

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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MONOLITHIC POWER SYSTEMS, INC.,  
Petitioner,

v.

GREENTHREAD, LLC,  
Patent Owner.

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Case IPR2024-00553  
U.S. Patent 11,316,014

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PATENT OWNER'S RESPONSE

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**EXHIBIT LIST**

| <b>Exhibit No.</b> | <b>Description</b>                                                                                                                                                                      | <b>Submitted Previously?</b> |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Ex. 2001           | <i>Greenthread, LLC v. Intel Corp.</i> , No. 6:22-cv-00105-ADA, Dkt. 1 (Complaint) (W.D. Tex. Jan. 27, 2022)                                                                            | X                            |
| Ex. 2002           | <i>Greenthread, LLC v. Intel Corp.</i> , No. 6:22-cv-00105-ADA, Dkt. 7 (summons returned executed) (W.D. Tex. Feb. 7, 2022)                                                             | X                            |
| Ex. 2003           | <i>Greenthread, LLC v. Intel Corp.</i> , 6:22-cv-00105-ADA, Dkt. 38 (First Amended Complaint for Patent Infringement) (W.D. Tex., filed Apr. 29, 2022)                                  | X                            |
| Ex. 2004           | <i>Greenthread, LLC v. Intel Corp.</i> , No. 6:22-cv-00105-ADA, Dkt. 113 (Redacted Memorandum Opinion and Order) (W.D. Tex. Dec. 27, 2022)                                              | X                            |
| Ex. 2005           | <i>Greenthread, LLC v. Intel Corp.</i> , 6:22-cv-00105-ADA, Dkt. 38-8 (Greenthread's Amended Preliminary Infringement Contentions) (W.D. Tex., filed Apr. 29, 2022)                     | X                            |
| Ex. 2006           | <i>Greenthread, LLC v. Intel Corp.</i> , 6:22-cv-00105-ADA, Dkt. 38-12 (Exs. D-1, D-2, D-3, D-6 to Greenthread's Preliminary Infringement Contentions) (W.D. Tex., filed Apr. 29, 2022) | X                            |
| Ex. 2007           | <i>Greenthread, LLC v. Intel Corp.</i> , 6:22-cv-00105-ADA, Dkt. 49 (Notice of Appearance of Additional Counsel) (W.D. Tex., filed June 9, 2022)                                        | X                            |
| Ex. 2008           | Petition (Paper 1) in <i>Sony Group Corp. v. Greenthread, LLC</i> , IPR2023-00376                                                                                                       | X                            |
| Ex. 2009           | <i>Greenthread, LLC v. Dell Inc.</i> , No. 6:22-cv-105-ADA, Dkt. 120 (Second Amended Complaint)                                                                                         | X                            |
| Ex. 2010           | <i>Greenthread, LLC v. Intel Corp.</i> , 6:22-cv-00105-ADA, Dkt. 135 (Motion for Admission Pro Hac Vice of L. Popovski on Behalf of Sony) (W.D. Tex., filed January 30, 2023)           | X                            |

| Exhibit No. | Description                                                                                                  | Submitted Previously? |
|-------------|--------------------------------------------------------------------------------------------------------------|-----------------------|
| Ex. 2011    | [SEALED] Confidential agreement                                                                              | X                     |
| Ex. 2012    | [SEALED] Confidential declaration                                                                            | X                     |
| Ex. 2013    | February 5, 2024 Neil Ozarkar email to counsel regarding IPR2014-00468, -00469, -00470                       | X                     |
| Ex. 2014    | February 21, 2024 Miguel Bombach email to counsel regarding IPR2014-00468, -00469, -00470                    | X                     |
| Ex. 2015    | May 10, 2024 Neil Ozarkar email to the Board regarding IPR2014-00550, -00551, -00552, -00553                 | X                     |
| Ex. 2016    | Greenthread's December 13, 2023 Preliminary Infringement Contentions to Monolithic                           | X                     |
| Ex. 2017    | Monolithic Power Systems, Inc., Investor/Analyst Day 2018 Presentation                                       | X                     |
| Ex. 2018    | Monolithic Power Systems, Inc. Q2 2021 Earnings Call Transcript                                              | X                     |
| Ex. 2019    | Monolithic Power Systems, Inc. Data Sheet MP2953B Intel VR12.5 Compliant Controller                          | X                     |
| Ex. 2020    | Monolithic Power Systems, Inc. LinkedIn post regarding Sony PlayStation 5                                    | X                     |
| Ex. 2021    | May 2, 2015 Investor's Business Daily, "Sony PlayStation 4 Chipmaker Monolithic Power Systems Tops Q1 Views" | X                     |
| Ex. 2022    | Monolithic Power Systems, Inc. 2023 Form 10-K                                                                | X                     |
| Ex. 2023    | Petition (Paper 2) in <i>Sony Group Corp. v. Greenthread, LLC</i> , IPR2023-00324                            | X                     |

| Exhibit No.      | Description                                                                                                                                     | Submitted Previously? |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Ex. 2024         | Petition (Paper 3) in <i>Sony Group Corp. v. Greenthread, LLC</i> , IPR2023-00325                                                               | X                     |
| Ex. 2025         | Petition (Paper 1) in <i>Sony Group Corp. v. Greenthread, LLC</i> , IPR2023-00375                                                               | X                     |
| Ex. 2026         | <i>Greenthread, LLC v. Monolithic Power Systems, Inc.</i> , No. 23-cv-579, Dkt. 1 (Complaint with accompanying exhibits) (D. Del. May 26, 2023) | X                     |
| Ex. 2027         | <i>Greenthread, LLC v. ON Semiconductor Corp.</i> , No. 23-443-RGA, Dkt. 24 (Scheduling Order) (D. Del. Sept. 11, 2023)                         | X                     |
| Ex. 2028         | Definition of “agent” in Black’s Law Dictionary (11 <sup>th</sup> ed. 2019) available from Westlaw at westlaw.com                               | X                     |
| Ex. 2029         | [RESERVED]                                                                                                                                      |                       |
| Ex. 2030         | U.S. Patent No. 8,704,292 to Disney                                                                                                             |                       |
| Ex. 2031 to 2033 | [RESERVED]                                                                                                                                      |                       |
| Ex. 2034         | [SEALED] Confidential agreement                                                                                                                 |                       |
| Ex. 2035 to 2056 | [RESERVED]                                                                                                                                      |                       |
| Ex. 2057         | Declaration of Dr. Alexander Glew                                                                                                               |                       |

| Exhibit No. | Description                                                                                                                                                                           | Submitted Previously? |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Ex. 2058    | Deposition Transcript of Dr. Stephen A. Campbell taken in <i>Semiconductor Components Indus., LLC v. Greenthread, LLC</i> , IPR2023-00468, -00469, and -00470, dated October 17, 2024 |                       |
| Ex. 2059    | Excerpts from Chen, J. Y., <u>CMOS Devices and Technology for VLSI</u> , Prentice-Hall (1990)                                                                                         |                       |
| Ex. 2060    | CV of Dr. Alexander Glew                                                                                                                                                              |                       |
| Ex. 2061    | U.S. Patent No. 8,421,195                                                                                                                                                             |                       |
| Ex. 2062    | U.S. Patent No. 9,190,502                                                                                                                                                             |                       |
| Ex. 2063    | U.S. Patent No. 10,510,842                                                                                                                                                            |                       |
| Ex. 2064    | U.S. Patent No. 11,121,222                                                                                                                                                            |                       |
| Ex. 2065    | U.S. Patent No. 10,734,481                                                                                                                                                            |                       |
| Ex. 2066    | U.S. Patent No. 11,316,014                                                                                                                                                            |                       |
| Ex. 2067    | File History of U.S. Patent No. 9,190,502                                                                                                                                             |                       |
| Ex. 2068    | File History of U.S. Patent No. 10,510,842                                                                                                                                            |                       |
| Ex. 2069    | File History of U.S. Patent No. 11,121,222                                                                                                                                            |                       |

| Exhibit No.      | Description                                                                                                                                                                | Submitted Previously? |
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| Ex. 2070         | File History of U.S. Patent No. 10,734,481                                                                                                                                 |                       |
| Ex. 2071         | File History of U.S. Patent No. 11,316,014                                                                                                                                 |                       |
| Ex. 2072         | [SEALED] Declaration of Mohan Rao                                                                                                                                          |                       |
| Ex. 2073         | Statista Information                                                                                                                                                       |                       |
| Ex. 2074         | <i>Greenthread, LLC v. Cirrus Logic Inc.</i> , No. 1:23-cv-369-DC-DTG, Dkt. 53 (Claim Construction Order and Memorandum in Support Thereof) (W.D. Tex. Mar. 13, 2024)      |                       |
| Ex. 2075         | <i>Greenthread, LLC v. Samsung Electronics Co., Ltd. Et Al.</i> , 2:19-cv-00147, Dkt. No. 67 (Claim Construction Memorandum Opinion and Order) (E.D. Tex. Apr. 20, 2020)   |                       |
| Ex. 2076 to 2079 | [RESERVED]                                                                                                                                                                 |                       |
| Ex. 2080         | Email from PTAB Board to Patent Owner and Petitioners, dated December 13, 2024.                                                                                            |                       |
| Ex. 2081 to 2084 | [RESERVED]                                                                                                                                                                 |                       |
| Ex. 2085         | Transcript of Deposition of Dr. Stephen A. Campbell, <i>Monolithic Power Systems, Inc. v. Greenthread, LLC</i> , IPR2024-00550, -00551, -00552, -00553, November 22, 2024. |                       |

## I. INTRODUCTION<sup>1</sup>

The Petition fails, because Petitioners' references do not teach "one graded dopant concentration to aid carrier movement from the first and second active regions towards an area of the substrate where there are no active regions," or "the graded dopant region to aid carrier movement from the surface towards the area of the substrate where there are no active regions."

Petitioner's primary reference, Kawagoe, does not teach anything about "aiding carrier movement" in the active region or surface of a device. The Petition claims that Kawagoe shows a graded dopant concentration in wells would aid carrier movement from the active region (surface) towards the substrate. But Kawagoe never says that is the effect or purpose of the dopant concentrations it describes. Rather, Petitioner *admits* that Kawagoe is discussing carriers in the substrate below the p-well—*not in the active region*. Kawagoe says that carriers in the *substrate* are "prevented from entering the p-well 6p." Kawagoe says nothing at all about carriers *in the active region*, as recited in the claims.

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<sup>1</sup> Patent Owner Greenthread, LLC submits this Response to the decision to institute IPR ("Decision") and to the Petition for *Inter Partes* Review ("Petition") filed by Monolithic Power Systems, Inc. ("Monolithic" or "Petitioner").

Petitioner's other principal references fare no better. Onoda does not discuss graded dopants moving carriers *anywhere*. Onoda simply has a doping concentration that Petitioner claims is graded. Nishizawa, like Kawagoe, discusses keeping carriers at the bottom of the device from moving upwards. It says that carriers in the surface or active regions can be "disregarded," because they are not relevant to the problem Nishizawa (and Kawagoe) were trying to solve.

In the absence of any teaching of the claim limitation in the prior art, Petitioner has two options: 1) it can read "aid carrier movement from the first surface" (or active region) out of the claim or 2) it can argue that any "graded dopant concentration" in the active region will "aid carrier movement." Both options fail.

The first option is clearly wrong, because it is "contrary to the well-established rule that claims are interpreted with an eye toward giving effect to all terms in the claim." *Digital-Vending Servs. Int'l, LLC v. Univ. of Phoenix, Inc.*, 672 F.3d 1270, 1275 (Fed. Cir. 2012) (internal quotation marks omitted). Petitioners cannot ignore a claim limitation. Moreover, two district courts have interpreted the claims to require more than a mere doping gradient. Ex. 2074, 39-40; Ex. 2075, 15. The Board should reject Petitioners' attempt to re-interpret the plain language of the claims.

The second option—inherency—also fails. The "probability or possibility" that a dopant gradient aids carrier movement "is insufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). The prior art "must *necessarily* include the unstated

limitation.” *Transclean Corp. v. Bridgewood Servs., Inc.*, 290 F.3d 1364, 1373 (Fed. Cir. 2002) (emphasis in original). Petitioners cannot possibly overcome this high bar.

Petitioner’s expert, Dr. Campbell, admitted that in order to aid minority carrier movement, the electric field created by a dopant gradient must be “properly constructed” and must “have a sufficient electric field intensity.” Ex. 1003, ¶33; Ex. 2058<sup>2</sup> (Deposition of Dr. Campbell on Oct. 17, 2024), 34:1-14. However, Dr. Campbell admitted that he did not analyze factors relevant to the “proper construction” of the electric field, including temperature, capacitance effects at PN junctions, and imperfections in the silicon crystal. Ex. 2058, 34:15-36:19; 39:8-12; *see also id.* at 20:7-10 (“[Q.] So, you didn’t calculate the electric field for any of the

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<sup>2</sup> Ex. 2058 is a transcript of Dr. Campbell’s first deposition, taken on October 17, 2024, for IPR2024-00468, IPR2024-00469, and IPR2024-00470, which are Petitioner’s IPRs on three other related Greenthread patents. Dr. Campbell conducted a second, more limited deposition, on November 22, 2024 for this IPR and other related IPRs by Petitioner (IPR2024-00550, IPR2024-00551, IPR2024-00552, and IPR2024-00553). Dr. Campbell indicated in the second deposition that he stood by and agreed with his testimony from the first deposition, with the exception of one point unrelated to the cited testimony. Ex. 2085, 8:20-13:21.

prior art cited in your declaration? [A.] That's correct."). The Petition and Dr. Campbell's report also makes no mention of the "intensity" of the electric fields in the references. Additional evidence confirms the holes in Dr. Campbell's testimony. Ex. 2080.<sup>3</sup>

Finally, objective indicia of non-obviousness confirm the patentability of Greenthread's claims. Two multibillion-dollar semiconductor companies, [REDACTED], paid for licenses covering *just the patent family at issue here without any threat of litigation*. Moreover, Greenthread has never threatened litigation against those companies. These companies approached Greenthread first. If either company had wanted to, it could have challenged Greenthread's patents at virtually no expense. At the time of the licenses, [REDACTED] had IPRs pending against Greenthread's patents. [REDACTED] could have joined those petitions or filed their own (as they regularly do). There is no plausible explanation for these transactions, except that two of Petitioner's competitors looked at the evidence and

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<sup>3</sup> Based on the Board's December 13, 2024 e-mail, Greenthread understands that it is not permitted to include this additional evidence in the record and or seek reconsideration of the Board's decision. Greenthread mentions the issue here and includes the Board's email as an exhibit to preserve its ability to appeal the Board's decision regarding this evidence.

came to the opposite conclusion than Petitioner urges here. The Board should reach the same conclusion as [REDACTED] and confirm the patentability of the Challenged Claims.

## II. THE CHALLENGED PATENT

At the time of invention of the Challenged Patent, most semiconductor devices relied on spatially uniform concentrations of dopants. Ex. 2061, Abstract, 1:64-2:11.<sup>4</sup> Dr. Rao (the named inventor) recognized, however, that graded concentrations of dopants can be used to improve certain aspects of the performance of transistors and other semiconductor devices. *Id.*, Abstract, 3:36-47, 4:1-3. The claimed invention is clearly disclosed in, e.g., Figs. 5B-5C of the Challenged Patent, and the corresponding parts of the specification. Ex. 2057, ¶34; *id.* at ¶¶34-37; *see also id.* at ¶¶1-33 (Dr. Glew’s background and overview of relevant technology).

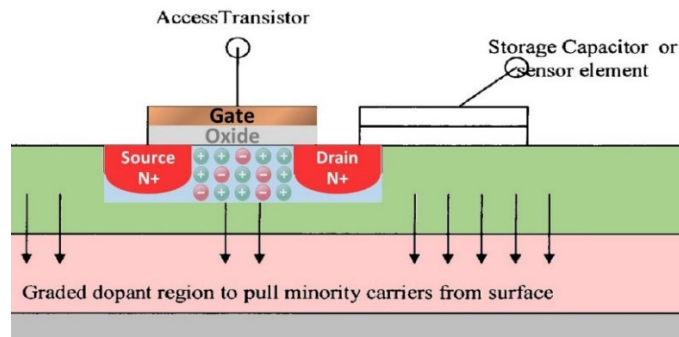
A surface-channel MOSFET is a common type of transistor capable of controlling current flow at or along the surface of the semiconductor substrate. Ex. 2059, 27 (“carriers propagate at the semiconductor surface”). Figure 5B shows an NMOS<sup>5</sup> transistor that is formed in a p-type surface layer. Ex. 2061. The transistor

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<sup>4</sup> Citations are made to the ’014 Patent, Ex. 2066, but each of Greenthread’s Challenged Patents have similar substantive disclosures.

<sup>5</sup> MOS stands for “metal oxide semiconductor.” Ex. 2057, ¶35 n.1.

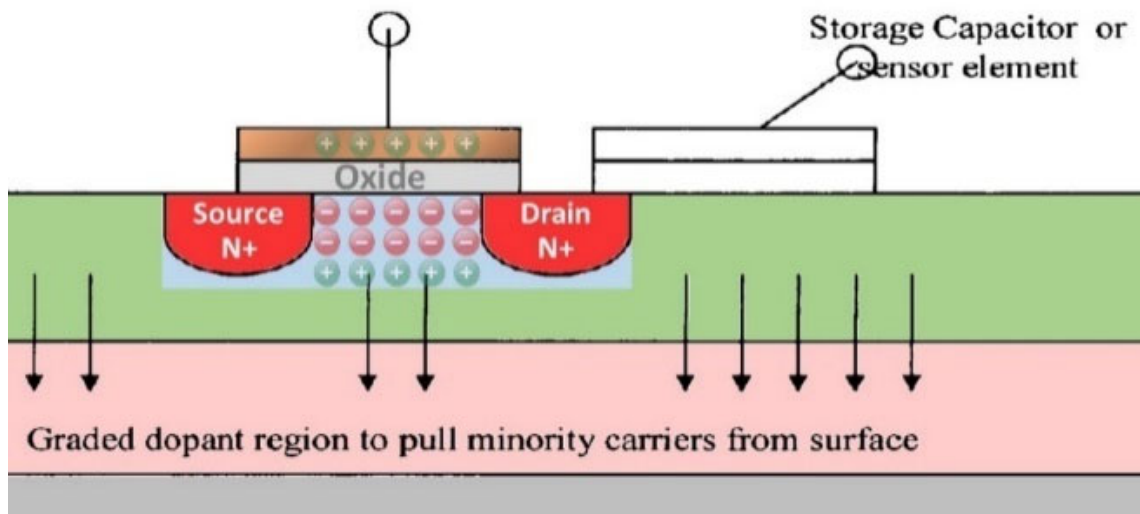
comprises (1) a gate; (2) a thin oxide separating the gate from the surface layer; and (3) two doped regions called the source and drain (shaded red). Ex. 2061, 3:44-45 (“electrons can be swept from source to drain”), 4:10-11 (“accelerate majority carriers towards the drain”). In Fig. 5B, the N<sup>+</sup> means these regions are heavily doped with an n-type dopant that creates a surplus of negative carriers (i.e., electrons).<sup>6</sup> The specification explains that the NMOS transistor in Fig. 5B can be a surface-channel MOSFET. Ex. 2057, ¶35.



*Id.*, ¶35 (explaining Fig. 5B above); Ex. 2061, 4:9-11. Meanwhile, the p-type silicon between the source and drain (shaded blue) has an abundance of positively charged holes (green circles). When the holes separate the source’s electrons from the drain’s electrons, current cannot flow through the transistor, and the transistor is in an “off” state. Ex. 2057, ¶¶34-35.

<sup>6</sup> An “N” region or layer has more electrons, and thus a “negative charge.” A “P” layer has more holes, and a “positive charge.” A “+” or “-” means heavily or lightly doped. Ex. 2057, ¶35 n.2.

When a positive voltage is applied to the gate, an electric field forms in the oxide. *Id.*, ¶36. This positive electric field repels the “positive” holes downwards, while the negative electrons (red circles) are attracted to move into the blue surface layer. *Id.* When enough electrons have accumulated in the surface layer below the oxide, they form a conductive channel of electrons between the source and the drain, and current can begin to flow through the transistor.



Ex. 2057, ¶36.<sup>7</sup> In order to turn the transistor “off,” the positive voltage is removed from the gate and the channel disappears as the holes return to the surface layer. *Id.*

Dr. Rao recognized that by using graded concentrations of dopants in the well region and a drift layer (shaded pink), it is possible to “pull” carriers from the

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<sup>7</sup> Because the channel is formed by electrons with a negative charge, the MOSFET is referred to as an n-channel MOSFET, and the “minority carriers” are holes. Ex. 2057, ¶36 n.3.

silicon's surface. Ex. 2061, Fig. 5B (annotated above). In this example, pulling the holes from the surface layer when a positive voltage is applied to the gate, allows the transistor to turn "on" more quickly. This improves the speed and performance of the transistor. Ex. 2057, ¶37; Ex. 2061, 3:42-47.

### **III. ALLEGED PRIOR ART**

The Petition's primary references include Kawagoe (Ground I) and Onoda (Grounds II, III). The Petition also uses Nishizawa in Ground III as a secondary reference. Dr. Glew provides an overview of pertinent portions of these references relevant to the present dispute. Ex. 2057, ¶¶38-49.

### **IV. LEVEL OF ORDINARY SKILL**

A person of ordinary skill in the art (POSITA) in the technology field of the Challenged Patent would be a person with at least a Bachelor's of Science degree in electrical or computer engineering, materials science, chemical engineering, applied physics, or a related field, with emphasis on semiconductor manufacturing, or an equivalent degree, and at least four years of experience in semiconductor design and manufacturing. Additional education in a relevant field or industry experience may compensate for a deficit in one of the other aspects of the requirements stated above. Ex. 2057, ¶¶17-18.

### **V. CLAIM CONSTRUCTION**

The claims in an IPR are construed using the same standard that applies in district court proceedings, as set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed.

Cir. 2005) (en banc); 37 C.F.R. § 100(b) (2019). “The Board only construes the claims when necessary to resolve the underlying controversy. *Toyota Motor Corp. v. Cellport Systems, Inc.*, IPR2015-00633, Paper 11 at 16 (PTAB Aug. 14, 2015) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). Patent Owner does not believe express claim construction is necessary for any claim terms of the Challenged Claims. Each term of the Challenged Claims should be given its plain and ordinary meaning. Ex. 2057, ¶¶20-25, 50.

However, as discussed below, Petitioner’s argument rests on an improper collapsing of the terms “graded concentration of dopants” and “aid the movement of carriers.” Further, Petitioner suggests that the “aid carrier movement” limitation can be met in situations where there is no carrier movement—an absurd result. *Infra* Section VI.A.1. This is contrary to the position of Petitioner’s expert which interpreted aiding movement to “sweep” i.e. move. Ex. 1003, ¶43. Petitioner’s position is also contrary to district court claim construction orders regarding the same patent family. The Western District of Texas unequivocally stated, “a graded concentration...that is [not ‘sufficiently graded’] will not aid in the movement of minority carriers[.]” Ex. 2074, 39-40. And the Eastern District of Texas understood that direction alone does not determine whether a gradient aids carrier movement—the **magnitude** of the gradient must also be considered. Ex. 2075, 15 (explaining that “the slope [of the gradient] has both a direction and a magnitude and [d]efendant

[incorrectly] suggests that the direction of the drift electric field depends solely on *the direction* of the slope of the graded concentration”) (emphasis in original). In light of Petitioner’s positions, the Board should clarify that these are separate terms and that the plain and ordinary meaning of “aid carrier movement” requires that a carrier move in the specified direction.

## **VI. THE CITED REFERENCES DO NOT RENDER OBVIOUS THE CHALLENGED CLAIMS**

The Petition is deficient because it fails to establish that the references identified in the Petition teach or render obvious at least the “aid carrier movement” limitations which are found in the challenged independent claims.

### **A. “Graded” does not mean “aided” and “aided” is not inherent in “graded.”**

Petitioner’s references do not teach the “aid carrier movement” claim limitations. Therefore, to locate “aid carrier movement” in the prior art, the Petition assumes that *any* “graded dopant concentration” will “aid carrier movement.” Petitioner is wrong.

#### **1. A “graded concentration of dopants” does not inherently “aid carrier movement.”**

Petitioner’s expert admitted in his report that a graded concentration of dopants does not inherently aid minority carrier movement. His report states that “an electric field *that is properly constructed* will push the minority carriers away from the surface.” Ex. 1003, ¶32 (emphasis added).

Dr. Campbell re-confirmed his understanding during his second deposition. He testified that “[t]he electric field [from a gradient] will provide a force” but “[t]here may be other forces acting upon the carriers, and you have to add all of the forces.” Ex. 2085, 42:12-17; *id.* at 95:14-17 (Q. ... “[Y]ou would have to look at the other forces in order to determine what actually happens? A. Yes, that is always true.”); 154:15-18 (“Q. And why is it important to look at the net effect of the forces? A. Because that is what determines the movement ....”);.

Dr. Campbell specifically identified other forces that need to be considered when determining the effect of a doping gradient. These include temperature, capacitance effects at the PN junction, and imperfections in the silicon crystal. *Id.* at 34:15-36:19; 39:8-12. Patent Owner’s expert Dr. Glew, agrees and Dr. Campbell’s admissions are echoes of the Western District of Texas *Markman* order which said “a graded concentration...that is [not ‘sufficiently graded’] will not aid in the movement of minority carriers[.]” Ex. 2074, 39-40; Ex. 2057, ¶¶55-56.

Yet, nothing in Dr. Campbell’s report addresses the “intensity” of the electrical fields or the “other forces” he says are necessary to determine carrier movement. To the contrary, Dr. Campbell claims he did calculations of the electric fields in the prior art references, but simply omitted them. Ex. 2058, 20:7-21:9.

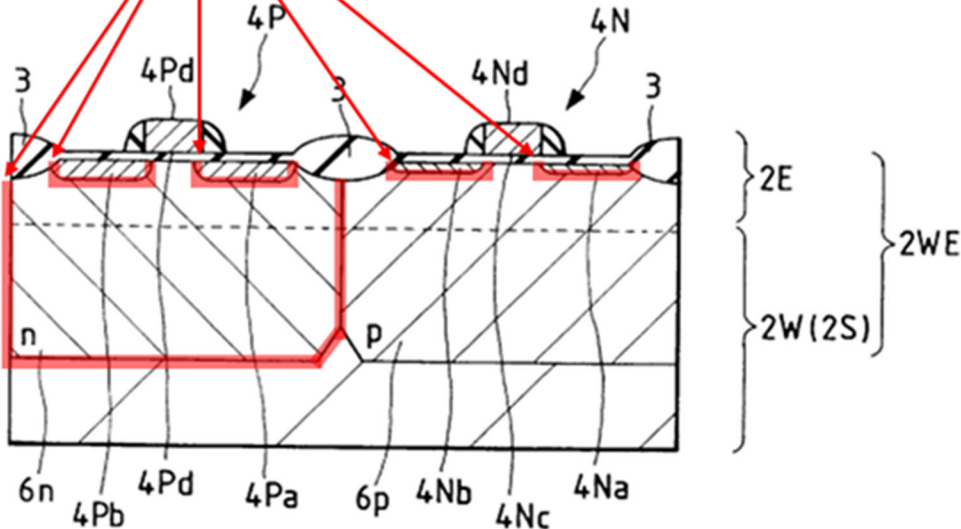
With respect to temperature, Dr. Campbell testified that he would expect different performance from a doping gradient depending on the operating

temperature of the device. Ex. 2085, 113:6-114:4; 115:2-20. Yet, Dr. Campbell does not discuss the operating temperatures of the prior art devices in his report.

With regards to PN junction capacitance Dr. Campbell testified that “[i]t creates a fairly substantial electric field in the depletion region ... near the junction,” which he said is in addition to the field created by the dopant gradient. Ex. 2058 at 35:22-36:4; Ex. 2057 ¶60. Petitioner’s representations to the Office also confirms that capacitance effects must be considered to determine the effect of a graded dopant profile: Ex. 2030 (U.S. Patent No. 8,704,292) at 7:4-7 (“*a graded doping profile, in combination with the capacitive depletion effect ..., may provide a substantially uniform electric field within the drift region.*”) (emphasis added). Again, however, the Petition and Dr. Campbell’s report do not discuss the PN junctions in the prior art devices.

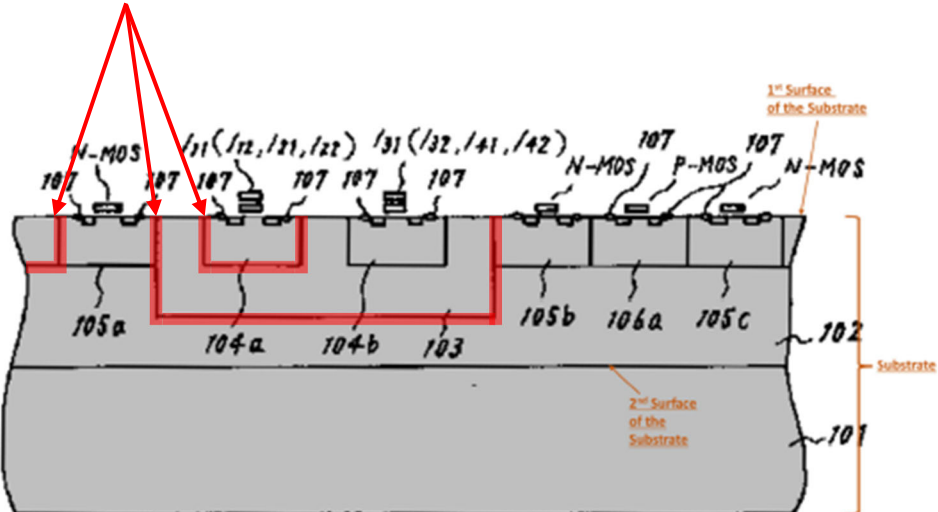
PN Junctions in Kawagoe create a “substantial electric field” not addressed by Petition

FIG. 23

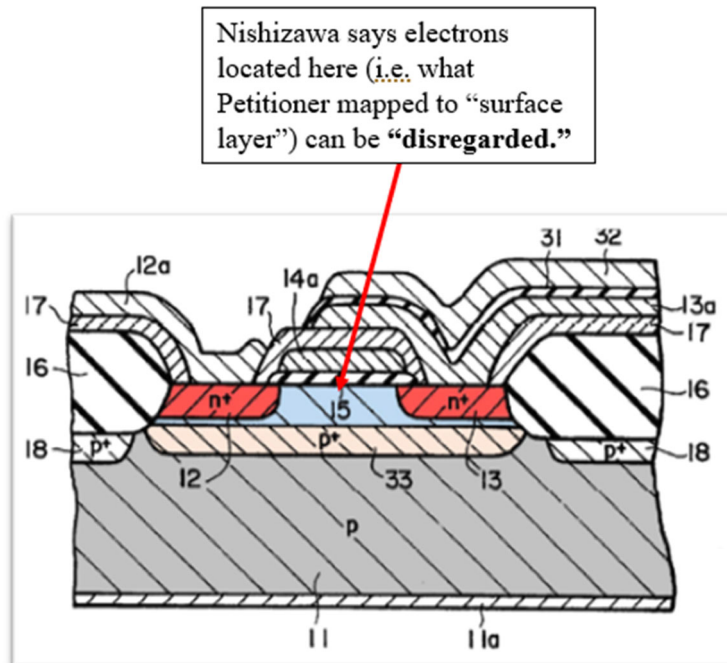


Pet. at 19 (annotations added).

PN Junctions in Onoda create a “substantial electric field” not addressed by Petition



Pet. at 44 (annotations added).



Pet. at 81 (annotations added).

Greenthread's expert, Dr. Glew also testifies that the inherent resistance of silicon also affects carrier movement. Ex. 2057, ¶¶54, 56. This is yet another factor Dr. Campbell fails to address.

Dr. Glew and the specification also show that the slope of the dopant concentration is a relevant parameter for determining whether a concentration gradient will aid carrier movement.

The relative doping concentrations of emitter and collector regions varies from  $10^{18}$  to  $10^{20}/\text{cm}^3$ , whereas the base region is  $10^{14}$  to  $10^{16}/\text{cm}^3$  depending on the desired characteristics of the BJT. In graded base p-n-p transistors, the donor dopant concentration may be 10 to 100× at the emitter-base junction, relative to the base-collector junction (1×). The gradient can be linear, quasi linear, exponential or complimentary

error function. The relative slope of the donor concentration throughout the base creates a suitable aiding drift electric field, to help the” carriers move.

Ex. 2061, 2:66-3:15; Ex. 2057, ¶¶57-65. Yet, Dr. Campbell did not consider the slope of any prior art gradients. *See, generally*, Ex. 1003.

He also said that temperature and imperfections in silicon lattice structure can affect carrier motion. Ex. 2085, 34:15-19; 39:8-12. Dr. Campbell’s report and the petition do not address any of these factors.

Dr. Campbell is not alone in concluding that other factors besides the existence of a gradient must be considered to determine if the “aid carrier movement” claim limitation is met. During prosecution, the examiner likewise 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 carrier movement. Ex. 1002, Ex. 2080.

The net force acting on a carrier—the result of all of these factors and forces—is what determines whether it moves and the direction of motion. Ex. 2057, ¶¶54-58. These other forces may prevent movement or push in the opposite direction from the force exerted by the gradient. Petitioner’s assumption that the gradients in their prior art references would aid carrier movement fails, because the Petition fails to

analyze whether the specific gradients at issue in the context of the disclosed devices would suffice to overcome the other forces that are present. Since Petitioner does not measure or account for these forces, and does not compare them to the magnitude of the force exerted by the gradients in the alleged prior art, they fail to establish that the disclosed gradients would “aid carrier movement.” Ex. 2057, ¶¶54-58, 60, 64.

Further, Petitioner’s own reference, Kawagoe, confirms that graded dopant concentrations do not necessarily *aid* carrier movement, because Kawagoe teaches using a graded slope to *impede* carrier movement. Kawagoe is concerned with naturally occurring  $\alpha$ -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”). Kawagoe teaches a “concentration gradient” to “*prevent*” [these SEU-generated carriers] from entering the p-well.” Ex. 1007, 16:7-11. Kawagoe proves that graded dopant concentrations don’t *always* aid carrier movement, as Petitioner claims, because sometimes the “concentration gradient” can “prevent” carrier movement. Ex. 2057, ¶¶62-68.

**2. A finding that a “graded concentration of dopants” “aid carrier movement” is inconsistent with the claim language and district court Markman orders.**

Finding that any gradient satisfies the “aid movement” claim term also goes against the plain language of the claim. If any “graded concentration of dopants” would “aid carrier movement” then there was no reason to include “aid carrier

movement” as a separate claim term. Greenthread included “aided” and “graded” as two separate claim terms, because they have separate meaning. As the Federal Circuit said in *Phillips v. AWH Corp.*, “[w]hen a claim refers to ‘steel baffles,’” that “strongly implies that the term ‘baffles’ does not inherently mean objects made of steel.” 415 F.3d 1303, 1314 (Fed. Cir. 2005). Here, “a graded concentration of dopants [] to aid the movement of carriers” “strongly implies” that a “graded concentration of dopants” “does not inherently” “aid the movement of carriers.” *Id.*

Petitioner’s apparent position that *any* gradient aids carrier movement, leads to absurd results that are plainly inconsistent with the claim language. For example, if the forces acting on a carrier—i.e. the force exerted by a gradient and any other forces—cancel each other out, the carriers do not move at all. Yet, Petitioner’s “graded” entails “aided” assumption (or claim construction) implies that a gradient can “aid” the movement of carriers that do not move at all. “Aid[ing] the movement of carriers” requires “movement.” Petitioner fails to address this claim limitation, except to say that it is “inherent”—a position which Petitioner’s expert admits is wrong. Ex. 2058, 34:1-14; 20:7-10; 34:15-36:19; 39:8-12.

Not one but two District Courts have previously agreed with Greenthread that not *all* doping gradients aid carrier movement. The Western District of Texas unequivocally stated, “a graded concentration...that is [not ‘sufficiently graded’] will not aid in the movement of minority carriers[.]” Ex. 2074, 39-40. And the

Eastern District of Texas understood that direction alone does not determine whether a gradient aids carrier movement—the *magnitude* of the gradient must also be considered. Ex. 2075, 15 (explaining that “the slope [of the gradient] has both a direction and a magnitude and [d]efendant [incorrectly] suggests that the direction of the drift electric field depends solely on *the direction* of the slope of the graded concentration”) (emphasis in original).

### 3. The prosecution history supports Greenthread.

Petitioner points to the prosecution history to support conflating “graded” with “aided,” but—setting aside the fact that Petitioner misrepresents that history—the prosecution history is the wrong place to start. “The prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful” in understanding the scope of the patent. *Phillips*, 415 F.3d at 1317. The prosecution history cannot overcome the clear claim language distinguishing the “graded” and “aided” terms.

First, Petitioner says that Greenthread argued in prosecution that the “graded dopant concentration itself creates a ‘built-in’ electrical field that forces the movement of carriers into a particular direction.” Pet. at 56. The point of the sentence Greenthread actually wrote is that a “graded dopant concentration” must move carriers *to meet the claim limitation*, not that any and every graded dopant

concentration must move carriers. Greenthread was emphasizing that “aid carrier movement” is a separate claim element from “graded dopant concentration”—the exact opposite of what Petitioner asserts. In context, Greenthread said:

Defendants assert that the specification does not provide guidance on how to assess or measure carrier movement. This is not true. The claims and the specification make clear that the electric field must move the carriers in a particular direction (from the surface layer to the substrate). Whether the carrier movement has a particular speed or acceleration is beyond the scope of the claim, as long as it meets the other limitations of the claim.

Ex. 1030 (Patent Owner’s Responsive Claim Construction Brief) at 38.

Further, Petitioner claims that Greenthread represented during prosecution that “downward-sloping graded-dopant concentrations were known and created an ‘inherent “built-in” unidirectional electric field.’” Pet. at 56. Greenthread, however, added that the movement of carriers “[d]epend[s] on the particular slope of the graded concentration of dopant[s].” Ex. 1002 (‘195 prosecution history) at 289. Moreover, Greenthread was responding to an Office Action regarding a claim that required a “single static unidirectional electric drift field to aid the movement of carriers.” *Id.* at 286. Those additional claim limitations were, as Greenthread said, an “additional parameter for ensuring that all minority carriers are moved in one direction.” *Id.* at 290 (emphasis added). The fact that an “additional parameter”

besides the graded dopants is necessary to “ensur[e] that all minority carriers are moved” shows that Greenthread was not asserting that “graded” entails “aided.”

**B. The Petition fails to establish that the prior art discloses or suggests the “aid carrier movement” limitations.**

For all of the asserted grounds, the Petition fails to show that any of the primary references disclose any of the claim elements requiring “aid carrier movement.”

**1. The Petition fails, because Dr. Campbell expressly restricted his analysis to the direction of the gradient—and nothing else.**

Dr. Campbell’s testimony should be rejected, because it rests on a false premise. As discussed above, a mere downward sloping gradient does *not* necessarily “aid carrier movement.” *See supra* Section VI.A. Yet Dr. Campbell did not look at the magnitude of the slope or other possible forces acting on a carrier. As explained above (see *supra* Sections VI.A.2, VI.B.1), Petitioner’s premise is flawed; indeed, as Dr. Campbell admitted that only a “properly constructed” electric field will aid carrier movement. Ex. 1003, ¶33; Ex. 2058, 34:1-14. Dr. Campbell does no analysis to show that the prior art fields are “properly constructed” and did not consider numerous factors he concedes are relevant. Ex. 2058, 34:15-36:19; 39:8-12.

**2. Petitioner’s Kawagoe-Based Arguments are Deficient.**

The Petition fails to demonstrate that Kawagoe teaches the “aid carrier movement from the active region” claim limitation.

**a. The electrons Kawagoe describes never enter the p-well—much less the active region.**

The carriers that Kawagoe describes are not in the “active region.” Every challenged independent claim requires “*active regions* having at least one graded dopant concentration to aid carrier movement,” Kawagoe does not teach that its gradient would have any effect on carriers in the “active region.”

The Challenged Patent and Kawagoe are talking about two very different things. Kawagoe’s teaching is about preventing carriers in the substrate from reaching the top of the device. Greenthread’s claims require a graded dopant concentration to move carriers from the surface towards the bottom of the device. Kawagoe does not talk about that at all.

Instead, Kawagoe’s electrons (i.e. the electrons about which Kawagoe provides teachings) are *below* p-well 6p, and prevented from moving *upward* into p-well 6p. Ex. 2057, ¶62. Kawagoe states:

Specifically, the electrons produced by the  $\alpha$ -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.

Ex. 1007, 16:7-11 (emphasis and highlighting added). Kawagoe's 6p extends to the very top of the device. Therefore, carriers travelling vertically could only enter 6p from below.<sup>8</sup> Ex. 2057, ¶¶49, 66. Kawagoe does not address carriers in the "active region," and does not "aid carrier movement *from the [first and second active regions | first or second active region | surface]*" because Kawagoe's carriers are nowhere near what Petitioner identifies as the "surface" or first/second "active regions" and are in fact "*prevented from entering the p-well 6p*" which stands between them and the "active regions." Ex. 2057, ¶62.

Since Kawagoe teaches inhibiting carrier movement, it does not teach aiding carrier movement. Ex. 2057, ¶¶61-68.

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<sup>8</sup> 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 surface or active regions. Since they are "prevented from entering" 6p, they would remain above 6p and Kawagoe's gradient would not aid their movement downward. As explained below, Dr. Glew confirms (citing Nishizawa) that Kawagoe is discussing carriers outside the surface layer. Nishizawa explicitly states that that probability of carriers from an alpha ray at the top of a device is "extremely low" and any such carriers can be "disregarded." Ex. 1046, 29.

Dr. Campbell confirmed that Kawagoe’s teaching is about preventing carriers at the bottom from moving up, not about moving carriers at the top down. Ex. 2058, 43:8-20.

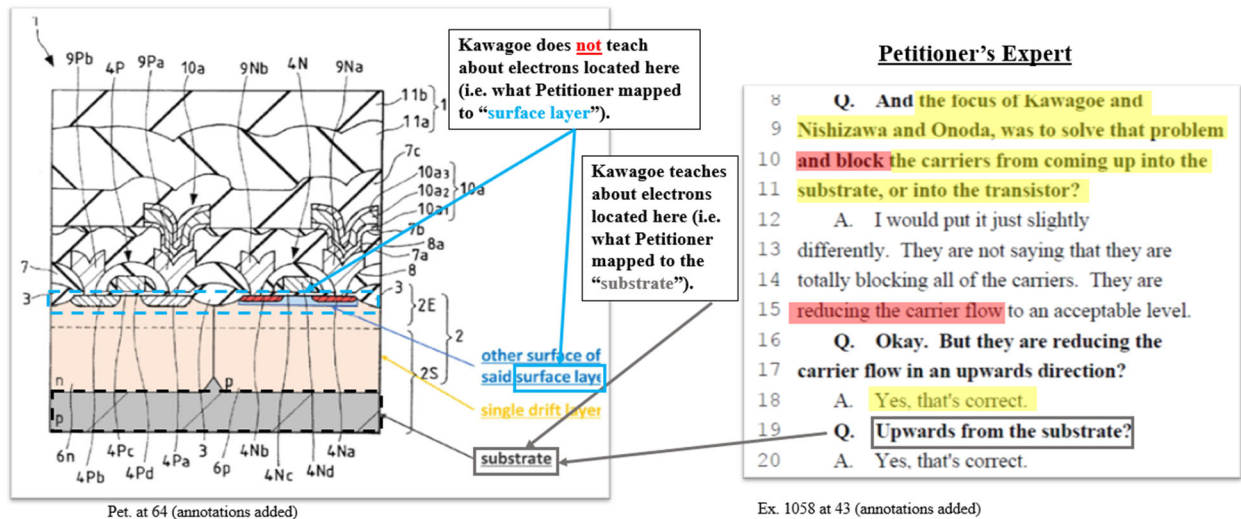
**b. Kawagoe cannot be modified to address carriers in the active region.**

As explained by Dr. Glew, Petitioner’s understanding of Kawagoe’s disclosure regarding electrons generated by alpha-rays is incorrect. Ex. 2057, ¶¶45-66-68. As explained by Dr. Glew—who has experience working with alpha-rays/alpha particles (*id.*, ¶10)—a POSITA would have understood when Kawagoe mentions “electrons produced by the  $\alpha$ -ray” (Ex. 1007, 16:7-11), Kawagoe is *not* describing electrons near the surface. Ex. 2057, ¶¶61-68. Dr. Glew cites Nishizawa—a reference from *before* the Challenged Patent’s priority date—to demonstrate what a POSITA would have known:

Accordingly, it will be understood that the alpha-particle immediately after irradiation to the surface of a semiconductor body has an energy of several MeV, for example about 5 MeV, and that, accordingly, *the probability of creation of electron-hole pairs is extremely low near the surface*. The alpha-particle will begin to create electron-hole pairs after it has entered into the semiconductor substrate to a certain distance.

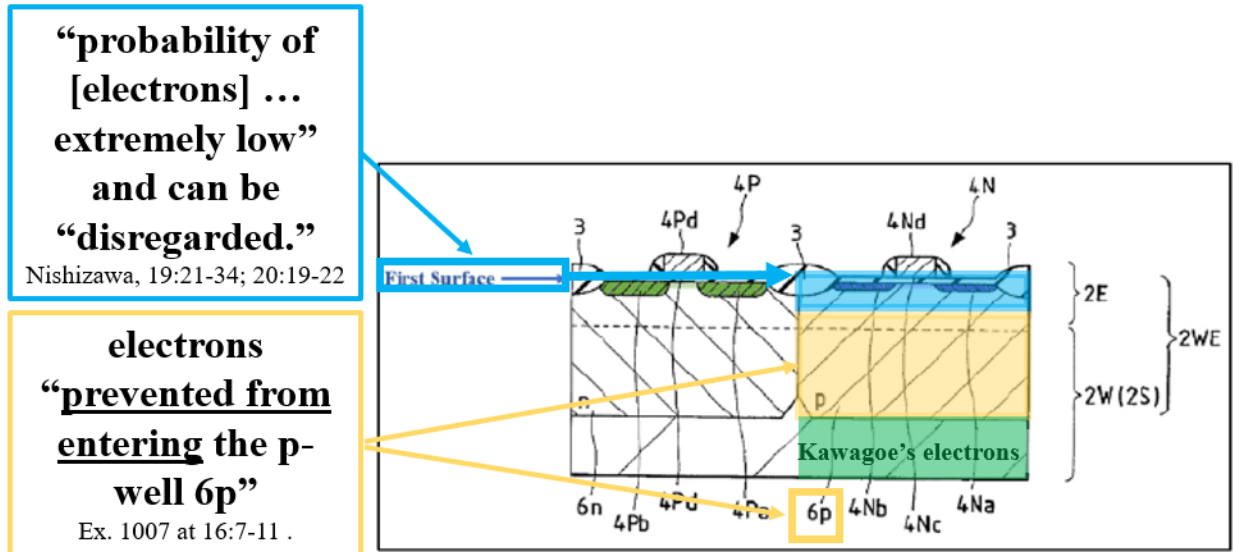
Ex. 1046, 19:21-34; *see also id.*, 20:19-22 (“[T]he amount of electrons created which adversely affect the memory action is no greater than only 10% of the stored electric charge, and thus it can be disregarded.”); Ex. 2057, ¶¶44-45, 66-68. Thus, a POSITA

would have understood that Kawagoe's electrons that are prevented from entering the p-well and are not moving from the surface. *Id.* Kawagoe says nothing about how any carriers at the surface are affected by its gradient.



In short, the Petition cites no evidence that a POSITA would have known of or thought about  $\alpha$ -rays generating carriers at the top of a semiconductor device on the critical date, much less adopted Kawagoe's solution to solve the problem.

The Petition does not include any obviousness arguments or cite Dr. Campbell for any obviousness rationale/evidence to support modifying Kawagoe to influence carriers in the surface or active region. Pet. at 24-28. Therefore, Petitioner cannot rely on obviousness to save its faulty arguments regarding "aid carrier movement" in the Kawagoe ground. And due to the Petition's deficient arguments regarding that limitation in the challenged independent claims, the Petition is deficient regarding the challenged dependent claims, too.

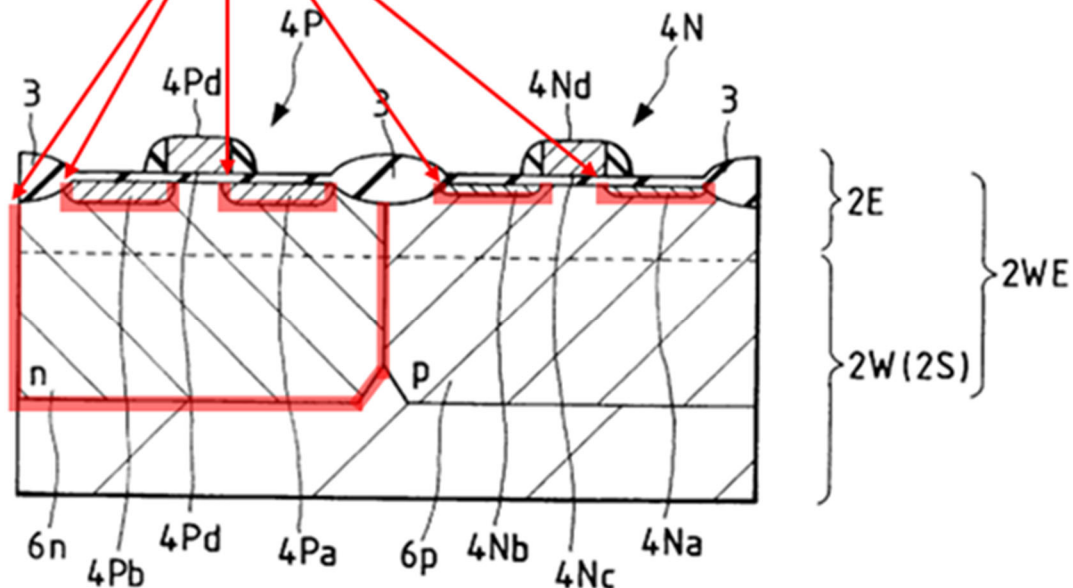


**c. Dr. Campbell did not consider the relevant factors in analyzing Kawagoe.**

The Petition points to Figures 16 and 17 of Kawagoe for the claimed “graded dopant concentration” limitation. Pet. at 24-27. But for the claimed “aid carrier movement” limitation, the Petition contains no discussion of the magnitude of the slope of the gradient or net forces. To the contrary, the Petition focuses on the downward-sloping direction of Kawagoe’s slope. *Id.* at 27. Again, as Dr. Campbell has testified, other factors—which he did not analyze—affect carrier movement, such as temperature, capacitance effects at the PN junction, and imperfections in the silicon crystal. Ex. 2058, 33:14-33:19, 39:8-12, 34:1-36:19; 39:8-12. As shown below, there are numerous PN junctions in Kawagoe. Dr. Campbell, however, confirmed again in his recent deposition that he only looked at direction, not other factors. Ex. 2085, 39:22-40:9, 42:15-43:12. Therefore, the Petition does not show that any gradient in Kawagoe’s active region would have the effect it claims.

PN Junctions in Kawagoe create a “substantial electric field” not addressed by Petition

FIG. 23



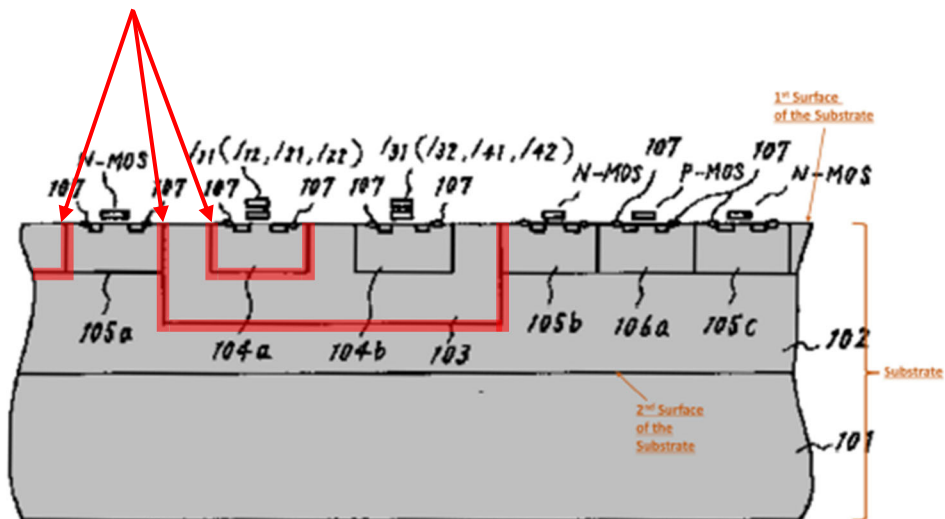
Ex. 1007, Fig. 23 (annotated).

### 3. Petitioner's Onoda-Based Arguments are Deficient.

The Petition fails to demonstrate that Onoda teaches the “aid the movement of minority carriers” claim limitation. Onoda does not say that a dopant gradient has any effect on carriers at all. For the Onoda-based grounds, the Petition points to Onoda disclosing a “well region has a doping profile that is downward graded” and jumps to the conclusion that the gradient would necessarily “aid carrier movement[.]” Pet. at 52-56. As explained above, the existence of a downward-sloping graded-dopant concentration alone is not sufficient to establish the “aid the

movement of minority carriers” claim limitation. *Supra* Sections VI.A.2, VI.B.1. As explained above (*see supra* Sections VI.A.2, VI.B.1), Dr. Campbell admitted that only a “properly constructed” “electric field” “will push minority carriers.” Ex. 1003 (Campbell Declaration), ¶33. Nothing in the Petition explains how Onoda’s field is “properly constructed” or analyzes the numerous factors that Dr. Campbell admits affect carrier movement (e.g. temperature, silicon imperfections, resistance, and slope). Ex. 2058 at 34:15-36:19; 39:8-12. As shown below, there are a number of PN junctions in Onoda that, according to Dr. Campbell, create “substantial electric fields” which he failed to account. Since Dr. Campbell does not identify the net force acting on the carriers, or analyze the factors necessary to identify it, the Petition fails to show that the gradient aids carrier movement.

PN Junctions in Onoda create a “substantial electric field” not addressed by Petition



Pet. at 44 (annotations added).

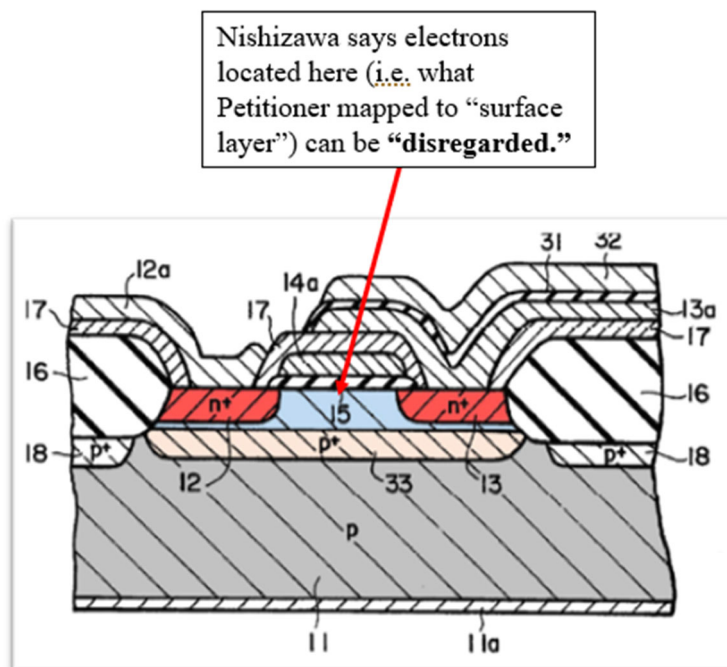
Petitioner and Dr. Campbell did not take into account anything besides the existence of a downward-sloping concentration gradient in concluding that Onoda teaches the “aid carrier movement” limitations. Pet. at 52-63. Therefore, the Petition is based on an incorrect premise and fails to carry Petitioner’s burden. Ex. 2057, ¶¶52-58.

#### 4. Petitioner’s Onoda-Nishizawa Combination is Deficient.

The Petition relies on Onoda in view of Nishizawa in Ground III. Pet. at 10. But Nishizawa does not cure the above-discussed deficiencies of Onoda in Ground II.

First, Nishizawa is directed to the same problem as Kawagoe, carriers created by alpha rays moving *up* from the *substrate*. Ex. 2057, ¶¶44-45, 59-60; Ex. 2058,

43:8-20. Just like Kawagoe, Nishizawa does not say that that its gradient—or any gradient—moves carriers down from the active region. Nishizawa expressly says that it was not addressing carriers at the surface of the device, because alpha rays do not create carriers there in large enough quantities to be relevant. Ex. 1046, 19:21-34. Nishizawa says carriers at the surface of the device can be “disregarded” for its purposes. *Id.* at 20:19-22. Since Nishizawa is silent on carriers in the surface layer, it does not teach the claim limitation.



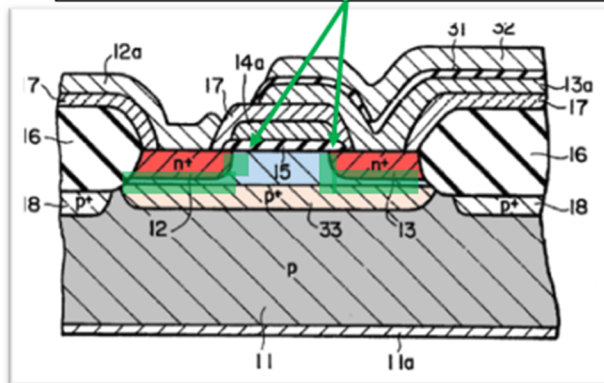
Pet. at 81 (annotations added).

Petitioner cannot simply rely on a gradient in Nishizawa for the same reason it cannot rely on the mere gradient in Onoda. As with all the grounds, the Petition does not mention the net force on carriers in Nishizawa or analyze numerous relevant factors that act on carriers *in addition* to the gradient, (e.g. temperature, silicon

imperfections, resistance, and slope). *See, generally*, Petition; Ex. 2058, 34:15-36:19; 39:8-12. As with Onoda, there are electric field-creating PN junctions in Nishizawa that are not discussed in the Petition. Ex. 2057, ¶¶59-60. Without analyzing these other forces, Petitioner has no basis to conclude that a mere gradient alone in Nishizawa would aid carrier movement.

PN junctions in Nishizawa create a “substantial electric field” **not addressed by Petition.**

Ex. 1058 at 36:3



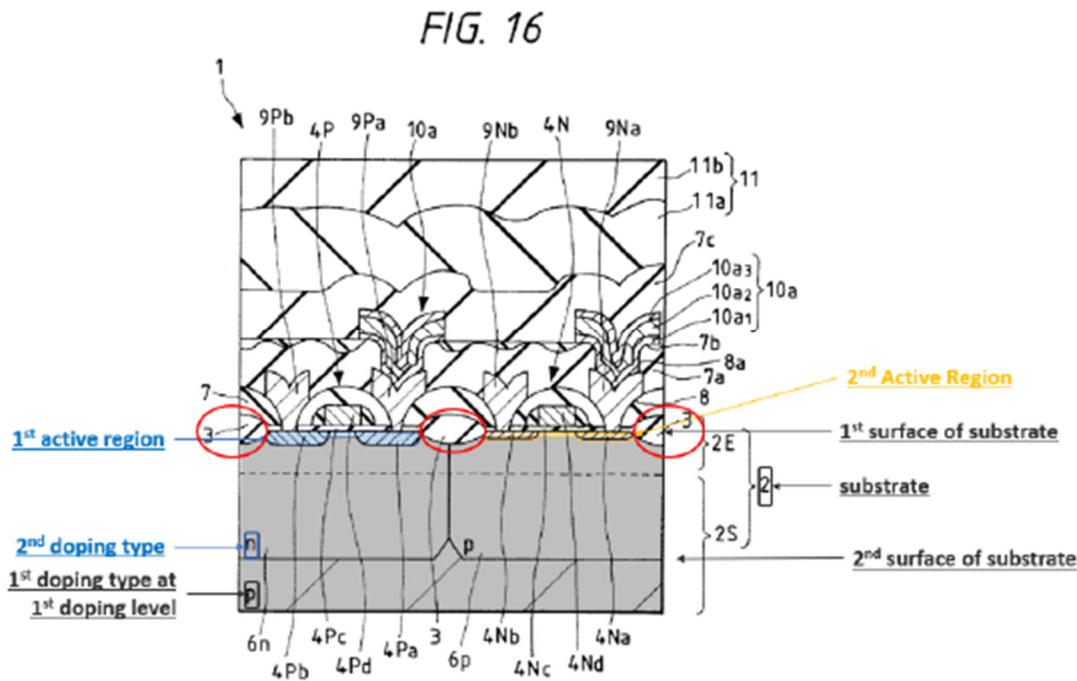
Pet. at 51 (annotations added)

Pet. at 76 (annotations added); *see also* Ex. 2058 at 36:3.

**C. The Petition fails to establish that Kawagoe discloses or suggests the “first active region and second active region are each separated by at least one isolation region” (Claims 6 and 27).**

The Petition has not established for Ground I that Kawagoe discloses or suggests the feature “the first active region and second active region are each separated by at least one isolation region” as recited in dependent claims 6 and 27. The Petition provides the following annotated Figure 16 of Kawagoe and maps the

first and second active regions as shown in the figure. Pet. at 33-34 (“Notably, the field insulating film region 3 located between the first and second active regions in FIG. 16 is an isolation region that separates the first active region and second active region.”).



Pet. at 34 (citing Ex. 1007, FIG. 16). The Petition further maps Kawagoe’s field insulating film 3 to the claimed “isolation region.” *Id.*, 33-34.

But the Petition fails to appreciate that regions 4Na and 4Nb, which “are regions for forming the source-drain regions of the nMOS 4N” (Ex. 1007, 8:66-67), “are made as deep as about 0.5  $\mu\text{m}$  and ***formed in the range of the thickness of the epitaxial layer 2E.***” Ex. 1007, 9:3-6. Kawagoe provides similar disclosure regarding regions 4Pa and 4Pb. *Id.*, 9:47-53. Thus, a POSITA would have understood that the

first and second active regions extend to about the depth of the epitaxial layer 2E and abut each other laterally, and therefore they are not separated by Kawagoe's field insulating film 3, as required by claims 6 and 27. The field insulating film 3 is formed "[o]ver the principal surface of the epitaxial layer 2E" (Ex. 1007, 8:40-42) and a POSITA would have understood that it does not extend deep enough to separate the two active regions.

## VII. OBJECTIVE INDICIA OF NON-OBVIOUSNESS ESTABLISH THAT THE CHALLENGED CLAIMS ARE PATENTABLE.

"Objective evidence of nonobviousness ... may often be the most probative and cogent evidence in the record. It may often establish that an invention appearing to have been obvious in light of the prior art was not." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012). During its prior litigation against [REDACTED] RPX Corp. ("RPX") approached Greenthread about negotiating a license on behalf of [REDACTED] and other companies. Greenthread and RPX then negotiated a license for [REDACTED] [REDACTED]. Ex. 2072 (Rao Decl.). The license covered only the patent family at issue here—no other patents. Moreover, Greenthread had never threatened litigation against either [REDACTED] in any way. *Id.* Rather, both companies first approached Greenthread through RPX.

"[L]icenses with companies under no apparent threat of litigation" are especially probative of non-obviousness. *Transocean*, 699 F.3d at 1353. The Board

has previously found claims not unpatentable based on licenses that were not “prompted by a threat of litigation.” *Samsung Electronics Co. Ltd., et al, v. Neonode Smartphone LLC*, IPR2021-0144, Paper 59 at 51 (PTAB Dec. 15, 2022). Here, [REDACTED] are sophisticated semiconductor companies with billions in annual revenue. Ex. 2073. Both companies also frequently file IPR petitions. [REDACTED]

[REDACTED] Yet, without any threat of litigation, both paid for licenses covering just the single patent family at issue here.<sup>9</sup>

The specification of the Challenged Patent, which is common to the Greenthread family, identifies “a novel technique” of creating “a drift field to sweep these unwanted minority carriers from the active circuitry at the surface into the substrate.” Ex. 1001, 3:52-56.

This aspect of Greenthread’s invention is part and parcel of Greenthread’s licenses, because every patent in the family contains claim language relating to using graded dopants to move carriers at the “surface” or “active region” further down into the device. *See, e.g.*, U.S. Pat. Nos. 11,316,014; 11,121,222; 10,510,842; 10,734,481

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<sup>9</sup> Greenthread later acquired two patents as part of its most recently signed license. However, at the time of the earlier licenses no party had an expectation that Greenthread would acquire additional patents. Ex. 2072.

(“graded dopant concentration to aid carrier movement from the [first surface or active region]...”); U.S. Pat. Nos. 8,421,195; 9,190,502 (“a graded concentration of dopants... to aid the movement of minority carriers from said surface...”).

Moreover, moving carriers “from the active circuitry at the surface” is missing from the prior art. As explained above, Kawagoe does not address carriers near the surface of the device, much less disclose a technique for moving them. *Supra* Section VI. Likewise, Wieczorek, at best, shows a downward sloping gradient, with no information about whether, why, or how such a gradient might be useful. *Supra* Section VI. Greenthread’s licenses discredit Petitioner’s argument as hindsight. ■■■

■■■ had access to the same prosecution history and employ numerous semiconductor experts, but decided to license Greenthread’s invention, without any threats or coercion.

Finally, in addition to ■■■, other major semiconductor companies—Intel, ■■■ Micron, and Western Digital, and AMS-OSRAM—have all taken licenses to Greenthread’s patents (with no expectation of receiving licenses to other patents) to settle litigation. Ex. 2072. Eight major semiconductor companies have paid more than \$50 million—more than \$6 million per company on average—for licenses all of which covered only one patent family. These agreements confirm that Greenthread’s patents have been widely recognized in the industry and valid and valuable. *Id.*

**VIII. THE PETITION IS UNTIMELY UNDER 35 U.S.C. § 315(B).**

**A. Background**

**1. Prior Litigation Involving the Challenged Patents**

**a. [REDACTED] Litigation**

On April 30, 2019, Greenthread filed a complaint against [REDACTED] in the Eastern District of Texas alleging infringement of the Challenged Patent and other patents not at issue in the Petition. On July 8, 2020, Greenthread and [REDACTED] settled the litigation and Greenthread granted a license to [REDACTED] as described below.

**b. Intel-[REDACTED] Litigation**

On February 1, 2022, Greenthread served Intel and [REDACTED] with a complaint filed in the Western District of Texas alleging infringement all of the Challenged Patents, except the '014 patent. Ex. 2001 (Complaint), 1-4; Ex. 2002 (Returned Summons). After the '014 patent issued, Greenthread filed a First Amended Complaint against [REDACTED] and Intel which it served via ECF on April 29, 2022. Ex. 2003. The cases against Intel and [REDACTED] were severed and the case against Intel was transferred to the District of Oregon. Ex. 2004, 22. The [REDACTED] litigation remained in Texas and continued in parallel with the Intel litigation.

[REDACTED] was a real-party-in-interest to the [REDACTED] litigation. Greenthread's allegations in the First Amended Complaint against [REDACTED] (i.e. the April 29 complaint) were based on, among other things, [REDACTED] components in [REDACTED] products. Ex. 2003,

¶¶18, 60, 76-81; Ex. 2005, 8 (“[REDACTED] Accused Products”), 18-20 (section entitled “[REDACTED] Accused Products”); Ex. 2006, 1-34. After Greenthread served the April 29 complaint accusing [REDACTED] products, additional counsel stepped in to represent [REDACTED] with respect to [REDACTED] products. Ex. 2007. [REDACTED] then filed its own IPRs against the Challenged Patents that had been asserted against [REDACTED] products. [REDACTED]

[REDACTED] The [REDACTED] petitions named [REDACTED] as a real-party-in-interest. *E.g.*, Ex. 2008, 7; Ex. 2023, 7; Ex. 2024, 7; Ex. 2025, 8. Afterwards, Greenthread added [REDACTED] as a party to the [REDACTED] litigation. Ex. 2009. After [REDACTED] was added to the case, [REDACTED] counsel for [REDACTED] products appeared in the case for [REDACTED]. Ex. 2010. [REDACTED] other counsel did not represent [REDACTED]. Greenthread and Intel, [REDACTED] settled their disputes and Greenthread granted [REDACTED] and Intel licenses as described below.

**c. Greenthread Licenses to [REDACTED] Intel, and [REDACTED]**

As part of the settlements, Greenthread granted [REDACTED] Intel, and [REDACTED] releases for past infringement and a license to Greenthread’s patents, by way of sublicense through RPX Corporation (“RPX”) (“Licenses”). Ex. 2011, 2. Greenthread licensed [REDACTED] (and two other companies) in one agreement signed July 8, 2020. Ex. 2034. Greenthread signed the second agreement, licensing and Intel and [REDACTED] on April 7, 2023. Ex. 2011. The two agreements are similar in all relevant

respects. In a parallel IPR, RPX submitted an affidavit stating: “By operation of their membership agreements with RPX, Intel and [REDACTED] acquired the full scope of sublicensable rights Greenthread granted to RPX at the time the RPX-Greenthread Agreement was executed.” Ex. 2012.

The Licenses grant Licensees (i.e. [REDACTED] Intel, and [REDACTED] via RPX) the right “to make, have made, use, have used, sell, ... offer for sale, have offered for sale, have sold, ... import, have imported, own, order, ... purchase, ... obtain, keep, acquire, receive, ... and otherwise exploit or dispose of any Licensed Product and Service.” Ex. 2011, 3 (definition of “Patent License”); Ex. 2034, 3 (definition of “Patent License”); *see also* Ex. 2012.

The Licenses define “Licensed Product and Service” to include “any product ... made, have made, used, purchased, provided, hosted, sold, leased, licensed, distributed, transmitted, exported, imported or offered for sale, lease, or import or otherwise exploited or disposed of by or on behalf of” Licensees. Ex. 2011, 2; Ex. 2034, 2.

The Licenses cover all of Greenthread’s patents, including the Challenged Patent. *See* Ex. 2011, 3-4 (“‘Patents’ shall mean ....”) and 17 (listing patents); *see also* Ex. 2034, 3 (“‘Patents’ shall mean ....”) and 15 (listing patents).

Accordingly, “any product” Licensees “have made” by Petitioner or “purchase” from Petitioner is a “Licensed Product or Service” which Licensees have

the right to “use, ... sell, ... obtain, ... acquire, ... receive, ... and otherwise exploit.”

Ex. 2011, 2-3; *see also* Ex. 2034, 2-3.

## **2. Petitioner’s Relationship with Patent Owner’s Licensees and the Co-Pending District Court Proceedings**

Patent Owner is currently involved in district court litigation against MPS. On May 26, 2023, Greenthread filed a complaint in the U.S. District Court for the Delaware that MPS infringes each of the Challenged Patents. The district court action was filed before MPS filed any IPR petitions against the Greenthread patents.

While the district court case was stayed before discovery was underway, public information confirms that Petitioner’s chips are incorporated into Intel and [REDACTED] products and that [REDACTED] and Intel are significant MPS customers. For instance, Petitioner announced during Investor/Analyst Day in 2018 that its technology would be used in Intel processors. Ex. 2017, 18. Petitioner’s Q2 2021 earnings call referred to its success including its technology in Intel products. Ex. 2018, 5. Petitioner’s MP2953B is a digital multi-phase controller that provides power for the core of the Intel VR12.5 platform. Ex. 2019. Publicly-available information also confirms that Petitioner is a chip supplier for [REDACTED]. Ex. 2020, 2021.

## **3. These Proceedings**

On February 3, 2024, Petitioner filed the first three petitions in these proceedings, IPR2024-00468, IPR2024-00469, and IPR2024-00470. Two days later, on February 5, Greenthread notified Petitioner that the Petitions are time barred

by virtue of Petitioner's contracts with Licensees. Ex. 2013. Greenthread's email included the information of Petitioner's relationships with Licensees discussed above. Greenthread requested that Petitioner withdraw their petitions or at a minimum provide discovery into whether the petitions are time barred.

On February 6, Petitioner responded refusing to withdraw the petitions or provide any discovery. Ex. 2014.

On March 18, Petitioner filed four more petitions, IPR2024-00550, IPR2024-00551, IPR2024-00552, and IPR2024-00553. In spite of the parties' correspondence, these petitions included the identical assertion that "Petitioner is not barred or estopped from requesting IPR of the Challenged Claims" unsupported by any argument or evidence whatsoever. IPR2024-00550, Paper 1 (Petition), 4; IPR2024-00551, Paper 1 (Petition), 8; IPR2024-00552, Paper 1 (Petition), 12; IPR2024-00553, Paper 1 (Petition), 9. Greenthread informed Petitioner that its objections to the first three IPRs applied equally to the additional four.

**B. The Petition should be dismissed under 35 U.S.C. § 315(b).**

**1. Control of prior litigation is not required to establish privity.**

Section 315(b) provides that "[a]n inter partes review may not be instituted if the petition requesting the proceeding is filed more than 1 year after the date on which the petitioner, real party in interest, or privy of the petitioner is served with a complaint alleging infringement of the patent." 35 U.S.C. § 315(b). In its institution,

the panel said that “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.’” Decision, 18. Greenthread respectfully contends that the purpose of § 315(b) and the privity inquiry is not so narrow.

Whether two parties are privies with respect to one another is evaluated under the “common law” framework set forth in *Taylor v. Sturgell*, 553 U.S. 880 (2008). *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1317 (Fed. Cir. 2018); *see also* Office Trial Practice Guide at 13 (citing *Taylor*). Control of the prior litigation is *sufficient* to establish privity between the parties. *See, e.g., WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1319 (Fed. Cir. 2018). But control or even awareness of the prior litigation are not necessary to establish privity. Rather, *Taylor* identifies a “pre-existing ‘substantive legal relationship’” as one reason to find privity and litigation via “proxy” or “control over the [prior] litigation” as different reasons to find privity. 553 U.S. at 894-95 (cleaned up). Preclusion based on a pre-existing substantive legal relationship is justified by the “needs of property law,” *not* because a precluded party was adequately represented in prior litigation, controlled prior litigation, or served as a proxy. *Id.* “Preclusion is extended or denied in an effort to protect conflicting property interests *rather than an effort to implement concepts of participation or representation.*” *Wright & Miller* (3d ed.) § 4448 Persons Affected by Preclusion (emphasis added).

The Board also has distinguished between privity based on a proxy relationship and privity based on pre-existing substantive legal relationship. For example, in the *Worlds* remand decision, the Board rejected the argument that the petitioner was not in privity when it “was not placed on notice of the infringement” previously and could not “control the [prior] District Court litigation.” *Bungie Inc. v. Worlds Inc.*, IPR2015-01264, Paper 64 at 38, 44 (PTAB Jan. 14, 2020).

Therefore, *Taylor* and the Board have identified “a variety of pre-existing ‘substantive legal relationship[s]’ between” two parties that can create privity, even in the absence of control over the prior litigation. *Taylor*, 553 U.S. at 894 (alterations in original). For example, customer-supplier relationships can and frequently do create privity. See, e.g., *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00789, Paper 148 at 14, (PTAB Jan. 24, 2019) (precedential); *Volkswagen Grp. of Am. Inc. v. Argina Tech. Ltd.*, IPR2021-01263, Paper 16 (PTAB Jan. 21, 2022); *Ericsson Inc. v. Regents of Univ. of Minn.*, IPR2017-01197, Paper 56 at 8, 10 (PTAB Sept. 18, 2020). “[A]n indemnity relationship is [also] the type of relationship that can establish privity,” particularly when the indemnity obligations “directly relate to the” accused products. *Ericsson Inc. v. Regents of Univ. of Minnesota*, IPR2017-01197, Paper 56 at 8, 10 (PTAB Sept. 18, 2020). A finding of privity is also appropriate when two parties are “preceding and succeeding owners

of property” and when one party acts as the “agent” for the other. *Taylor*, 553 U.S. 894-95.

**2. Petitioner bears the burden to show that its petition is timely—i.e. it is not in privity with a time-barred party.**

“[T]he IPR petitioner bears the burden of persuasion to demonstrate that its petitions are not time-barred” under § 315(b). *Samsung Electronics Co. Ltd. v. Netlist, Inc.*, IPR2022-00615, Paper 40 at 2 (PTAB Feb. 3, 2023) (quoting *Worlds, Inc. v. Bungie, Inc.*, 903 F.3d 1237, 1242 (Fed. Cir. 2018)). There is no “rebuttable presumption that formally shifts a burden of production to the patent owner” or a presumption that a petition is timely because a petitioner asserts that it is. *Worlds*, 903 F.3d at 1242. Such a presumption would be unfair, because it would “disfavor the party that likely has inferior access to potential sources of proof.” *Id.* at 1244. As in this case, a patent owner is unlikely to know the details (or even existence) of a petitioner’s relationships that might give rise to privity. Therefore, to dispute the timeliness of the petition, “a patent owner must produce *some* evidence that” a petition is time barred—but only “*some*.” *Worlds*, 903 F.3d at 1244 (emphasis in original). Once the patent owner has “presented evidence sufficient to put” the timeliness of the petition “into dispute,” “the Board c[an] no longer merely rely upon” the petitioner’s assertion that its petition is timely. *Id.* at 1246. Throughout the proceeding, the “burden remains with the petitioner to establish” that its petition is timely. *Id.* at 1242.

██████████ Intel, and ██████████ were served with a complaint alleging infringement of the Challenged Patent more than one year prior to the filing of the Petition. Ex. 2001, 2, 4; Ex. 2018. ██████████ was an RPI to the First Amended Complaint against ██████████ (served by ECF on April 29, 2022). Ex. 2032; Ex. 2017, 7. Thus, the Petition is untimely if Petitioner is in privity with Intel or ██████████. Greenthread has disputed the timeliness of the Petition with evidence showing that Petitioner is in privity with Licensees. Petitioner has offered no evidence whatsoever to controvert Greenthread's evidence or demonstrate the timeliness of their Petition. Accordingly, the Petition should be dismissed.

**3. The Petitions should be dismissed, because Petitioner has not attempted to carry their burden.**

**a. Patent Owner has satisfied its “practical” burden under *Worlds*.**

There can be no serious dispute that Patent Owner here has met its initial “practical” burden under *Worlds*. *Worlds*, 903 F.3d at 1243-44. First, it is well-established that customer-supplier relationships can create privity and there is no dispute that Petitioner and the Licensees have such a relationship. *See supra* Section IX.A.2; Ex. 2017, 18; Ex. 2018, 5; Ex. 2019-2021. Public filings suggest that Petitioner's sales to Licensees are custom products. Petitioner has said that its products “typically require a highly technical sales and applications engineering effort” and Petitioner maintains a staff of “applications engineers who work directly

with customers’ engineers.” Ex. 2022, 6. In MPS’s opposition to PO’s motion for additional discovery, MPS claimed that to comply with PO’s requested additional discovery, it would have needed to search its “engineering team” communications. Opp. to Motion for Additional Discovery (Paper 12), 13. This demonstrates that MPS engineers work directly with Licensees on the accused products, and these products are not simply “commodity” products later sold in the public marketplace, such as on the Digikey website.

**b. Petitioner has done nothing to satisfy its burden under Section 315(b).**

“Failure to prove [a] matter ... means that the party with the burden of persuasion loses on that point—thus, if the fact trier of the issue is left uncertain, the party with the burden loses.” *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378–79 (Fed. Cir. 2015). Here, Petitioner “loses,” because (1) it has the burden to show that the Petitions are timely and (2) Petitioner deliberately chose to ignore the issue, even after Patent Owner expressly identified the issue to it. *Id.* In short, Petitioner has not even attempted to meet their burden.

The instant Petition, like all seven of the Petitions, simply asserts, without support or explanation, that “Petitioner is not barred or estopped from requesting IPR of the Challenged Claims on the grounds identified in this Petition.” Pet. at 9. That is inadequate. The burden therefore falls on Petitioner to establish that the

relationship does *not* create privity. Meeting its burden requires Petitioner to put into the record evidence about their relationships.

The privity inquiry is a “highly fact-dependent question,” “handled by the Office on a case-by-case basis.” *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00651, Paper 148 at 6 (PTAB Jan. 24, 2019) (precedential). Therefore, in virtually every case where the Board has found that a petitioner met its burden, the Board examined the actual agreements and correspondence between the alleged privies. *See, e.g., WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1321 (Fed. Cir. 2018) (“the Board reviewed the purchase agreements”); *Samsung Electronics Co. Ltd. v. Netlist Inc.*, IPR2022-00615, Paper 64 at 14-15 (PTAB Jun. 30, 2023) (examining “indemnification correspondence” and contracts); *Assa Abloy AB v. CPC Patent Tech. Pty., Ltd.*, IPR2022-01093, Paper 20 at 18 (PTAB Feb. 2, 2023) (citing an “88-page agreement”). When the documents are *not* in the record the Board has consistently said that the absence of evidence “cuts against” the *petitioner*, not the patent owner. *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00789, Paper 148 at 14 (PTAB Jan. 24, 2019) (precedential).<sup>10</sup> Moreover, to the extent that control of the prior litigation is relevant,

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<sup>10</sup> The only exception of which Greenthread is aware are decisions involving Greenthread. *E.g., Semiconductor Components Indus., LLC v. Greenthread, LLC*,

“the lack of evidence” regarding control should count against Petitioner, not Greenthread. *Bungie Inc. v. Worlds Inc.*, IPR2015-01264, Paper 64 at 35 (PTAB Jan. 14, 2020). Mere “attorney argument that itself fail[s] to cite evidence” cannot meet Petitioner’s burden. *Worlds*, 903 F.3d at 1246. With no evidence to support the timeliness of the Petitions, Petitioner “lose[.]” *Dynamic Drinkware*, 800 F.3d at 1379.

Indeed, not only does Petitioner lose in the absence of any evidence, the “lack of evidence” that would presumably be in Petitioner’s possession, such as their contracts with Licensees, affirmatively “cuts against the party bearing the burden of proof on these issues.” *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00789, Paper 148 at 14, 2019 WL 858745, at \*6 (PTAB Jan. 24, 2019) (precedential). Therefore, the Board can reasonably infer from Petitioner’s resistance to providing evidence to meet their burden that the evidence (not in the record) is unfavorable to Petitioner.

**c. Petitioner cannot show timeliness by asserting that it has “standard” or “commodity” relationships.**

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IPR2023-01242, Paper 31 (PTAB Feb. 5, 2024). *See also* IPR2023-01243, Paper 30 (PTAB Feb. 5, 2024); IPR2023-01244, Paper 31 (PTAB Feb. 5, 2024). Greenthread respectfully urges the panel decide this case in accordance with the Board’s other post-*Worlds* precedents.

Petitioner claims that it is not in privity with Licensees’ because its sales are “commodity” sales. Opposition to Motion for Additional Discovery (Paper 12), 2-6. That is incorrect. There is no “standard” or “commodity” relationship that evades privity. Privity “is a ‘highly fact-dependent question.’” *Apps. in Internet Time, LLC v. RPX Corp.*, IPR2015-01750, Paper 128 at 7 (PTAB Oct. 2, 2020) (“*AIT*”) (precedential).

Customer-supplier relationships can and frequently do create privity. *See, e.g., Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00789, Paper 148 at 14, (PTAB Jan. 24, 2019) (precedential); *Volkswagen Grp. of Am. Inc. v. Argina Tech. Ltd.*, IPR2021-01263 Paper 16 (PTAB Jan. 21, 2022); *Ericsson Inc. v. Regents of Univ. of Minn.*, IPR2017-01197, Paper 56 at 8, 10 (PTAB Sept. 18, 2020).

Here, Petitioner admits that it has customer-supplier relationships with time-barred parties, but has introduced no evidence regarding the nature of those relationships. A petitioner’s failure to produce pertinent documents regarding its customer-supplier relationships precludes institution. *Volkswagen*, IPR2021-01263, Paper 16 at 10 n.4. *Ventex*, IPR2017-00789, Paper 148 at 14. Petitioner cannot prevail on a “fact-dependent question” when it offers no evidence to support a finding of facts. *AIT*, IPR2015-01750, Paper 128 at 7.

Further, Petitioner’s contracts with Licensees could implicate an indemnity relationship, and “an indemnity relationship is the type of relationship that can

establish privity.” *Ericsson*, IPR2017-01197, Paper 56 at 8, 10 (PTAB Sept. 18, 2020). Since Petitioner bear the burden of persuasion, their failure to produce the contracts is dispositive.

**4. The Petition should be dismissed, because evidence of record shows that the Petition is time-barred.**

The Board need not evaluate whether Patent Owner’s evidence suffices to show that the Petition are time-barred, because Petitioner bear the burden of proof on that issue and have not even attempted to meet their burden. If the Board chooses to look at the evidence of record, however, it is clear that the Petitions are time-barred.

Whether two parties are privies with respect to one another is evaluated under the “common law” framework set forth in *Taylor v. Sturgell*, 553 U.S. 880 (2008). *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1317 (Fed. Cir. 2018); *see also* Office Trial Practice Guide at 13 (citing *Taylor*). *Taylor* identifies “a variety of pre-existing ‘substantive legal relationship[s]’ between” two parties that can create privity. *Taylor*, 553 U.S. at 894 (alterations in original). Among them are when two parties are “preceding and succeeding owners of property” and when one party acts as the “agent” for the other. *Id.* at 894-95. Here, Petitioner is in privity with Licensees. Since Licensees are time-barred, Petitioner is likewise time-barred.

**a. Petitioner act as Licensees’ “agent” for Licensees’ “have made” rights.**

Petitioner is in privity with Licensees, because, by virtue of their contracts with Licensees, they exercise Licensees' rights under the Licenses and are thus Licensees' agents.

It is well established that "agents and principals are in privity for res judicata purposes 'if the prior action concerned a matter within the agency.'" *Herrion v. Children's Hosp. Nat. Med. Ctr.*, 448 F. App'x 71, 73 (D.C. Cir. 2011). The D.C. Circuit is "hardly alone in this approach to privity between principals and their agents." *Herrion v. Children's Hosp. Nat. Med. Ctr.*, 786 F. Supp. 2d 359, 371 n.9 (D.D.C.), *aff'd*, 448 F. App'x 71 (D.C. Cir. 2011). Courts around the country have held similarly and the leading treatise on Federal procedure agrees. *Id.* (citing cases from the Supreme Court, First, Second, Third, Fifth, Sixth, Seventh, Ninth, and Eleventh Circuits); *Wright & Miller* § 4460 (3d ed.).

For example, in *John St. Leasehold, LLC v. Cap. Mgmt. Res., L.P.*, 283 F.3d 73, 75 (2d Cir. 2002), the FDIC contracted with asset managers to exercise its rights as receiver for a failed bank. The Second Circuit held that the asset managers were the FDIC's agents, acting within "the scope of their agency," and thus "in privity with the" FDIC. *Id.* at 75.

Likewise in *Fiumara v. Fireman's Fund Ins. Companies*, 746 F.2d 87, 87 (1st Cir. 1984), a motel operator sued his fire insurer for denying his claim. The motel operator lost and then sued the contractors the insurer used to investigate his claim.

*Id.* The First Circuit affirmed summary judgment for the contractors, holding that the contractors were “acting as agents of the” insurer and therefore “clearly qualify as persons in privity.” *Id.* at 92.

Finally, *In re Google LLC*, 949 F.3d 1338, 1346 (Fed. Cir. 2020) the Federal Circuit said that contracts between Google and an internet service provider to “[a]ssembl[e] equipment based on information and instructions provided by” Google were “suggestive of an agency relationship.”<sup>11</sup>

Here, Petitioner is in the same position as the (1) contract asset managers in *John St. Leasehold* acting on behalf of the FDIC and (2) the contract investigators acting on behalf of the insurance company in *Fiumara*, because Petitioner is likewise exercising the contractual rights of another party as its agent. The specific contractual rights are different—controlling the operation of a failed bank, investigating a fire, and making licensed products—but privity does not turn on the nature or scope of the agency. Here, Licensees could exercise their license rights by making the accused products themselves, but choose to “have [the accused products] made” by Petitioner instead, just as the FDIC or insurer could have exercised their rights directly, but chose to employ an agent. For privity, what matters is not the

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<sup>11</sup> The contractors were not “conducting Google’s business within the meaning of the [venue] statute,” but that is irrelevant for purposes of agency. *Id.* at 1346.

scope or nature of the agency, but whether “the prior action concerned a matter within the agency.” *Herrion*, 448 F. App’x at 73. Here, the manufacture of licensed or accused goods is obviously relevant to these proceedings.

Furthermore, as in *Google*, Petitioner likely “[a]ssembl[es] equipment”—or manufactures accused products—at Licensee’s instruction. For example, when MPS “typically require[s] a highly technical sales and applications engineering effort” and MPS maintains a staff of “applications engineers who work directly with customers’ engineers,” its actions are legally indistinguishable from the contractors in Google assembling equipment at Google’s direction. Ex. 2022, 6. Therefore, Petitioner is Licensees’ agent and is in privity with Licensees. *Herrion*, 448 F. App’x at 73.

Finally, to be in privity with Licensees, Petitioner does not need to be Licensees’ agent for these proceedings or the prior proceedings. What matters is whether Petitioner is an agent with respect to the facts giving rise to the parties’ dispute. In all of the examples cited above—*Herrion*, *St. John’s Leasehold*, *Fiumara*, and *Google*—the party held to be in privity was an agent with respects to the fact underlying the dispute, not the prior litigation. Nothing in any of those cases indicates that the party in privity was an agent with respect to the prior litigation.

Moreover, the Board has rejected the argument that § 315(b) “should not apply if a petitioner was not placed on notice of the [prior] infringement allegation” or if the petitioner lacked “the opportunity to participate in and control the District

Court litigation.” *Bungie*, IPR2015-01264, Paper 64 at 44. To the extent that control is relevant, it is Petitioner’s burden to show that they did not control the prior litigation. There is no evidence in the record to support such a finding, and “the lack of evidence [on that point] also precludes [the Board] from being able to find that Petitioner has met its burden.” *Id.* at 35.

**b. Petitioner and Licensees are “preceding and succeeding owners of property” and parties to sales of accused goods.**

It is undisputed that Petitioner on the one hand and Licensees on the other are “preceding and succeeding owners of” the licensed and/or infringing products, because Petitioner products are indisputably components of Licensees’ products.<sup>12</sup> *Taylor*, 553 U.S. at 894.

Petitioner also do not dispute that several of these Licensee products were accused in the prior litigation, including [REDACTED].

Under the America Invents Act (“AIA”), privity “extend[s] to parties to transactions and other activities relating to the property in question,” i.e., infringing

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<sup>12</sup> Petitioner apparently sells at least some of these accused models to parties other than licensees, such as online marketplaces. *See, e.g.*, Petitioner’s Opp. to Motion for Additional Discovery (Paper 12), 13. These sales and sales of other accused products are the subject of the current district court litigation.

goods. *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1318 (Fed. Cir. 2018) (quoting legislative history of the AIA). Here, the “transactions ... in question” are the sales Petitioner make to Licensees and “the property in question” is the goods conveyed in those sales. *Id.* Each sale of accused products to Licensees is a “transaction” regarding a piece of “property” which puts Petitioner and Licensees in privity. *WesternGeco*, 889 F.3d at 1318.

In their opposition to Greenthread’s discovery motion, MPS tried to distance itself from Licensees, by claiming to sell to Licensees through “commodity” sales. Paper 12, 2-6. This argument fails. First, MPS does not dispute that its products are components in Licensee products, including products accused in the prior litigation. If MPS believe that there is some relevance to its “commodity” sales, it must provide evidence showing how its products are sold and their contracts with Licensees.

Second, even if MPS’s claims were supported by evidence, making “commodity” sales does not change the fact that MPS has direct relationships with Licensees and make the products for Licensees. MPS says its products “typically require a highly technical sales and applications engineering effort” and Petitioner maintains a staff of “applications engineers who work directly with customers’ engineers.” Ex. 2022, 6.

Finally, how MPS's products end up in Licensees' products is irrelevant. MPS is still a preceding owner of property that was previously accused and is accused again, even if the property flows through another party.

**i. Petitioner and RPI are beneficiaries of Licensees' "agreement[] directly related" to the accused products.**

"[A]greements directly related to the product accused of infringing the patent at issue in this proceeding" satisfy Taylor's "pre-existing substantive legal relationship" test. *Ventex Co. v. Columbia Sportswear North America, Inc.*, IPR2017-00651, Paper 148 (PTAB Jan. 24, 2019) (precedential)). Here, Petitioner operates under and is a beneficiary of Licensees' agreements with Patent Owner. That agreement is "directly related to" the accused products. *Id.*

Under the Licenses, "any product" Licensees "have made" by Petitioner or "purchase" from Petitioner is a "Licensed Product or Service" which Licensees have the right to "use, ... sell, ... obtain, ... acquire, ... receive, ... and otherwise exploit." Ex. 2011-2012; Ex. 2022, 2-3; Ex. 2034, 2-3. Furthermore, the license grants a limited sublicense to Licensees' "have-made vendors" (for the limited purposes of making products for Licensees). Ex. 2011-2012; Ex. 2022, 5; Ex. 2034, 5. Petitioner is such vendors and therefore are (limited) sublicensees of Licensees under the Licenses. Even if that were not the case, "have-made vendors" are entitled to a limited implied license. *See LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694

F.3d 51, 73 (Fed. Cir. 2012). Therefore, Petitioner is a beneficiary of Licensees’ “agreements directly related to the product accused of infringing the patent at issue in this proceeding” satisfying Taylor’s “pre-existing substantive legal relationship” test. *Ventex*, IPR2017-00651, Paper 148 (precedential).

**ii. Petitioner’s licensed sales encumber otherwise infringing articles.**

Under the doctrine of exhaustion, a licensed “sale is treated, for purposes of patent exhaustion, as if the patentee made the sale itself. The result: The sale exhausts the patentee’s rights *in that item*.” *Impression Prod., Inc. v. Lexmark Int’l, Inc.*, 581 U.S. 360, 376 (2017) (emphasis added). Therefore, after Petitioner sells a product under the Licenses, any downstream user of the article sold would have an exhaustion defense against Patent Owner. Put differently, the “property” of which Petitioner and Licensees are “preceding and succeeding owners” becomes encumbered under the doctrine of exhaustion. *Taylor*, 553 U.S. at 894. Further, it does not matter whether the products were accused in the instant litigation or whether Petitioner even asserts a license defense. Petitioner still limits Patent owner’s rights vis-à-vis the “property” they sell under the Licenses by giving future owners an exhaustion defense. Thus, Petitioner effectively provides rights to third-parties under the Licenses and, therefore, is in privity with Licensees.

**5. Due Process and the policy underlying the AIA support dismissing the Petition.**

**a. Petitioner is trying to take inconsistent positions before the Board and in district court.**

“[T]o protect the integrity of the judicial process,” “courts have uniformly ... prohibit[ed] parties deliberately changing [litigation] positions according to the exigencies of the moment.” *New Hampshire v. Maine*, 532 U.S. 742, 750 (2001). That is what Petitioner is attempting here. Right now, Petitioner wants to claim that they are strangers to Licensees’ agreement, and therefore not in privity with them. But, Petitioner refuses to produce any evidence to support that conclusion or to say whether they will later claim the benefit of the agreement to reduce the likely damages against it in district court. Petitioner is “playing fast and loose” with the Board and the district court. *Id.* Petitioner stepped into Licensees’ shoes by making and selling products under their license. Petitioner should not be able to take those shoes off when standing before the Board, only to put them back on again when it appears in district court.<sup>13</sup>

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<sup>13</sup> Patent Owner is not suggesting that Petitioner could make their Petition timely by disclaiming a license defense in district court. Whether or not Petitioner actually asserts its license defense, they still have been acting under the license and reaping benefits from it, such as not owing any indemnity to Licensees. *Supra* § IX.A.2. Petitioner also has been selling goods subject to exhaustion, thereby limiting Patent Owner’s rights, whether or not Petitioner disclaims any license. *Supra* § IX.B.1.

**b. Petitioner's other interests are irrelevant.**

“Congress ‘chose language that bars petitions where proxies or privies would *benefit* from an instituted IPR, even where the petitioning party might separately have its own interest in initiating an IPR.” *Power Integrations, Inc. v. Semiconductor Comps. Indus., LLC*, 926 F.3d 1306, 1316 (Fed. Cir. 2019) (emphasis in original); *RPX Corp. v. Applications in Internet Time LLC*, IPR2015-01750, Paper 128 at 10 (PTAB Oct. 2, 2020) (precedential) (same). Therefore, the fact that the Petitioner benefits from a license that does not cover *all* of Petitioner sales is irrelevant. Petitioner *still benefits* from the license (and exercises Licensees’ “have made” rights). Therefore, Petitioner is privity with Licensees. Petitioner will have the opportunity to challenge the validity of the Challenged Patent in district court. The only question before the Board is whether Petitioner can avail themselves of *additional* challenges here. The answer Congress provided in § 315(b) is “no.”

**c. A finding in Petitioner's favor here would violate due process.**

A finding in favor of Petitioner on § 315(b) would violate Greenthread's constitutional right to due process. First, “[i]n almost every setting where important decisions turn on questions of fact, due process requires an opportunity to confront

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Petitioner cannot turn privity on and off at will. Patent Owner's point is simply that Petitioner's apparent strategy is unfair and the Board should not condone it.

and cross-examine adverse witnesses.” *Goldberg v. Kelly*, 397 U.S. 254, 269 (1970). Here, the Board suggests that there is “no factual support in the record” “sufficient to demonstrate privity for purposes of nonparty preclusion.” Paper 23, 32. But this is due to the denial of PO’s motion for additional discovery (Paper 8), which requested additional information key to this inquiry. Instead, Petitioner made various factual assertions in its opposition to support institution, which the Board apparently relied on, such as Petitioner’s assertion that it merely has “commodity” sales with Licensees. Opposition (Paper 12), 2-6. But there is no evidence to support this conclusion in the record, just the statement from Petitioner’s attorney. Greenthread has had no opportunity to cross examine any witness about those assertions or see relevant documents, because Petitioner did not identify a declarant, other than Petitioner’s counsel, and was not required to produce any documents.

Second, “where governmental action seriously injures an individual, and the reasonableness of the action depends on fact findings, the evidence used to prove the Government’s case must be disclosed to the individual so that he has an opportunity to show that it is untrue.” *Greene v. McElroy*, 360 U.S. 474, 496 (1959). Here, Greenthread has received no notice of any evidence to support a finding for Petitioner under § 315(b). For example, it is undisputed that Petitioner has a customer-supplier relationship with time-barred parties and that such relationships can create privity. However, neither Greenthread has not seen the documents

governing petitioner's relationships, or any other evidence to support a finding for Petitioner under § 315(b). Therefore, Greenthread has not had the "opportunity to show that [Petitioner's assertions about the facts are] untrue." *Id.*

## IX. THE AIA IS UNCONSTITUTIONAL.

The Board should dismiss this IPR, because the AIA violates the Supreme Court's non-delegation doctrine and the Constitution. "Congress generally cannot delegate its legislative power to [the Executive] Branch" without identifying an "intelligible principle" to guide the Executive's exercise of that power. *Mistretta v. United States*, 488 U.S. 361, 372 (1989). In determining whether a statutory scheme violates the non-delegation doctrine, Courts consider "(1) whether Congress has delegated power to the agency that would be legislative power but-for an intelligible principle to guide its use and, if it has, (2) whether it has provided an intelligible principle such that the agency exercises only executive power." *Jarkesy v. Sec. & Exch. Comm'n*, 34 F.4th 446, 461 (5th Cir. 2022).

The power to determine whether a dispute proceeds before an "Article III court" or in an "agency adjudication" is a "legislative power" "that Congress uniquely possesses." *Id.* at 462. Here, Greenthread and Petitioner is currently litigating its dispute, including the issue of patent validity, in Article III Courts. In the AIA, however, Congress delegated to the Director the power to determine whether the PTAB should decide the very same dispute. In other words, the Director

decides whether Greenthread “should receive *certain legal processes* (those accompanying Article III proceedings)” such as the protections of a jury trial and the clear and convincing evidence standard for patent validity. *Id.* (emphasis in original); *see also Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. 91, 95 (2011) (affirming the clear and convincing evidence standard).

In § 314(a), Congress has told the Director when she can institute proceedings—i.e., only if “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims”—but once that criterion is satisfied, the decision to institute is committed “to the Director's unreviewable discretion” without any further guiding principle. 35 U.S.C. § 314(a); *United States v. Arthrex, Inc.*, 141 S. Ct. 1970, 1977 (2021); *Apple Inc. v. Vidal*, 63 F.4th 1, 6 (Fed. Cir. 2023). After making the threshold finding under § 314(a), the Director can institute or not institute for any reason, no reason, or a completely arbitrary reason, like the flip of a coin. She could institute every petition meeting the § 314(a) or no petitions at all, if she prefers. She need not give any reasons for her decision. Since Congress provided no intelligible principle for the Director to apply in deciding whether to institute IPR proceedings, the statute governing these proceedings is unconstitutional and the Petition must be dismissed.

**X. CONCLUSION**

For the foregoing reasons, Petitioner has failed to prove by a preponderance of the evidence that any of the Challenged Claims are unpatentable. Patent Owner respectfully requests that the Board confirm the patentability of the Challenged Claims and enter judgment against Petitioner.

Dated: January 9, 2025

Respectfully submitted,

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**CERTIFICATE OF WORD COUNT**

The undersigned hereby certifies that the portions of the above-captioned **PATENT OWNER'S RESPONSE** specified in 37 C.F.R. § 42.24 have 12,718 words, in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24(b)(1). This word count was prepared using Microsoft Word 2016 (12,571 words counted) and by hand (147 words included in figure annotations).

Dated: January 9, 2025

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**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that the foregoing **PATENT OWNER'S RESPONSE** and supporting exhibits were served electronically via e-mail on **January 9, 2025**, in its entirety on the following counsel of record for Petitioner:

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