‘first active region’ contains a P-MOS and the ‘second active region’ contains an N-MOS.” Pet. 48; *see id.* at 49.

[1.5] at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to aid carrier movement from the first surface to the second surface of the substrate; and

Referring to its showing for limitation 1.3, Petitioner contends that Onoda discloses “a second active region is formed within p-well region 105c” and “that the well region has a doping profile that is downward graded and, consequently, the active region would have the same doping profile because it is formed within the well region.” Pet. 49. Petitioner further contends that “Onoda’s FIG. 11 depicts the graded dopant profile across the p-type well regions 105a, 105b, 105c, which constitutes the ‘at least one

graded dopant concentration’ of the ‘at least a portion of at least one of the first and second active regions.’” *Id.* Petitioner also contends that “FIG. 11 is a cross sectional slice (B-B) through the device depicted in FIG. 8, which is the same embodiment as FIG. 3.” *Id.* (citing Ex. 1042 ¶¶ 41–45). Petitioner contends that

the dopant concentration decreases as a function of depth through the third well region 105a (p-type) and the second semiconductor layer 102 (p-type). Then, at the point where the slice reaches the semiconductor layer 101, the dopant concentration increases. (*Id.* at [0052]). Moreover, a POSITA would have understood that third well regions 105b and 105c would have the same dopant profile as region 105a, because the composition of all three regions are identical.

Id. at 49–50 (citing Ex. 1042 ¶ 52; Ex. 1003 ¶¶ 98–100); *see id.* at 50–57; Ex. 1003 ¶¶ 94–117).

3. Patent Owner’s Arguments for Claim 1

Patent Owner contends that “Petitioner points to Onoda (primary reference for Grounds II and III) for its disclosure of a graded dopant concentration,” but “does not point to anything in Onoda describing how a graded dopant concentration affects carrier movement at all” or how any disclosure in Onoda would “meet the ‘aid carrier movement’ or ‘from the first surface to the second surface’ limitations.” Prelim. Resp. 6. Patent Owner contends that “[f]or Ground II, to find these claim limitations in Onoda, Petitioner relies entirely on Greenthread’s purported admissions that a downward slope ‘creates an inherent’ electric field ‘to aid the movement of minority carriers.’” *Id.* (citing Prelim. Resp. § II.A; Pet. 52–53).

Patent Owner again argues that “during prosecution, the Office agreed that ‘without knowing other parameters of the device’ one cannot say whether the gradient would aid the movement of carriers.” *Id.* at 7 (citing

Ex. 1002, 270). According to Patent Owner, “[s]ince neither the Petition nor Dr. Campbell analyze ‘other parameters’ they cannot show whether Onoda’s concentration gradient would ‘aid carrier movement’ of carriers ‘from the first surface to the second surface,’” and “[t]herefore, Ground II fails to show how Onoda teaches this claim limitation.” *Id.*

4. *Analysis of Claim 1*

After considering the parties’ arguments and evidence, on the present record, we determine that Petitioner has shown sufficiently as supported by Dr. Campbell’s testimony that the cited portions of Onoda teach or suggest the subject matter of the preamble and limitations 1.1 through 1.5 of independent claim 1.

As set forth above, Patent Owner argued during prosecution that a graded dopant concentration creates an electric field that forces the movement of carriers in a particular direction, absent any discussion of the force exerted by the specific dopant gradients, whether any other forces are present, or the comparative magnitude of all forces present.. *See* Ex. 1002, 289–290. Furthermore, although Patent Owner now directs us to the Examiner’s findings during prosecution also set forth above (*see* Prelim. Resp. 4 (citing Ex. 1002, 270)), Patent Owner previously represented to the Patent Office that it disagreed with the Examiner’s position (*see* Ex. 1002, 289) and these comments were made with respect to claims that required *all* carriers be moved to the substrate, as opposed to merely aiding in their movement towards the substrate.

Our analysis of Petitioner’s challenge applying Onoda alone is substantially similar to the analysis set forth above with respect to Kawagoe. *Supra* § III.F.4. We do not repeat it in this section.

5. *Remaining Claims*

In view of our determination that Petitioner establishes a reasonable likelihood for claim 1, and because Petitioner’s arguments and evidence for remaining claims 2, 4–9, and 12–18 (Pet. 57–58) are similar to Petitioner’s arguments and evidence for independent claim 1 (*id.* at 36–57) and are essentially unopposed at this stage by Patent Owner (except for the issues discussed above with respect to independent claim 1), we determine that it is not necessary to provide an explicit analysis of Petitioner’s challenges to the remaining claims in order to provide guidance to the parties for the upcoming trial. CTPG at 64; *see* 37 C.F.R. § 42.108(a) (“When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”); *see SAS*, 138 S. Ct. at 1359–60 (holding that 35 U.S.C. § 314 forbids the Board’s prior “partial institution” practice).

H. Ground 3—Asserted Obviousness over Onoda and Nishizawa

Petitioner argues that claims 1, 2, 4–9, and 12–18 would have been obvious in view of Onoda in view of Nishizawa. Pet. 5, 69–76. Patent Owner presents the same arguments for this ground as for Onoda alone (Ground II). *See* Prelim. Resp. 6–9.

In view of our determination that Petitioner establishes a reasonable likelihood of prevailing on its challenge to independent claim 1 based on Onoda alone (Petitioner’s Ground II), we institute *inter partes* review. Because we find some grounds sufficient for institution, we institute on all grounds in the Petition. 37 C.F.R. § 42.108(a); *SAS*, 138 S. Ct. at 1353 (“The agency cannot curate the claims at issue but must decide them all.”); *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting

the statute as requiring “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”).

IV. CONCLUSION

After considering the evidence and arguments presented in the current record, we determine that Petitioner demonstrates a reasonable likelihood of success in proving that at least one of the challenged claims of the ’842 patent is unpatentable. We therefore institute trial on all challenged claims and grounds raised in the Petition.

At this stage of the proceeding, we have not made a final determination as to the patentability of any challenged claim or as to the construction of any claim term. Any final determination will be based on the record developed during trial. We place Patent Owner on express notice that any argument not asserted in a timely-filed Response to the Petition, or in another manner permitted during trial, shall be deemed waived, even if that argument was presented in the Preliminary Response.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1, 2, 4–9, and 12–18 of the ’842 patent is instituted with respect to all grounds set forth in the Petition;

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the ’842 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial;

FURTHER ORDERED that, in view of the pending motion to seal, this Decision is being filed “Board and Parties Only”; and

FURTHER ORDERED that after conferring with Petitioner, Patent Owner shall, within one week of this Decision, submit to the Board via email to Trials@uspto.gov, a version of this Decision to be filed on the public record, with any redactions proposed by either party.

IPR2024-00550
Patent 10,510,842 B2

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