

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY  
LIMITED,  
Petitioner,

v.

ALIDDOUBLE, INC.,  
Patent Owner.

---

IPR2023-00374  
Patent 6,168,965 B1

---

Before KRISTINA M. KALAN, CHRISTOPHER M. KAISER,  
and JEFFREY W. ABRAHAM, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

DECISION  
Granting Institution of *Inter Partes* Review  
35 U.S.C. § 314, 37 C.F.R. § 42.4

## I. INTRODUCTION

### A. *Background and Summary*

Taiwan Semiconductor Manufacturing Company Limited (“Petitioner”) filed a petition for an *inter partes* review (Paper 1 (“Pet.”)) challenging claims 1, 2, and 7–10 of U.S. Patent No. 6,168,965 B1 (Ex. 1001 (“the ’965 patent”)). Alidouble, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2022). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless the Director determines . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

For the reasons set forth below, we determine the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, we institute an *inter partes* review.

### B. *Real Parties-in-Interest*

Each party identifies itself as the real party-in-interest. Pet. 85; Paper 3, 1.

### C. *Related Matters*

The parties identify *Alidouble Inc. v. Taiwan Semiconductor Manufacturing Company Limited*, Case No. 2:21-cv-00452-JRG (E.D. Tex.), and *Alidouble Inc. v. Taiwan Semiconductor Manufacturing Company Limited*, Case No. 2:22-cv-00298-JRG (E.D. Tex.), as related matters. Pet. 85; Paper 3, 1.

*D. The '965 Patent*

The '965 patent, titled “Method for Making Backside Illuminated Image Sensor,” issued on January 2, 2001. Ex. 1001, codes (45), (54). The patent “relates to a method for fabricating backside illuminated image sensors.” *Id.* at 1:6–8. According to the '965 patent, “conventional methods for fabricating backside illuminated image sensors are expensive” because some methods “require non-standard fabrication process steps” that “are performed to control the potential on the backside of the wafer during fabrication.” *Id.* at 4:13–20. “In addition, packaging of conventional backside illuminated image sensors is performed after image sensor fabrication is completed,” which “is logistically complex and produces high production costs.” *Id.* at 4:21–29. In contrast, the '965 patent describes a fabrication process that “is performed using standard wafer processing techniques and equipment.” *Id.* at 8:47–50.

The method of the '965 patent includes forming an image sensor circuit “on a frontside surface of the semiconductor substrate that is facing away from the image source,” with “a photodiode diffusion region that extends into the surface from the frontside surface,” as well as “several metal lines [that] are formed in an insulator material that is formed on the frontside surface.” *Id.* at 5:19–26. The wafer is secured “onto a protective substrate . . . with [the] first surface . . . facing [the] protective substrate.” *Id.* at 6:28–29. Material is removed “from [the] second surface . . . of the wafer . . . until the light-sensitive pixel region[s] of [the] image sensor circuits . . . are effectively exposed through the second surface” of the wafer. *Id.* at 6:44–48. “[A] transparent (e.g., glass) substrate” is secured “onto the second surface . . . of the wafer . . . , thereby producing a waferwise sandwich.” *Id.* at 7:57–60. This “waferwise sandwich is sliced along

lines . . . that extend into grooves . . . , thereby separating die-sized sections . . . into separate backside-illuminated image sensor devices.” *Id.* at 8:40–44.

*E. Illustrative Claims*

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

1. A method of producing backside illuminated image sensors comprising the steps of:

producing a plurality of image sensor circuits on a wafer having first and second surfaces each of the image sensor circuits being formed on the first surface and including a matrix of light-sensitive pixel regions extending into the wafer from the first surface;

securing the wafer onto a protective substrate such that the first surface faces the protective substrate;

removing material from the second surface of the wafer until the light-sensitive pixel regions of each image sensor circuit are effectively exposed through the second surface;

securing a transparent substrate onto the second surface of the wafer, thereby producing a waferwise sandwich;

and

slicing the waferwise sandwich, thereby defining a plurality of backside illuminated image sensors.

Ex. 1001, 11:15–33.

*F. Asserted Unpatentability Challenges*

Petitioner asserts that claims 1, 2, and 7–10 are unpatentable based on the following challenges:

| Claim(s) Challenged | 35 U.S.C. § <sup>1</sup> | Reference(s)/Basis         |
|---------------------|--------------------------|----------------------------|
| 1, 2, 7–9           | 103                      | Nixon <sup>2</sup>         |
| 10                  | 103                      | Nixon, Assadi <sup>3</sup> |
| 1, 2, 7–9           | 103                      | Badihi <sup>4</sup>        |
| 10                  | 103                      | Badihi, Assadi             |

Petitioner relies on the declaration of Konstantinos P. Giapis, Ph.D.  
Ex. 1003, the “Giapis Declaration.”

## II. ANALYSIS

### A. *Legal Standards*

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is unpatentable under 35 U.S.C. § 103 if “the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to

---

<sup>1</sup> The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103. Because the ’965 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA version of § 103.

<sup>2</sup> US 6,429,036 B1, issued Aug. 6, 2002 (Ex. 1004).

<sup>3</sup> US 6,642,963 B1, issued Nov. 4, 2003 (Ex. 1044).

<sup>4</sup> A. Badihi, *ShellCase Ultrathin Chip Size Package*, in PROCS. INT’L SYMPOSIUM ON ADV. PACKING MATERIALS, PROCESSES, PROPERTIES AND INTERFACES, IEEE, pp. 236–40 (Mar. 1999) (Ex. 1101).

which the claimed invention pertains.” 35 U.S.C. § 103. The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when present, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To show obviousness, it is not enough to merely show that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). “Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.* (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007)). “This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *KSR*, 550 U.S. at 418–19. On the other hand, an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). Nevertheless, “[a] factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *KSR*, 550 U.S. at 421.

*B. Level of Ordinary Skill in the Art*

Petitioner asserts that a person of ordinary skill in the art would have had “a Master’s degree in electrical engineering, computer engineering, or physics with at least two years of industry experience in integrated circuit design, layout, packaging or fabrication,” as well as that “[a] greater level of experience may compensate for less education, and vice versa.” Pet. 13 (citing Ex. 1003 ¶ 56). Patent Owner does not challenge Petitioner’s definition or offer its own but “reserves the right to dispute Petitioner’s definition of a [person of ordinary skill in the art] if an IPR is instituted.” Prelim. Resp. 8–9.

In light of the record before us, and for purposes of this Decision, we adopt Petitioner’s proposal regarding the level of ordinary skill in the art. Based on our review of the ’965 patent and the prior art of record, we determine that the definition offered by Petitioner comports with the qualifications a person would have needed to understand and implement the teachings of the ’965 patent and the prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required “where the prior art itself reflects an appropriate level and a need for testimony is not shown”) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)).

*C. Claim Construction*

In an *inter partes* review, we construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b). Under *Phillips*, claim terms are afforded “their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312. “[T]he ordinary and customary meaning of a claim term is the

meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. “Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.*

Petitioner does not propose any terms for construction. Pet. 13. Patent Owner, however, argues that the term “effectively exposed” must be construed. Prelim. Resp. 9–10. Specifically, Patent Owner argues that “[t]he ’965 patent specification defines this term to mean ‘the pixel of each light-sensitive pixel region generates electron flow in response to light (photons) passing through [the] second surface.’” *Id.* at 9 (quoting Ex. 1001, 6:48–51).

To define specific terms used to describe an invention, an inventor must do so “with reasonable clarity, deliberateness, and precision” and must “‘set out his uncommon definition in some manner within the patent disclosure’ so as to give one of ordinary skill in the art notice of the change” in meaning. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (quoting *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1387–88 (Fed. Cir. 1992)). As Patent Owner notes, the ’965 patent states that “[t]he term ‘effectively exposed’ is used herein to indicate that the pixel of each light-sensitive pixel region generates electron flow in response to light (photons) passing through [the] second surface.” Ex. 1001, 6:48–51; Prelim. Resp. 9–10. This language suggests that some electron flow in response to light is necessary for a region to be “effectively exposed.” But, as Petitioner notes, Pet. 31 n.5, the ’965 patent also says that

[t]he exposed backside surface of the semiconductor substrate is then subjected to the material erosion process . . . to thin the

semiconductor substrate until the semiconductor substrate is transparent to visible light, thereby effectively exposing the light-sensitive pixel diffusion regions of the image sensor circuit through the backside surface.

Ex. 1001, 4:61–5:4. This suggests that merely the transparency of the overlying structure to visible light is sufficient for the underlying structure to be “effectively exposed.”

Given the ambiguity in the present record, we do not agree with Patent Owner that the ’965 patent defines “effectively exposed” sufficiently clearly and precisely that we can conclude that it means “the pixel of each light-sensitive pixel region generates electron flow in response to light (photons) passing through [the] second surface.” Instead, on the present record, we synthesize the different uses of the term within the Specification to arrive at a preliminary conclusion that the term means “having a semiconductor substrate that is thin enough to be transparent to visible light, thereby rendering the pixels of the light sensitive pixel regions capable of generating electron flow in response to light (photons) passing through the substrate.” For purposes of this decision, we adopt this construction of the term “effectively exposed,” but we encourage both parties to address the construction of this term during trial.

After considering the arguments and information presented in the Petition and Preliminary Response, we determine that we do not need to expressly construe any additional terms for purposes of this Decision. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”)).

*D. Discretion under 35 U.S.C. § 314(a)*

Under 35 U.S.C. § 314(a), the Director has discretion to deny institution. In determining whether to exercise that discretion on behalf of the Director, we are guided by the Board’s precedential decision in *NHK Spring Co., Ltd. v. Intri-Plex Technologies, Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (designated precedential).

In *NHK*, the Board found that the “advanced state of the district court proceeding” was a “factor that weighs in favor of denying” the petition under § 314(a). *NHK*, Paper 8 at 20. The Board determined that “[i]nstitution of an *inter partes* review under these circumstances would not be consistent with ‘an objective of the AIA . . . to provide an effective and efficient alternative to district court litigation.’” *Id.* (citing *Gen. Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 16–17 (PTAB Sept. 6, 2018) (designated precedential in relevant part)).

“[T]he Board’s cases addressing earlier trial dates as a basis for denial under *NHK* have sought to balance considerations such as system efficiency, fairness, and patent quality.” *Apple Inc. v. Fintiv Inc.*, IPR2020-00019, Paper 11 at 5 (PTAB Mar. 20, 2020) (designated precedential). *Fintiv* sets forth six non-exclusive factors for determining “whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding.” *Id.* at 6. These factors are reproduced below:

1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
2. proximity of the court’s trial date to the Board's projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;

4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board's exercise of discretion, including the merits.

In evaluating the factors, we take a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review. *Fintiv*, Paper 11 at 6. We are also guided by the Director's Memorandum, *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation*, issued June 21, 2022 ("Guidance Memo"),<sup>5</sup> which provides several clarifications concerning the application of the *Fintiv* factors. One such clarification instructs that "the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB." Guidance Memo 3 (emphasis omitted); *see also id.* at 7–8. Thus, we will not exercise our discretion to deny institution if a petitioner makes the stipulation provided in *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (PTAB Dec. 1, 2020) (precedential as to § II.A).

Petitioner argues that it has made a *Sotera*-type stipulation that "precludes discretionary denial under § 314(a)." Pet. 87. Specifically, Petitioner

---

<sup>5</sup> Available at [https://www.uspto.gov/sites/default/files/documents/interim\\_proc\\_discretionary\\_denials\\_aia\\_parallel\\_district\\_court\\_litigation\\_memo\\_20220621\\_.pdf](https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf).

stipulates that if the PTAB institutes *inter partes* review in relation to any petition filed by [Petitioner] with respect to the '965 patent, Petitioner will not pursue in the district court litigation any ground raised or that could have been reasonably raised in the instituted IPR with respect to the patent claim subject to the instituted IPR.

*Id.*

Patent Owner argues that we should exercise discretion to deny institution in light of the advanced stage of the parallel district court litigation. Prelim. Resp. 10–13. Patent Owner also argues that Petitioner's stipulation is insufficient both (1) because "Petitioner has not filed a stipulation in district court" and (2) because Petitioner's stipulation "is significantly narrower than the [stipulation] that was considered by the Board in *Sotera*." *Id.* at 12–13.

On the present record, we are not persuaded by Patent Owner's first argument. The Guidance Memo provides that "the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding [the relevant grounds]." Guidance Memo 3 (emphasis omitted). This is because, "[w]hen a petitioner stipulates not to pursue in a parallel district court proceeding [the relevant grounds], it mitigates concerns of potentially conflicting decisions and duplicative efforts between the district court and the PTAB." *Id.* at 7. All the Guidance Memo requires, therefore, is that Petitioner "stipulate[]" or "present[] a stipulation," not that the stipulation be filed in district court. *Id.* at 3, 7. Accordingly, we do not discount Petitioner's stipulation because Petitioner failed to file it in district court.

Patent Owner’s second argument is more persuasive. According to the Guidance Memo, we should not exercise discretion to deny institution where a petitioner “stipulates not to pursue in a parallel district court proceeding the same grounds as in the petition or any grounds that could have reasonably been raised in the petition.” *Id.* at 7. Here, Petitioner’s stipulation makes use of this language but is limited “to the patent claim subject to the instituted IPR.” Pet. 87. This leaves open the possibility that Petitioner might still raise in the parallel district court proceeding a ground that it asserted or reasonably could have asserted here with respect to a claim that is not subject to an instituted IPR. There are several such claims here that would not be subject to an instituted IPR, because the Petition does not challenge claims 3–6 or 11. *Id.* at 1–84. Each of those claims depends from one or more of the claims challenged here. Ex. 1001, 11:39–12:18, 12:46–49. Accordingly, the possibility exists that the district court could make findings about the invalidity of the claims not challenged in this IPR, but dependent on claims that are challenged in this IPR, potentially leading to conflicting decisions. The fact that this possibility exists shows that Petitioner’s stipulation does not mitigate the risk of duplicative proceedings and conflicting decisions to the same degree as the stipulation in *Sotera*. Accordingly, we do not find that this stipulation implicates the Guidance Memo’s prohibition against discretionary denial where a *Sotera*-type stipulation is presented. Thus, we must consider the *Fintiv* factors.

Neither party has directed us to any evidence that the district court has stayed or is likely to stay the parallel proceeding, so the first factor is neutral. Trial in the parallel proceeding is scheduled to begin on May 6, 2024, approximately two and a half months before our final written decision would be due, so the second factor weighs somewhat in favor of exercising

discretion to deny institution. Ex. 2004, 1. As of the date when our institution decision is due, there will be significant work left to do in the parallel proceeding, including claim construction, fact and expert discovery, and dispositive motions, so the third factor weighs against discretionary denial. *Id.* at 1–4. Although, as discussed above, Petitioner’s stipulation does not eliminate the possibility of overlapping issues here and in the parallel proceeding, it does minimize that possibility, so the fourth factor weighs somewhat against discretionary denial. Petitioner here is the defendant in the parallel proceeding, so the fifth factor weighs in favor of discretionary denial. Finally, neither party raises additional circumstances impacting our exercise of discretion, so the sixth factor is neutral. Considering these factors as a whole, we are not persuaded the efficiency and integrity of the system would be best served by exercising discretion to deny institution. Having evaluated all of the *Fintiv* factors, and taking into account Petitioner’s stipulation, we determine that the circumstances presented here do not warrant exercising our discretion under § 314(a) to deny institution.

*E. Asserted Obviousness over Nixon*

Petitioner contends claims 1, 2, and 7–9 are unpatentable because they would have been obvious in view of Nixon. Pet. 26–47.

*1. Nixon*

Nixon “relates to . . . the manufacturing of CMOS image sensors capable of backside illumination.” Ex. 1004, 1:8–10. Nixon’s image sensors are “packaged at the wafer level using semiconductor manufacturing processes,” which “results in lower cost, particularly for smaller dies.” *Id.* at 1:66–2:1, 3:16–17. The sensor of Nixon has a silicon substrate “sandwiched between two thin protective plates” made from glass. *Id.*

at 2:1–3, 2:26–28, 2:49–52, Figs. 1, 2. The pixels of the image sensor circuits “are positioned at the top surface . . . of the silicon substrate.” *Id.* at 2:8–10, Figs. 1, 2. One of the protective plates is notched to expose underlying metal pads for connection to electrical leads. *Id.* at 1:65–2:10, 2:15–22, Figs. 1, 2. One embodiment of Nixon has “electrical leads . . . and pads [that] are moved to the top surface . . . of the image sensor.” *Id.* at 2:16–22, Fig. 2.

2. *Analysis*

a) *Claim 1*

The preamble of claim 1 of the ’965 patent recites “[a] method of producing backside illuminated image sensors.” Ex. 1001, 11:15–16. Petitioner argues that “Nixon discloses” the preamble of claim 1.<sup>6</sup> Pet. 26–27 (quoting Ex. 1004, 1:8–10). Patent Owner does not dispute Petitioner’s argument at this time. Prelim. Resp. 15–20. On the present record, Petitioner shows sufficiently that Nixon discloses the preamble of claim 1. Ex. 1004, 1:8–10 (“This invention relates . . . to the manufacturing of CMOS image sensors capable of backside illumination.”).

Claim 1 next recites “producing a plurality of image sensor circuits on a wafer having first and second surfaces, each of the image sensor circuits being formed on the first surface and including a matrix of light-sensitive pixel regions extending into the wafer from the first surface.” Ex. 1001, 11:17–21. Petitioner argues that Nixon discloses this limitation, and Patent Owner does not dispute Petitioner’s argument. Pet. 27–29 (citing Ex. 1003 ¶¶ 84–86; Ex. 1004, code (57), 1:65–2:10, 2:22–35; Ex. 1005, Figs. 2–4); Prelim. Resp. 15–20. Nixon discusses “[a] CMOS image sensor” that

---

<sup>6</sup> We express no opinion on whether the preamble is limiting.

“allow[s] the light sensitive area of the die to be illuminated from either the front side or the backside, or both.” Ex. 1004, code (57). The pixels of Nixon’s image sensor “are positioned at the top surface . . . of the silicon substrate.” *Id.* at 1:65–2:10. Thus, on the present record, Petitioner shows sufficiently that Nixon discloses this limitation.

Claim 1 recites “securing the wafer onto a protective substrate such that the first surface faces the protective substrate.” Ex. 1001, 11:22–23. Petitioner argues that Nixon discloses this limitation. Pet. 29–31 (citing Ex. 1004, 2:1–6, 2:22–36, Figs. 2, 4A; Ex. 1005, Figs. 2, 4). Patent Owner disagrees, arguing both that Petitioner fails to show that Nixon’s substrate provides structural support and that Petitioner fails to show that Nixon’s substrate is non-transparent. Prelim. Resp. 15–18. Nixon’s “thin silicon substrate . . . is sandwiched between two thin protective plates” attached by “[a]n epoxy adhesive layer.” Ex. 1004, 2:1–6. The “first glass plate,” described also as “a thin protective layer,” “is bonded while the active surface of the silicon wafer is facing up into the encapsulate.” *Id.* at 2:22–31.

Patent Owner argues that the ’965 patent uses the word “protective” to mean that a protective substrate provides structural support. Prelim. Resp. 15–17 (citing Ex. 1001, code (57), 4:48–50). There is language to this effect in the ’965 patent. Ex. 1001, code (57) (“With the protective substrate providing structural support”), 4:48–50 (“because the method utilizes a protective substrate to support the semiconductor substrate”). When the ’965 patent makes these statements, it is discussing the invention as a whole rather than any individual embodiment. *Id.* But, on the present record, we are not persuaded that the ’965 patent defines “protective” so clearly and precisely as to constitute a redefinition of the term under

*Paulsen.* We invite both parties, within the limits imposed by our rules, to supplement the record as to the proper interpretation of the term “protective” during trial. On the present record, we consider Nixon’s description of the first glass plate as “protective” sufficient to show, at least for purposes of institution, that this plate is “protective.” Ex. 1004, 2:1–6, 2:22–31.

Patent Owner also argues that, to constitute a protective substrate within the meaning of claim 1, a substrate must be non-transparent. Prelim. Resp. 17–18. Specifically, Patent Owner argues that the claim’s recitation of both “protective substrate” and “transparent substrate,” together with the rule that “[d]ifferent terms in the same claim usually have different meanings,” means that the protective substrate must be non-transparent.<sup>7</sup> *Id.* We disagree. It is true that different terms in the same claim generally mean different things. *See Neville v. Aldridge Contr., Inc.*, 825 F. App’x 808 (Fed. Cir. 2020); *Firstface Co., Ltd. v. Apple Inc.*, 859 F. App’x 579 (Fed. Cir. 2021). But this does not mean that the structures referred to by the terms in question cannot share any characteristics in common. Here, there must be a protective substrate and a transparent substrate, so there could not be a single structure that fulfills both roles. In addition, the protective substrate would need to be protective, and the transparent substrate would need to be transparent, but we are not presented with any reason that the protective substrate could not also be transparent or that the transparent substrate could not also be protective. On the present record, Petitioner shows sufficiently that Nixon discloses this limitation.

---

<sup>7</sup> Patent Owner does not make the correlated argument that the “transparent substrate” of claim 1 also must be non-protective.

Claim 1 next recites “removing material from the second surface of the wafer until the light-sensitive pixel regions of each image sensor circuit are effectively exposed through the second surface.” Ex. 1001, 11:24–27. Petitioner argues that Nixon discloses this limitation. Pet. 31–32 (citing Ex. 1004, 2:36–41, 3:7–17, Fig. 4B). Based on its proposed construction of “effectively exposed,” Patent Owner argues that Petitioner fails to show sufficiently that Nixon teaches this limitation. Prelim. Resp. 18–20. As discussed above with respect to claim construction, on the present record, we do not adopt Patent Owner’s proposed construction of the term “effectively exposed.” Instead, we interpret the term as “having a semiconductor substrate that is thin enough to be transparent to visible light, thereby rendering the pixels of the light sensitive pixel regions capable of generating electron flow in response to light (photons) passing through the second surface.” Nixon teaches that “the silicon wafer . . . is ground to a predetermined thickness” that “allows for the light sensitive area of the die . . . to be illuminated from . . . the back side.” Ex. 1004, 2:36–41, 3:7–17, Fig. 4B. Thus, on the present record, Petitioner shows sufficiently that Nixon discloses this limitation.

Claim 1 recites “securing a transparent substrate onto the second surface of the wafer, thereby producing a waferwise sandwich.” Ex. 1001, 11:29–30. Petitioner argues that Nixon discloses this limitation. Pet. 32–34 (citing Ex. 1004, code (57), 1:37–47, 1:65–2:10, 2:49–57, Figs. 2, 4A–4G). Patent Owner does not dispute Petitioner’s argument at this time. Prelim. Resp. 15–20. Nixon’s “thin silicon substrate . . . is sandwiched between two thin protective plates” attached by “[a]n epoxy adhesive layer.” Ex. 1004, 2:1–6. The “second glass plate . . . is bonded onto the back side of the

silicon dies.” *Id.* at 2:49–57, Fig. 4D. Thus, on the present record, Petitioner shows sufficiently that Nixon discloses this limitation.

Claim 1 next recites “slicing the waferwise sandwich, thereby defining a plurality of backside illuminated image sensors.” Ex. 1001, 11:32–33. Petitioner argues that Nixon discloses this limitation. Pet. 34–35 (citing Ex. 1004, 3:1–6, Fig. 4G). After bonding the second glass plate to the silicon dies, Nixon teaches that “the wafer is diced into individual packaged dies . . . along score lines.” Ex. 1004, 3:1–6, Fig. 4G. Thus, on the present record, Petitioner shows sufficiently that Nixon discloses this limitation.

As discussed above, we encourage both parties, to the extent permitted by our rules, to address during trial the question of the proper interpretation of “protective” and “effectively exposed” in the claims of the ’965 patent. On the present record, however, we determine that Petitioner has shown sufficiently that Nixon teaches the subject matter of claim 1. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 1 would have been obvious in view of Nixon.

*b) Claim 2*

Claim 2 depends from claim 1 and adds limitations reciting “wherein the step of securing the protective substrate onto the first surface comprises depositing an adhesive onto the protective substrate, and then placing the wafer onto the protective substrate such that the first surface contacts the deposited adhesive.” Ex. 1001, 11:34–38. Petitioner argues that Nixon teaches or suggests these limitations. Pet. 35–38 (citing Ex. 1003 ¶ 100; Ex. 1004, 1:65–2:10, 2:26–31, Fig. 2). On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 15–20. We have reviewed Petitioner’s argument and the cited evidence, and, on the present record,

Petitioner shows sufficiently that Nixon suggests the limitations of claim 2. Ex. 1003 ¶ 100; Ex. 1004, 1:65–2:10, 2:26–31, Fig. 2. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 2 would have been obvious in view of Nixon.

*c) Claim 7*

Claim 7 depends from claim 1 and adds limitations reciting “wherein the step of securing a transparent substrate onto the second surface comprises depositing an adhesive onto the second surface, and then placing the transparent substrate onto the deposited adhesive.” Ex. 1001, 12:19–23. Petitioner argues that Nixon teaches or suggests these limitations. Pet. 38–42 (citing Ex. 1003 ¶¶ 106–107; Ex. 1004, 1:65–2:10, 2:49–57, Figs. 2, 4D). On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 15–20. We have reviewed Petitioner’s argument and the cited evidence, and, on the present record, Petitioner shows sufficiently that Nixon suggests the limitations of claim 7. Ex. 1003 ¶¶ 106–107; Ex. 1004, 1:65–2:10, 2:49–57, Figs. 2, 4D. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 7 would have been obvious in view of Nixon.

*d) Claim 8*

Claim 8 depends from claim 7 and adds limitations reciting “wherein the step of removing material includes separating each of the plurality of image sensor circuits; and wherein the step of depositing the adhesive onto the second surface further comprises depositing adhesive into interstices located between the plurality of image sensor circuits, thereby protecting the image sensor circuits.” Ex. 1001, 12:24–31. Petitioner argues that Nixon discloses these limitations. Pet. 42–44 (citing Ex. 1004, 2:43–58, 3:7–17, Figs. 3, 4C, 4D). On the present record, Patent Owner does not dispute this

argument. Prelim. Resp. 15–20. We have reviewed Petitioner’s argument and the cited evidence, and, on the present record, Petitioner shows sufficiently that Nixon discloses the limitations of claim 8. Ex. 1004, 2:43–58, 3:7–17, Figs. 3, 4C, 4D. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 8 would have been obvious in view of Nixon.

*e) Claim 9*

Claim 9 depends from claim 1 and adds limitations reciting “forming metal leads on the protective substrate after the step of securing the transparent substrate, wherein the metal leads are connected to metal contact pads located on the first surface of the wafer.” Ex. 1001, 12:32–36. Petitioner argues that Nixon teaches or suggests these limitations. Pet. 44–47 (citing Ex. 1003 ¶¶ 120–121; Ex. 1004, 2:6–9, 2:20–22, 2:58–67, Figs. 1, 2, 4F; Ex. 1047, Fig. 4). On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 15–20. We have reviewed Petitioner’s argument and the cited evidence, and, on the present record, Petitioner shows sufficiently that Nixon discloses the limitations of claim 9. Ex. 1003 ¶¶ 120–121; Ex. 1004, 2:6–9, 2:20–22, 2:58–67, Figs. 1, 2, 4F; Ex. 1047, Fig. 4. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 9 would have been obvious in view of Nixon.

*F. Asserted Obviousness in View of Nixon and Assadi*

Petitioner contends claim 10 is unpatentable because it would have been obvious in view of Nixon and Assadi. Pet. 47–55.

*1. Assadi*

Assadi “relates to optical devices and more particularly to protecting and/or stabilizing color filter material overlying optical devices.” Ex. 1044, 1:8–10. Assadi discloses an “image sensor.” *Id.* at 4:27. “Overlying the top

surface of [the] image sensor . . . is [a] transparent passivation layer.” *Id.* at 4:35–37, Fig. 3b. This layer “is, for example, silicon nitride . . . or silicon oxynitride,” which “are chosen because of their transparent properties and their particular resistance to environmental contaminants, particularly moisture.” *Id.* at 4:37–41.

## 2. *Analysis*

Petitioner argues that a person of ordinary skill in the art would have had a reason to combine the teachings of Assadi with those of Nixon. Pet. 47–49. On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 21. Petitioner directs us to evidence that a person of ordinary skill in the art would have seen a benefit to adding Assadi’s passivation layer to Nixon’s CMOS image sensor. Ex. 1003 ¶¶ 123–124 (testifying that passivation layers protect microelectronics “from abrasion, moisture, or contaminants” and that “it was very well-known and highly conventional that passivation layers should be included in CMOS image sensors”); Ex. 1044, 4:26–44 (passivation layers have “particular resistance to environmental contaminants, particularly moisture”). Thus, Petitioner shows sufficiently that that a person of ordinary skill in the art would have had reason to combine to the teachings of Assadi with those of Nixon.

Claim 10 depends from claim 1 and recites three additional limitations. Ex. 1001, 12:37–44. The first of these limitations is “wherein the step of securing the wafer onto a protective substrate further comprises: forming a passivation layer on the first surface of the wafer.” *Id.* at 12:37–41. Petitioner argues that the combination of Nixon and Assadi teaches or suggests this limitation. Pet. 49–52. On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 21. Assadi teaches a passivation layer formed over “the entirety of” a CMOS image sensor.

Ex. 1044, 4:15–45, Fig. 3b. Although Assadi’s image sensor is front-side illuminated, Petitioner directs us to evidence that could support a finding that a person of ordinary skill in the art would have applied the same passivation layer to a back-side illuminated sensor, such as that taught by Nixon. Ex. 1003 ¶ 130 (back-side illuminated image sensors “have the same concerns [as front-side illuminated sensors] regarding abrasion, moisture, and contaminants”). Thus, Petitioner shows sufficiently that the combination of Nixon and Assadi teaches or suggests this limitation.

Claim 10 next recites “forming openings in the passivation layer.” Ex. 1001, 12:42. Petitioner argues that the combination of Nixon and Assadi teaches or suggests this limitation. Pet. 52–54. On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 21. Assadi teaches making openings in its passivation layer for connection to its bond pads, and Nixon teaches exposing its bond pads for connection to the outside world. Ex. 1004, 2:58–67, Figs. 1, 2, 4; Ex. 1044, 4:15–45, Fig. 3b; Ex. 1047, Fig. 4. Thus, Petitioner shows sufficiently that the combination of Nixon and Assadi teaches or suggests this limitation.

Claim 10 also recites “securing the protective substrate onto the passivation layer.” Ex. 1001, 12:43–44. Petitioner argues that the combination of Nixon and Assadi teaches or suggests this limitation. Pet. 54–55. On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 21. Assadi teaches forming its passivation layer directly on the surface of the semiconductor substrate, and Nixon teaches that its glass plate “creates a complete protective enclosure for each die,” suggesting that the plate should be placed on the outside. Ex. 1004, 2:49–

57; Ex. 1044, 4:15–45, Fig. 3b. Thus, Petitioner shows sufficiently that the combination of Nixon and Assadi teaches or suggests this limitation.

Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 10 would have been obvious in light of Nixon and Assadi.

*G. Asserted Obviousness over Badihi*

Petitioner contends claims 1, 2, and 7–9 are unpatentable because they would have been obvious in view of Badihi. Pet. 55–76.

*1. Badihi*

Badihi relates to “[t]he ShellCase [Chip Size Package (CSP)],” a “fully packaged integrated circuit [that] can be as small and thin as the chip itself” and that “is distinguished by its ultra-thin profile, its reliability, and its cost-effective wafer-level process.” Ex. 1101, 236. According to Badihi, this process can be used for CMOS image sensors. *Id.* at 239. In Badihi’s process, a first “thin protective glass layer is bonded to the active side of a silicon wafer,” “[t]he silicon material between the dies . . . is etched away (back side),” and “a second thin glass cover is bonded onto the silicon dies back side to achieve a complete protective enclosure for each die.” *Id.* at 237. “Deep notches are drawn between the dies, revealing the cross sections of the bond pads,” then “[a] metal layer, patterned by lithography to individual leads, is deposited to contact the bond pads at their cross-sections,” and “[w]afer dicing yields individual packaged dies.” *Id.*

*2. Analysis*

*a) Claim 1*

The preamble of claim 1 of the ’965 patent recites “[a] method of producing backside illuminated image sensors.” Ex. 1001, 11:15–16.

Petitioner argues that “Badihi renders obvious” the preamble of claim 1.

Pet. 55–58 (citing Ex. 1101, 237, 239, Figs. 2–4). Patent Owner disagrees, arguing that “Badihi’s disclosures are not specific to producing image sensors” and that “Badihi does not disclose or suggest that its packaging process could be applied to [back-side illuminated] image sensors.” Prelim. Resp. 21–24. Badihi teaches that its process is applicable to CMOS and CCD image sensors. Ex. 1101, 239. In addition, Badihi teaches an image sensor whose metal leads and solder bumps cover the front side of the sensor. *Id.* at 237, Fig. 2. This evidence could support a finding that Badihi suggests an image sensor illuminated from the back side. Thus, on the present record, Petitioner shows sufficiently that Badihi teaches or suggests the preamble of claim 1.

Claim 1 next recites “producing a plurality of image sensor circuits on a wafer having first and second surfaces, each of the image sensor circuits being formed on the first surface and including a matrix of light-sensitive pixel regions extending into the wafer from the first surface.” Ex. 1001, 11:17–21. Petitioner argues that Badihi discloses this limitation, and Patent Owner does not dispute Petitioner’s argument. Pet. 58–61 (citing Ex. 1101, 236–37, Figs. 2–4); Prelim. Resp. 21–29. Badihi teaches a silicon wafer and a first glass cover on one side of the wafer. Ex. 1101, 236–37, Fig. 2. Badihi also teaches using its method in connection with a CMOS image sensor with an array of pixels formed on the wafer. *Id.* at Fig. 4; Ex. 1050, 1–2. Badihi’s first glass cover “is bonded to the active side of [the] silicon wafer.” Ex. 1101, 237. Petitioner directs us to evidence that suggests Badihi’s image sensor circuits are formed on this active side of the wafer. Ex. 1003 ¶¶ 146–147; Ex. 1101, 237, Fig. 3 (showing solder bumps on

active surface). Thus, on the present record, Petitioner shows sufficiently that Badihi teaches or suggests the preamble of claim 1.

Claim 1 recites “securing the wafer onto a protective substrate such that the first surface faces the protective substrate.” Ex. 1001, 11:22–23. Petitioner argues that Nixon discloses this limitation. Pet. 61–62 (citing Ex. 1101, 237, Figs. 2, 3). Patent Owner disagrees, arguing both that Petitioner fails to show that Badihi’s substrate provides structural support and that Petitioner fails to show that Badihi’s substrate is non-transparent. Prelim. Resp. 24–27. Badihi’s “thin protective glass layer is bonded to the active side of a silicon wafer.” Ex. 1101, 237; *see* Ex. 1101, Fig. 2 (“A protective glass layer is attached to the active side of a silicon wafer.”).

Patent Owner argues that the ’965 patent uses the word “protective” to mean that a protective substrate provides structural support. Prelim. Resp. 24–25 (citing Ex. 1001, code (57), 4:48–50). As discussed above, we are not persuaded that the ’965 patent defines “protective” so clearly and precisely as to constitute a redefinition of the term under *Paulsen*. We invite both parties, within the limits imposed by our rules, to supplement the record as to the proper interpretation of the term “protective” during trial. On the present record, we consider Badihi’s description of the thin protective glass layer as “protective” sufficient to show, at least for purposes of institution, that this layer is “protective.”

Patent Owner also argues that, to constitute a protective substrate within the meaning of claim 1, a substrate must be non-transparent. Prelim. Resp. 25–27. Specifically, Patent Owner argues that the claim’s recitation of both “protective substrate” and “transparent substrate,” together with the rule that “[d]ifferent terms in the same claim usually have different

meanings,” means that the protective substrate must be non-transparent.<sup>8</sup> *Id.* We disagree. It is true that different terms in the same claim generally mean different things. *See Neville*, 825 F. App’x 808; *Firstface*, 859 F. App’x 579. But this does not mean that the structures referred to by the terms in question cannot share any characteristics in common. Here, there must be a protective substrate and a transparent substrate, so there could not be a single structure that fulfills both roles. In addition, the protective substrate would need to be protective, and the transparent substrate would need to be transparent, but we are not presented with any reason that the protective substrate could not also be transparent or that the transparent substrate could not also be protective. On the present record, Petitioner shows sufficiently that Badihi discloses this limitation.

Claim 1 next recites “removing material from the second surface of the wafer until the light-sensitive pixel regions of each image sensor circuit are effectively exposed through the second surface.” Ex. 1001, 11:24–27. Petitioner argues that Badihi teaches or suggests this limitation. Pet. 62–63 (citing). Based on its proposed construction of “effectively exposed,” Patent Owner argues that Petitioner fails to show sufficiently that Badihi teaches this limitation. Prelim. Resp. 27–29. As discussed above with respect to claim construction, on the present record, we do not adopt Patent Owner’s proposed construction of the term “effectively exposed.” Instead, we interpret the term as “having a semiconductor substrate that is thin enough to be transparent to visible light, thereby rendering the pixels of the light sensitive pixel regions capable of generating electron flow in response to

---

<sup>8</sup> Patent Owner does not make the correlated argument that the “transparent substrate” of claim 1 also must be non-protective.

light (photons) passing through the second surface.” Badihi teaches that the back surface of the wafer is ground until the wafer is 100 microns thick. Ex. 1101, Fig. 2. Petitioner directs us to evidence suggesting that the purpose of this grinding would have been to expose the back side of the light-sensitive pixel regions to light. Ex. 1020, 2:10–22, 6:10–42; Ex. 1022, 14. Thus, on the present record, Petitioner shows sufficiently that Badihi teaches or suggests this limitation.

Claim 1 recites “securing a transparent substrate onto the second surface of the wafer, thereby producing a waferwise sandwich.” Ex. 1001, 11:29–30. Petitioner argues that Badihi discloses this limitation. Pet. 63–65 (citing Ex. 1101, 237, Figs. 2, 3). Patent Owner does not dispute Petitioner’s argument at this time. Prelim. Resp. 21–29. Badihi teaches that a “second thin glass cover is bonded onto the silicon dies back side to achieve a complete protective enclosure for each die.” Ex. 1101, 237. Thus, on the present record, Petitioner shows sufficiently that Badihi discloses this limitation.

Claim 1 next recites “slicing the waferwise sandwich, thereby defining a plurality of backside illuminated image sensors.” Ex. 1001, 11:32–33. Petitioner argues that Badihi discloses this limitation. Pet. 65–66 (citing Ex. 1101, 237, Figs. 2, 3). Patent Owner does not dispute Petitioner’s argument at this time. Prelim. Resp. 21–29. Badihi describes “[w]afer dicing [that] yields individual packaged dies.” Ex. 1101, 237. Thus, on the present record, Petitioner shows sufficiently that Badihi discloses this limitation.

As discussed above, we encourage both parties, to the extent permitted by our rules, to address during trial the question of the proper interpretation of “protective” and “effectively exposed” in the claims of the

'965 patent. On the present record, however, we determine that Petitioner has shown sufficiently that Badihi teaches or suggests the subject matter of claim 1. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 1 would have been obvious in view of Badihi.

*b) Claim 2*

Claim 2 depends from claim 1 and adds limitations reciting “wherein the step of securing the protective substrate onto the first surface comprises depositing an adhesive onto the protective substrate, and then placing the wafer onto the protective substrate such that the first surface contacts the deposited adhesive.” Ex. 1001, 11:34–38. Petitioner argues that Badihi teaches or suggests these limitations. Pet. 66–69 (citing Ex. 1003 ¶ 162; Ex. 1101, 237, Fig. 2). On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 21–29. We have reviewed Petitioner’s argument and the cited evidence, and, on the present record, Petitioner shows sufficiently that Badihi suggests the limitations of claim 2. Ex. 1003 ¶ 162; Ex. 1101, 237, Fig. 2. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 2 would have been obvious in view of Badihi.

*c) Claim 7*

Claim 7 depends from claim 1 and adds limitations reciting “wherein the step of securing a transparent substrate onto the second surface comprises depositing an adhesive onto the second surface, and then placing the transparent substrate onto the deposited adhesive.” Ex. 1001, 12:19–23. Petitioner argues that Badihi teaches or suggests these limitations. Pet. 69–72 (citing Ex. 1003 ¶¶ 169–170; Ex. 1101, 237, Fig. 2). On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 21–29. We have reviewed Petitioner’s argument and the cited evidence, and, on the

present record, Petitioner shows sufficiently that Badihi suggests the limitations of claim 7. Ex. 1003 ¶¶ 169–170; Ex. 1101, 237, Fig. 2. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 7 would have been obvious in view of Badihi.

*d) Claim 8*

Claim 8 depends from claim 7 and adds limitations reciting “wherein the step of removing material includes separating each of the plurality of image sensor circuits; and wherein the step of depositing the adhesive onto the second surface further comprises depositing adhesive into interstices located between the plurality of image sensor circuits, thereby protecting the image sensor circuits.” Ex. 1001, 12:24–31. Petitioner argues that Badihi discloses these limitations. Pet. 72–74 (citing Ex. 1101, 237, Figs. 2, 3). On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 21–29. We have reviewed Petitioner’s argument and the cited evidence, and, on the present record, Petitioner shows sufficiently that Badihi discloses the limitations of claim 8. Ex. 1101, 237, Fig. 2. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 8 would have been obvious in view of Badihi.

*e) Claim 9*

Claim 9 depends from claim 1 and adds limitations reciting “forming metal leads on the protective substrate after the step of securing the transparent substrate, wherein the metal leads are connected to metal contact pads located on the first surface of the wafer.” Ex. 1001, 12:32–36. Petitioner argues that Badihi teaches or suggests these limitations. Pet. 74–76 (citing Ex. 1101, 237, Fig. 2). On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 21–29. We have reviewed Petitioner’s argument and the cited evidence, and, on the present record,

Petitioner shows sufficiently that Badihi discloses the limitations of claim 9. Ex. 1101, 237, Fig. 2. Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 9 would have been obvious in view of Badihi.

*H. Asserted Obviousness in View of Badihi and Assadi*

Petitioner contends claim 10 is unpatentable because they would have been obvious in view of Badihi and Assadi. Pet. 76–84.

Petitioner argues that a person of ordinary skill in the art would have had a reason to combine the teachings of Assadi with those of Badihi. Pet. 77–78. On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 30. Petitioner directs us to evidence suggesting that a person of ordinary skill in the art would have seen a benefit to adding Assadi’s passivation layer to Badihi’s CMOS image sensor. Ex. 1003 ¶¶ 185–186 (testifying that passivation layers protect microelectronics “from abrasion, moisture, or contaminants” and that “it was very well-known and highly conventional that passivation layers should be included in CMOS image sensors”); Ex. 1044, 4:26–44 (passivation layers have “particular resistance to environmental contaminants, particularly moisture”). Thus, Petitioner shows sufficiently that a person of ordinary skill in the art would have had reason to combine to the teachings of Assadi with those of Badihi.

Claim 10 depends from claim 1 and recites three additional limitations. Ex. 1001, 12:37–44. The first of these limitations is “wherein the step of securing the wafer onto a protective substrate further comprises: forming a passivation layer on the first surface of the wafer.” *Id.* at 12:37–41. Petitioner argues that the combination of Badihi and Assadi teaches or suggests this limitation. Pet. 78–80. On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 30. Assadi teaches a

passivation layer formed over “the entirety of” a CMOS image sensor. Ex. 1044, 4:15–45, Fig. 3b. Although Assadi’s image sensor is front-side illuminated, Petitioner directs us to evidence that could support a finding that a person of ordinary skill in the art would have applied the same passivation layer to a back-side illuminated sensor, such as that taught by Badihi. Ex. 1003 ¶ 191 (back-side illuminated image sensors “have the same concerns [as front-side illuminated sensors] regarding abrasion, moisture, and contaminants”). Thus, Petitioner shows sufficiently that the combination of Badihi and Assadi teaches or suggests this limitation.

Claim 10 next recites “forming openings in the passivation layer.” Ex. 1001, 12:42. Petitioner argues that the combination of Badihi and Assadi teaches or suggests this limitation. Pet. 80–83. On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 30. Assadi teaches making openings in its passivation layer for connection to its bond pads, and Badihi teaches forming notches to expose its bond pads. Ex. 1101, 237; Ex. 1044, 4:15–45, Fig. 3b. Thus, Petitioner shows sufficiently that the combination of Badihi and Assadi teaches or suggests this limitation.

Claim 10 recites “securing the protective substrate onto the passivation layer.” Ex. 1001, 12:43–44. Petitioner argues that the combination of Badihi and Assadi teaches or suggests this limitation. Pet. 83–84. On the present record, Patent Owner does not dispute this argument. Prelim. Resp. 30. Assadi teaches forming its passivation layer directly on the surface of the semiconductor substrate. Ex. 1044, 4:15–45,

Fig. 3b. Thus, Petitioner shows sufficiently that the combination of Badihi and Assadi teaches or suggests this limitation.

Accordingly, Petitioner shows a reasonable likelihood of prevailing on its argument that claim 10 would have been obvious in light of Badihi and Assadi.

### III. CONCLUSION

Upon consideration of the Petition, the Preliminary Response, and the evidence presented, we determine that Petitioner has shown a reasonable likelihood that it will prevail in showing that claims 1, 2, and 7–10 are unpatentable. Accordingly, we institute an *inter partes* review of all challenged claims based on all grounds asserted in the Petition.

### IV. ORDER

For the reasons given, it is:

ORDERED that an *inter partes* review is instituted with respect to the grounds asserted in the Petition; and

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

IPR2023-00374  
Patent 6,168,965 B1

FOR PETITIONER:

James M. Glass  
John T. McKee  
Andrew M. Holmes  
Jonathan S. Tse  
QUINN EMANUEL URQUHART & SULLIVAN, LLP  
jimglass@quinnemanuel.com  
johnmckee@quinnemanuel.com  
drewholmes@quinnemanuel.com  
jonathantse@quinnemanuel.com

FOR PATENT OWNER:

Eric Cohen  
RIMON PC  
eric.cohen@rimonlaw.com  
IPRALidouble-TSMC@rimonlaw.com