

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SONY CORPORATION,  
Petitioner,

v.

COLLABO INNOVATIONS, INC.,  
Patent Owner.

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Case IPR2016-00941  
Patent 5,952,714

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Before DAVID C. McKONE, GREGG I. ANDERSON, and  
JENNIFER MEYER CHAGNON, *Administrative Patent Judges*.

ANDERSON, *Administrative Patent Judge*.

FINAL WRITTEN DECISION  
*35 U.S.C. § 318(a) and 37 C.F.R. § 42.73*

## I. INTRODUCTION

Sony Corporation (“Petitioner”)<sup>1</sup> filed a Petition (Paper 2, “Pet.”) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–13, 15, and 16 (“the challenged claims”) of U.S. Patent No. 5,952,714 (“the ’714 patent,” Ex. 1001), filed July 30, 1996.<sup>2</sup> Collabo Innovations, Inc. (“Patent Owner”) elected not to file a Preliminary Response. On October 13, 2016, we granted the Petition and instituted trial on claims 1–13, 15, and 16 of the ’714 patent. Paper 6 (“Institution Decision” or “Inst. Dec.”).

After institution of trial, Patent Owner filed a Patent Owner Response (Paper 11, “PO Resp.”), and Petitioner filed a Reply (Paper 18, “Pet. Reply”). The Petition is supported by the Declaration of R. Michael Guidash (“Guidash Declaration,” “Guidash Decl.,” Ex.1002). Patent Owner proffered the Declaration of Dr. Martin Afromowitz (“Afromowitz Declaration,” “Afromowitz Decl.,” Ex. 2001). Petitioner took Dr. Afromowitz’s deposition (“Afromowitz Deposition,” “Afromowitz Dep.,” Ex. 1028). Patent Owner took Mr. Guidash’s deposition (“Guidash Deposition,” “Guidash Dep.,” Ex. 1029).

An oral hearing was held on July 11, 2017. The transcript of the hearing has been entered into the record. Paper 26 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(b). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). We conclude, for the

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<sup>1</sup> Sony Corporation of America and Sony Electronics Inc. also are identified as real-parties-in-interest. Pet. 1.

<sup>2</sup> The ’714 patent was filed July 30, 1996, under the Patent Cooperation Treaty (PCT). Ex. 1001, at [22], [86]. Thus, Petitioner alleges the ’714 patent expired on July 30, 2016. Pet. 11. *See* section II.A. below.

reasons that follow, that Petitioner has shown by a preponderance of the evidence that claims 1–13, 15, and 16 of the ’714 patent are unpatentable.

*A. Related Proceedings*

The ’714 patent has been asserted by Patent Owner against Petitioner in *Collabo Innovations, Inc. v. Sony Corp.*, Case No. 1-15-cv-01094 (D. Del.), which was filed on November 25, 2015, and first served (on Sony Electronics Inc.) on February 22, 2016. Pet. 1; Paper 5, 1.

*B. Technology Overview*

The ’714 patent relates to a package for a semiconductor “image sensing apparatus using a solid-state image sensing device” (also referred to as a “CCD chip” or “chip”). Ex. 1001, col. 1, ll. 6–8. The image sensing apparatus is mounted on a video camera which reproduces pictures. *Id.* at col. 1, ll. 19–29. The chip is mounted in a package made of plastic, glass, or ceramic material. *Id.* at col. 1, ll. 8–10. The background of the technology and the ’714 patent are discussed below.

*1. Background of the Technology*

The process of aligning and securing the chip in a package is called “mount[ing].” *See* Ex. 1001, col. 1, ll. 42–61. One prior art method of mounting an image sensor is “die bonding.” *Id.* at col. 1, ll. 47–48. “‘Die bonding’ refers to affixing the back side of a chip (a ‘die’) to substrate, for example, the base of a package.” Guidash Decl. ¶ 44. “This leaves the upper (or front side) surface of the chip exposed.” *Id.*

Figure 10 of the '714 patent is reproduced below.

**FIG. 10**  
**PRIOR ART**

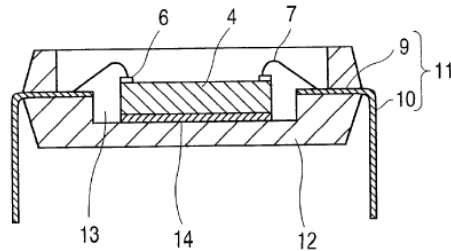


Figure 10 is a cross section of prior art chip 4 mounted in plastic package 12. Ex. 1001, col. 1, ll. 53–56. Lead frame 11 allows for electrical connections to external circuitry and includes inner lead 9 and outer lead 10 molded into plastic package 12. *Id.*; see also Guidash Decl. ¶¶ 43–45 (describing die-bonding). CCD chip 4 is die-bonded by conductive paste 14 to concave portion 13 of package 12. Ex. 1001, col. 1, ll. 57–58. Electrode pad 6 on the CCD chip is “wire-bonded to the inner lead 9 by the metal lead 7 as same as the case of the [conventional] ceramic package.” *Id.* at col. 1, ll. 59–60. Upon mounting the image sensing apparatus to a “three-eye video camera and . . . accurately position[ing]” the apparatus, the “package 12 to which the CCD chip 4 is die-bonded” results in “high accuracy.” *Id.* at col. 1, l. 66–col. 2, l. 5.

## 2. The '714 Patent (Ex. 1001)

The invention of the '714 patent is described in several different embodiments. Ex. 1001, col. 4, ll. 15–40 (Brief Description of the Drawings). Figure 2 of the '714 patent is reproduced below.

**FIG. 2**

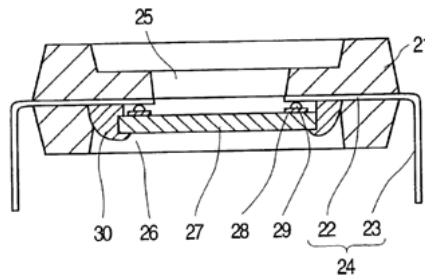


Figure 2 is a cross section of the “first exemplary embodiment” of the image sensing apparatus. Ex. 1001, col. 4, ll. 64–67. Epoxy resin is mixed with inorganic filler to form package 21, which includes lead frame 24. *Id.* at col. 4, l. 67–col. 5, l. 4. Two openings 25 and 26 are formed respectively at the front side and back side of the package, opening 25 being of a smaller area than opening or inlet 26. *Id.* at col. 5, ll. 10–12; *see id.* at col. 4, ll. 53–58. “A frame body of the lead frame 24 is cut away, and the outer lead 23 is bent toward the inlet 26, thereby forming the package 21.” *Id.* at col. 5, ll. 4–6. Bump 29 is formed on electrode pad 28 of CCD chip 27 and the bump is press-fitted to inner lead 22 through inlet 26. *Id.* at col. 5, ll. 6–12.

“During [the] press-fit operation, a position signal is feedbacked from a[n] optical position adjusting device (not shown) disposed in front of the CCD chip 27 to the mounting jig, thereby finely adjusting an orientation of the CCD chip 27 and disposing the CCD chip 27 on the back side of the step of the package 21.” Ex. 1001, col. 5, ll. 12–18. Simultaneously, ultra-violet hardening adhesive 30 is injected onto four sides of the CCD chip to glue the chip to package 21. *Id.* at col. 5, ll. 18–21. Thus, “CCD chip 27 is accurately mounted to the package 21.” *Id.* at col. 5, ll. 21–22.

*C. Illustrative Claims*

Of the challenged claims, claims 1, 2, 6, 7, and 12 are independent apparatus claims and claims 13, 15, and 16 are independent method claims. Claims 3–5 depend from claim 2. Claims 8–11 are multiple dependent claims that depend from either claim 6 or claim 7. Claims 1 and 13 are reproduced below:

1. A solid-state image sensing apparatus comprising:
  - a package having a through hole therein, openings on both end faces thereof, and different opening areas of said openings,
  - a lead frame comprising inner leads and outer leads, said lead frame being sealed in said package, and
  - a solid-state image sensing device mounted in said package by being inserted from an inlet of said opening which has a wider area, and thereby sealing said through hole, said solid-state image sensing device being secured to said package via an adhesive.

Ex. 1001, col. 9, ll. 20–30.

13. A manufacturing method of a solid-state image sensing apparatus comprising a package having a through hole therein, a lead frame comprising inner leads and outer leads, said lead frame being sealed in said package, and a solid state image sensing device mounted in said package, said manufacturing method comprising the steps of:
  - inserting said solid-state image sensing device into said through hole,
  - connecting an electrode pad of the solid-state image sensing device inserted in the through hole to the inner lead via a bump or an anisotropic conductor having only vertical conductivity, while simultaneously adjusting the optical positioning of said solid-state image sensing device, and

securing said solid-state image sensing device to the package with an adhesive.

*Id.* at col. 10, l. 56–col. 11, l. 4.

*D. Asserted Grounds of Unpatentability*

Petitioner challenges claims 1–13, 15, and 16 patent as unpatentable on the following grounds. Pet. 2–3, 15–60.

Reference(s)	Basis	Claim(s) Challenged
Yoshino <sup>3</sup>	§ 102(b)	1
Yoshino and Izumi <sup>4</sup>	§ 103(a)	6
Yoshino, Nagano, <sup>5</sup> and Wakabayashi <sup>6</sup>	§ 103(a)	7
Yoshino, Izumi/Nagano, Hirosawa, <sup>7</sup> and Nita <sup>8</sup>	§ 103(a)	8
Yoshino and Izumi/Nagano	§ 103(a)	9

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<sup>3</sup> JP Pat. Application Pub. No. S61-131690, to T. Yoshino et al., published June 19, 1986 (“Yoshino,” Ex. 1003 (English translation)/Ex. 1006 (Japanese)). All citations to Yoshino and the other translated Japanese references are to the English translations thereof.

<sup>4</sup> JP Pat. Application Pub. No. 63-221667, to A. Izumi et al., published Sept. 14, 1988 (“Izumi,” Ex. 1016 (English translation)/Ex. 1017 (Japanese))

<sup>5</sup> JP Pat. Application Pub. No. H06-29507, to T. Nagano, published Feb. 4, 1994 (“Nagano,” Ex. 1018 (English translation)/Ex. 1019 (Japanese)).

<sup>6</sup> JP Pat. Application Pub. No. H07-45803, to T. Wakabayashi et al., published Feb. 14, 1995 (“Wakabayashi,” Ex. 1004 (English translation)/Ex. 1007 (Japanese)).

<sup>7</sup> JP Pat. Application Pub. No. S60-74880, to I. Hirosawa et al., published Apr. 27, 1985 (“Hirosawa,” Ex. 1020 (English translation)/Ex. 1021 (Japanese)).

<sup>8</sup> JP Pat. Application Pub. No. H07-78951, to S. Nita, published Mar. 20, 1995 (“Nita,” Ex. 1011 (English translation)/Ex. 1023 (Japanese)).

Reference(s)	Basis	Claim(s) Challenged
Yoshino, Izumi/Nagano, and Wakabayashi	§ 103(a)	10
Yoshino, Izumi/Nagano, and Onishi <sup>9</sup>	§ 103(a)	11
Yoshino and Tobase <sup>10</sup>	§ 103(a)	12
Yoshino and Hikosaka <sup>11</sup>	§ 103(a)	13
Yoshino, Izumi, Nagano, and Hikosaka	§ 103(a)	15
Yoshino, Tobase, and Hikosaka	§ 103(a)	16
Wakabayashi	§ 103(a)	1
Wakabayashi and Fujii <sup>12</sup>	§ 103(a)	2–4
Wakabayashi, Fujii, and Onishi	§ 103(a)	5
Wakabayashi and Hikosaka	§ 103(a)	13

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<sup>9</sup> JP Disc. No. H05-6989, to E. Onishi, disclosed Jan. 14, 1993 (“Onishi,” Ex. 1014 (English translation)/Ex. 1015 (Japanese)).

<sup>10</sup> JP Pat. Application Pub. No. H05-275611, to K. Tobase, published Oct. 22, 1993 (“Tobase,” Ex. 1022 (English translation)/Ex. 1013 (Japanese)).

<sup>11</sup> JP Pat. Application Pub. No. S59-225560, to M. Hikosaka, published Dec. 18, 1984 (“Hikosaka,” Ex. 1005 (English translation)/Ex. 1008 (Japanese)).

<sup>12</sup> JP Pat. Application Pub. No. H06-85221, to H. Fujii, published Mar. 25, 1994 (“Fujii,” Ex. 1024 (English translation)/Ex. 1025 (Japanese)).



## II. ANALYSIS

### A. Claim Construction

Petitioner alleges the '714 patent expired on July 30, 2016. *See* Pet. 11. On the face of the published '714 patent, the application for the '714 patent was filed as a PCT application on July 30, 1996. Ex. 1001, at [22]. Thus, the July 30, 1996, filing date of the PCT application is the calculation date for the expiration of the '714 patent under 35 U.S.C. § 154(a)(2). *See Broad. Innovation, L.L.C. v. Charter Commc'ns, Inc.*, 420 F.3d 1364, 1368 (Fed. Cir. 2005). Patent Owner agrees that the '714 patent has expired. PO Resp. 12. On this record, we determine that the '714 patent has expired.

“[T]he Board’s review of the claims of an expired patent is similar to that of a district court’s review.” *In re Rambus Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012) (internal citations omitted). Thus, we construe the claims in accordance with their ordinary and customary meanings, as would be understood by a person of ordinary skill in the art, in the context of the specification. *See generally Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Petitioner proposed six terms for construction. Pet. 11–14. We preliminarily construed two terms in the Institution Decision, “electrode pad(s)” and “bump.”<sup>13</sup> These two terms are not disputed and their constructions are not dispositive of any patentability issue at trial. *See* PO Resp. 11. Accordingly, we need not construe these two terms for purposes

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<sup>13</sup> We construed “electrode pad(s)” to mean “a pad disposed on the substrate which provides for an electrical connection point.” Inst. Dec. 9. We construed “bump” to mean “a mound or hump of conductive material.” *Id.* at 10.

of this Decision. *See Vivid Techs. Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (Only those terms that are in controversy need to be construed and only to the extent necessary to resolve the controversy).

As to the remaining claim terms, including the additional terms Petitioner proposed for construction, we proceeded on the plain and ordinary meaning of the words in the context of the claim in which they appear or how the term would have been understood by the person of ordinary skill in the art. We determined that some of Petitioner’s construction arguments were instead arguments relating to application of the claim language to the issues presented. *See* Inst. Dec. 9 n.13.

Patent Owner proposes that “‘secured’ to the package via an adhesive” (the “secured via an adhesive” limitation)<sup>14</sup> should be construed as “‘gluing’ to the package.” PO Resp. 13. Petitioner argues the term should be given its plain and ordinary meaning, and requires only “that the device be affixed to the package via a material that tends to adhere.” Pet. Reply 1–2 (citing Inst. Dec. 14). The Institution Decision did not separately construe the “secured via an adhesive” limitation and, as Petitioner asserts, applied the plain and ordinary meaning in analyzing the claim limitations. *See* Inst. Dec. 14–15 (citing THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE, 16 (New College Edition 1979) (Ex. 3001) in connection with claim 1 analysis).

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<sup>14</sup> For example, claim 1 recites a “solid-state image sensing device being secured to said package via an adhesive.” The other independent claims all include “secured to” and “via an adhesive,” varying in exactly what is secured to what. *See, e.g.*, claim 2 (“solid-state image sensing device being *secured to* said main body of said package *via an adhesive*”).

Patent Owner's evidence and argument is found at pages 11 through 15 of its Response.<sup>15</sup> Arguing that "secured via adhesive" is limited to "gluing," Patent Owner contrasts "gluing" with the epoxy resin manufacturing method described in the Specification where epoxy resin is "injected into a mold" that is used to form the package including the lead frame." PO Resp. 13 (citing, e.g., Ex. 1001, col. 4, l. 67–col. 5, l. 4). Patent Owner then cites to several parts of the Specification that describe the process as "gluing," as opposed to the previously described injection process. *Id.* at 13–14 (citing Ex. 1001, Abstract, col. 3, ll. 10–11, col. 3, ll. 27–29, col. 3, ll. 45–47, col. 3, ll. 58–59, col. 3, ll. 64–65, col. 5, ll. 18–21, col. 6, ll. 23–28, col. 8, ll. 18–22, col. 8, ll. 28–33). Patent Owner also argues that the "figures of the '714 patent show the adhesive (i.e., ultra-violet hardening adhesive 30) is applied such that the substrate is secured to the package by gluing it to the package." *Id.* at 14 (citing Ex. 1001, Figs. 3, 5).

Patent Owner adds extrinsic evidence in the form of the Afromowitz Declaration that "one having ordinary skill in the art, gleaning relevant information from the specification and prosecution history would have known that securing to the package with an adhesive would not include the use of injection molding because 'adhesive' as used in the art would not, as the term is typically used, include injection molding." PO Resp. 14–15 (citing Afromowitz Decl. ¶ 32). Patent Owner concludes with an argument

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<sup>15</sup> Patent Owner first argues that "Mr. Guidash's testimony [in the Guidash Declaration] regarding claim construction, should be afforded little to no weight." PO Resp. 11–12. Our claim construction analysis does not rely on the Guidash Declaration, thus Patent Owner's argument is not relevant. We do consider the Guidash Declaration in section II.D.2. below relating to the application of the prior art to the "secured via an adhesive" limitation.

that “securing with an adhesive, in light of the specification, would not include injection molding because of the higher probability of disturbing, even slightly, the position of the imaging device in the x, y, or z axis, in contradiction to the purpose of the ’714 patent[,] which is to be ‘positioned within its package to a high degree of precision.’” *Id.* at 15.

Petitioner responds that “[n]othing in the claims, the specification, or the file history necessitates any specific securing technique or adhesive agent, and this claim term should be given its plain and ordinary meaning.” Pet. Reply 2. Petitioner summarizes Patent Owner’s argument as a “gluing” process is within the scope of “securing with an adhesive” and an injection molding process is not. *Id.* citing (PO Resp. 13–15). Petitioner makes four arguments in opposition to Patent Owner’s proposal and in support of Petitioner’s proposal to use the plain and ordinary meaning of the “secured via an adhesive” limitation.

First, Petitioner argues “[u]se of ‘glued’ in the specification does not limit the actual claim term ‘secured.’” Pet. Reply 3–4. Following the standard applied in the district courts, Petitioner argues Patent Owner’s construction relies improperly on “embodiments that describe the substrate/image sensor as ‘glued’ to the package.” *Id.* at 3 (citing *Phillips*, 415 F.3d at 1323 (exemplary embodiments should not be imported into the claims)). Further, Petitioner argues the fact that a specific, and unclaimed, molding step is described does not exclude molding from securing via adhesive. *Id.* at 3–4.

Second, Petitioner argues “[t]he ’714 patent’s positioning process does not require that ‘secured’ be construed as ‘gluing.’” Pet. Reply 4–6. Though not cited in Patent Owner’s Response, Petitioner responds to the testimony in paragraph 31 of the Afromowitz Declaration that an “injection

or pressing operation forces flow of the viscous resin encapsulant, and *if used around wire-bonded chips*, for example, can cause wire sweep . . . , resulting in shorts, and other deformations, including unintended movement of the chip.”<sup>16</sup> *Id.* at 4 (quoting Afromowitz Decl. ¶ 31). Petitioner argues the ’714 patent does not teach wire bonded chips but rather “one that is bonded using bumps or a conductive adhesive” and, in any event, bonding occurs before securing by adhesive. *Id.* (citing Ex. 1001, claim 1).

Petitioner also refutes the Afromowitz Declaration testimony that optical positioning is not possible with a “molding process,” again pointing out that positioning takes place prior to the securing via adhesive step and thus a molding process would not interfere with positioning. *Id.* at 5–6 (citing Afromowitz Decl. ¶ 32; Ex. 1001, col. 10, l. 64–col. 11, l. 4 (claim 13 method steps)). Dr. Afromowitz testified in his deposition that thermoset epoxies can shrink while curing, which could slightly shift the position of a chip bonded via indium bumps. Afromowitz Dep., 72:9–73:20. Petitioner responds that the ’714 patent does not teach indium bumps and “both Yoshino and Wakabayashi teach using a resin to secure a bump-bonded chip to the package, and neither reports chip displacement issues when resin is cured.” Pet. Reply 6 (citing Ex. 1003, 3; Ex. 1004 ¶ 15).

Third, Petitioner disagrees with Patent Owner’s contention that one of ordinary skill would have understood that the phrase “secured to said package via an adhesive” excludes molding methods. Pet. Reply 7–10 (citing PO Resp. 14–15 (citing Afromowitz Decl. ¶ 32)). Petitioner asserts that the testimony in the Afromowitz Declaration is not credible because

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<sup>16</sup> Petitioner notes that the testimony mentions two references never made of record and is unsupported. Pet. Reply 4 n.1.

Dr. Afromowitz's deposition revealed a lack of familiarity with molding methods he testified about. *Id.* at 7 (citing Afromowitz Dep., 35:18–36:4, 40:3–17, 41:14–42:20, 43:15–44:11). Specifically, although Petitioner acknowledged that Dr. Afromowitz “holds a patent directed to ‘Fabrication of Molds and Mold Components Using a Photolithographic Technique and Structures Made Therefrom,’” Dr. Afromowitz testified the patent was “peripherally related to molding of resins that are part of the technology described in patent ’714.” *Id.* (citing Afromowitz Dep., 13:17–25).

Petitioner argues that Dr. Afromowitz “lacks practical experience with package design” and was involved with only one industry project prior to 1974. *Id.* (citing Afromowitz Dep., 9:21–11:1, 16:4–13; Ex. 2001, Appendix A). Petitioner also highlights that Dr. Afromowitz has no teaching experience and has not done any research relating to design or fabrication of semiconductor packaging. *Id.* at 7–8 (citing Afromowitz Dep., 11:12–15, 12:3–13:17).

Petitioner contrasts Dr. Afromowitz's experience with that of Mr. Guidash. Pet. Reply 8. Mr. Guidash testifies that “molded resin” is “a material sometimes used in the fabrication of package bodies that functions here as an adhesive.” Guidash Decl. ¶¶ 69, 108. Mr. Guidash was employed at Kodak for 31 years and was “[r]esponsible for all aspects of IC . . . packaging” for “Instant Camera IC's.” Guidash Curriculum Vitae (Ex. 1026), 3. Mr. Guidash testified in his deposition to four projects where he designed image sensor packages. Guidash Dep., 7:11–10:12; 11:8–12:24, 19:13–20:7, 34:19–37:18, 44:19–45:20. Petitioner relies on these qualifications of Mr. Guidash to assert that “he is more qualified to opine on how one of skill would have understood the materials and processes used.” Pet. Reply 8.

Petitioner further cites to testimony from the Afromowitz Deposition, including that “epoxy resins can be used as an adhesive.” Pet. Reply 9 (citing Afromowitz Dep., 48:5–49:16). Petitioner notes that Dr. Afromowitz is the inventor on a patent teaching that “[t]hermosetting resins are well-known and are widely used as matrices for advanced composite materials and structural adhesives.” *Id.* at 9–10 (citing Ex. 1030,<sup>17</sup> col. 4, ll. 46–48; Afromowitz Dep., 14:14–15:3). Additionally, Petitioner points to the Afromowitz Deposition testimony that “a resin functions as a ‘binder’ to hold together particles that otherwise would not ‘adhere to one another.’” *Id.* at 10 (citing Afromowitz Dep., 52:1–12). Last, Petitioner cites to the Afromowitz patent (Ex. 1030) for additional teachings that “*thermosetting resins*” can be adhesives used in molds. *Id.* (citing Ex. 1030, col. 1, ll. 35–36); *see also id.* (citing Afromowitz Dep., 53:10–15 (“[A] resin would need a special ‘releasing agent’ in order for it to *not* act as an adhesive with regard to the mold itself.”)).

Fourth, Petitioner argues that construing the “secured via an adhesive” limitation to mean gluing is ambiguous. Pet. Reply 10–11. Petitioner bases this assertion on the alleged inability of Dr. Afromowitz to define “adhesive.” *Id.* at 11 (quoting Afromowitz Dep., 67:6–68:17 (“[T]here’s hardly any generalized statement one could make.”)).

We are not persuaded by Patent Owner’s arguments and conclude that the plain and ordinary meaning of “adhesive” is “to adhere.” We find that Patent Owner’s construction relies improperly on “embodiments that describe the substrate/image sensor as ‘glued’ to the package.” We further

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<sup>17</sup> U.S. Patent No. 5,009,102, issued April 23, 1991, to Martin A. Afromowitz.

find that the fact that a specific, and unclaimed, molding step is described does not exclude molding from “securing via adhesive.” We therefore decline to adopt Patent Owner’s proposed construction of the “secured via an adhesive” limitation as meaning “gluing.” Further, we find that although “glue” is an “adhesive,” is not the only “adhesive” that falls within the scope of the claims. Thus, the claim language supports a construction not limited to “gluing.” Neither party cites to the prosecution history for construction of the “secured via an adhesive” term. In sum, we reject Patent Owner’s construction because it relies on improperly importing an embodiment described in the Specification into the claim. *See Phillips*, 415 F.3d at 1323.

Accordingly, we do not agree with Patent Owner’s arguments that “secured via an adhesive” excludes injection molding. These arguments rely on extrinsic evidence. Tellingly, the Afromowitz patent (Ex. 1030), and the Afromowitz Deposition testimony cited above by Petitioner, both support our finding that epoxy resin used in molding the semiconductor package is an adhesive. We are not persuaded that a molding process would interfere with positioning the package because positioning, according to the claims, takes place prior to the securing via adhesive. *See* Ex. 1001, col. 10, l. 64–col. 11, l. 4 (claim 13 method steps). Regardless, only claims 13–16 recite any limitation that requires precision positioning. Even if injection molding interfered with positioning, the claim limitation regarding “secured via adhesive” would still be met with respect to all other claims.

We have reviewed the parties’ arguments based on their respective expert’s testimony. The Afromowitz Declaration testimony that one of ordinary skill would not understand “adhesive” to encompass injection molding is entitled to little, if any, weight because it is contradicted by statements made in the Afromowitz patent (Ex. 1030) and at his deposition.



*See* Pet. Reply 7–10. However, Mr. Guidash does not testify specifically as to the construction of the “secured via an adhesive” limitation. Thus, expert testimony is of little assistance, nor is it necessary, to reach our determination.

This construction also is supported by the dictionary reference. *See* Ex. 3001, 16; *see also Phillips*, 415 F.3d at 1318 (dictionaries can be useful in claim construction). Applying the district court standard for claim construction as per *Phillips*, we decline to limit the “secured via an adhesive” limitation to “gluing.”

*B. Incorporation by Reference*

Patent Owner argues the Petition improperly incorporates arguments by reference. PO Resp. 15–17. Patent Owner contends eight paragraphs of the Guidash Declaration were improperly incorporated to support the level of ordinary skill. *Id.* at 15 (citing Guidash Decl. ¶¶ 52–59). Patent Owner argues this violates our rules regarding the word count limit because, with the material allegedly incorporated by reference, the Petition would exceed the word limit maximum under 37 C.F.R. § 42.24(a)(1). *Id.* at 15–16. Patent Owner also attacks the Petition for an alleged failure to identify the grounds of the challenge by failing “to provide analysis of one of the required *Graham* factors that are required factual inquiries when making an obviousness argument.” *Id.* at 16 (citing 35 U.S.C. § 312(a)(3), 37 C.F.R. § 42.6 (a)(3), other citations omitted). Patent Owner requests that we terminate the Petition on all grounds of obviousness or that we “consider only the arguments properly supported in the Petition.” *Id.* at 16–17 (citations omitted).

Although Patent Owner is correct that the Petition does not specify a level of ordinary skill, we are not persuaded that Petitioner is precluded from

proceeding on the basis of the level of ordinary skill set forth in the Guidash Declaration. *See* section II.E.1. below (citing Guidash Decl. ¶ 53). Patent Owner raises only one incorporation by reference issue, the level of ordinary skill. *See* Pet. Reply 11. Patent Owner did not argue a different level of ordinary skill should be used in its Patent Owner Response or at the final hearing. Petitioner does allege a person of ordinary skill would find the challenged claims obvious. *See, e.g.,* Pet. 24 (regarding the combination of Yoshino and Izumi). Under these circumstances, this is at most a *de minimis* alleged incorporation by reference. Neither are we persuaded that the Petition is deficient for failure to copy the level of ordinary skill from the Guidash Declaration. We decline to find that either alleged deficiency requires termination of all obviousness grounds. Moreover, we agree with Petitioner that the prior art itself reflects the level of ordinary skill. *See* Pet. Reply 11 (citing *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001)).

### *C. Law of Anticipation*

In order for a prior art reference to serve as an anticipatory reference, it must disclose every limitation of the claimed invention, either explicitly or inherently. *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997).

Anticipation “requires that every element and limitation of the claim was previously described in a single prior art reference, either expressly or inherently, so as to place a person of ordinary skill in possession of the invention.” *Sanofi-Synthelabo v. Apotex, Inc.*, 550 F.3d 1075, 1082 (Fed. Cir. 2008) (citing *Schering Corp. v. Geneva Pharms., Inc.*, 339 F.3d 1373, 1379 (Fed. Cir. 2003); *Cont’l Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1267–69 (Fed. Cir. 1991)).

As the Federal Circuit has held,

This modest flexibility in the rule that “anticipation” requires that every element of the claims appear in a single reference accommodates situations where the common knowledge of technologists is not recorded in the reference; that is, where technological facts are known to those in the field of the invention, albeit not known to judges. It is not, however, a substitute for determination of patentability in terms of § 103.

*Cont’l Can*, 948 F.2d at 1268–69.

The elements must be arranged as required by the claim, but identity of terminology is not required. *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Furthermore,

unless a reference discloses within the four corners of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. § 102.

*Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008).

Whether a patent is invalid as anticipated is a two-step inquiry. *See Power Mosfet Tech., LLC v. Siemens AG*, 378 F.3d 1396, 1406 (Fed. Cir. 2004).

The first step requires construction of the claims. *Id.* The second step in the analysis requires a comparison of the properly construed claim to the prior art. *Id.*

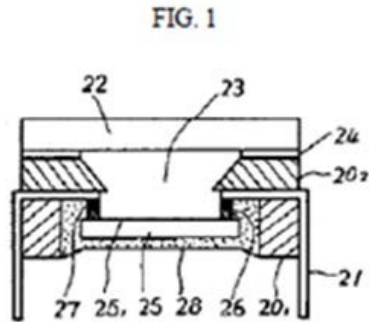
*D. Anticipation of Claim 1 Under § 102(b) by Yoshino (Ground 1)*

Petitioner alleges claim 1 is anticipated by Yoshino. Pet. 15–19.

Petitioner supports its position with the Guidash Declaration. *See* Guidash Decl. ¶¶ 66–69, 96–114. Patent Owner disagrees. PO Resp. 19–30. Patent Owner’s position is supported by the Afromowitz Declaration. Afromowitz Decl. ¶¶ 33–36.

1. *Yoshino Overview (Ex.1003)*

Yoshino discloses a packaging substrate for a solid-state image sensing device, where the device is mounted in a through hole and bonded to inner leads. Ex. 1003, 2. Yoshino's Figure 1 is reproduced below.



Yoshino's Figure 1 is a cross-section of the invention of Yoshino. *Id.* at 3. Yoshino teaches packaging substrate 20 and opening 23. *Id.* "The solid-state image sensor (25) is placed so that the bonding pads (26) of the solid-state image sensor (25) are aligned with the electrode leads (21), and the bonding pads (26) and the electrode leads (21) aligned therewith are connected via a conductive bonding material (27)." *Id.* The solid-state image sensor is "supported" in the packaging substrate "via a molded resin (28)." *Id.*

2. *Petitioner's Arguments and Evidence*

The preamble of claim 1, limitation 1a in the Petition, recites "[a] solid-state image sensing apparatus."<sup>18</sup> Yoshino is directed to

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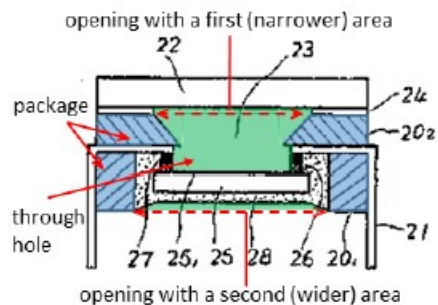
<sup>18</sup> We adopt Petitioner's convention of the claim number and a letter for each limitation. For example, the preamble is "1a." Petitioner proceeds on the basis that the preamble is limiting. In this instance the preamble is simply an introduction to the general field of the claim, i.e., "solid-state image sensing apparatus." *See On Demand Machine Corp. v. Ingram Indus., Inc.*, 442 F.3d 1331, 1343 (Fed. Cir. 2006). Nonetheless, given that Yoshino and other prior art references are in the general field, for purposes of this Decision our analysis includes the preamble.

“[a] solid-state image pickup device characterized by comprising a solid-state image sensor, [and] a packaging substrate supporting said solid-state image sensor.” Ex. 1003, 2 (claim 1). Petitioner relies on the preceding and the Guidash Declaration to show that Yoshino discloses the preamble. Pet. 15 (citing Guidash Decl. ¶ 100).

Limitation 1b recites “a package having a through hole therein, openings on both end faces thereof, and different opening areas of said openings.” Petitioner points to Figure 1 of Yoshino, showing packaging substrate and opening 23 and relies on the Guidash Declaration to show that limitation 1b is met. Pet. 15–16 (citing Ex. 1003, 3, Fig. 1 (annotated); Guidash Decl. ¶ 102).

Petitioner’s annotation of Yoshino’s Figure 1, described in section II.D.1. above, is reproduced below.

**Petitioner’s Annotation of Yoshino Figure 1 (Pet. 16)**



Annotated Figure 1 of Yoshino shows that “the package has openings on both end faces thereof, and different opening areas of said openings.”

Guidash Decl. ¶ 102; *see* Pet. 16. Dr. Guidash further testifies:

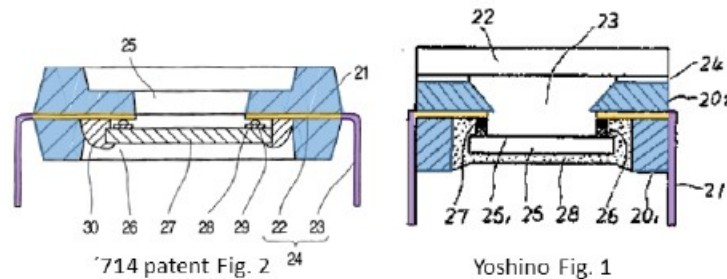
The package (“packaging substrate (20)”) is highlighted in light blue and the through hole (“tapered opening (23)”) is highlighted in green. (Ex. 1003, p. 2). The openings on both end faces, having different opening areas, are indicated with red arrows.

Guidash Decl. ¶ 102.

Limitation 1c recites “a lead frame comprising inner leads and outer leads, said lead frame being sealed in said package.” Petitioner relies on Yoshino’s disclosures that the solid-state image sensor and bonding pads 26 of the solid-state image sensor are aligned with electrode leads. Pet. 16–17 (citing Ex. 1003, 3; Guidash Decl. ¶ 104).

A side-by-side comparison of annotated versions of Figure 2 of the ’714 patent and Figure 1 of Yoshino is reproduced below.

**Annotated Figure 2 of the ’714 Patent and  
Figure 1 of Yoshino (Pet. 17)**



As illustrated above, Petitioner presents ’714 patent Figure 2 beside Yoshino Figure 1, each annotated to add color, to make a side-by-side comparison of the lead frame of the ’714 patent and Yoshino’s lead frame. Pet. 17.

Petitioner argues that “Yoshino teaches the same lead frame **comprising inner leads (orange) and outer leads (purple)**, described in the ’714 patent as ‘inner lead 22’ and ‘outer lead 23’ of ‘lead frame 24.’” *Id.* (citing Ex. 1001, 4:52–53; Guidash Decl. ¶ 105). Petitioner also argues that “Yoshino’s lead frame is **sealed in said package (blue)** in the same way as the ’714 patent.” *Id.* (citing Guidash Decl. ¶ 105).

Limitation 1d recites “a solid-state image sensing device mounted in said package by being inserted from an inlet of said opening which has a wider area, and thereby sealing said through hole, said solid-state image

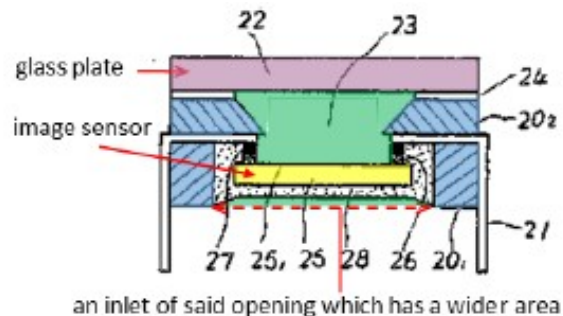
sensing device being secured to said package via an adhesive.” Petitioner relies on the following disclosure from Yoshino to disclose limitation 1d:

In this solid-state image pickup device, the packaging substrate (20) . . . is constructed . . . and the electrode leads (21) are provided . . . . The **light transmitting glass plate (22) is hermetically secured** to the ceramic molded frame (202) using black fritted glass **beforehand so as to cover the tapered opening (23) of the packaging substrate (20)**. The **solid-state image sensor (25) is placed** so that the bonding pads (26) of the solid-state image sensor (25) are aligned with the electrode leads (21) . . . . [N]o heating is required in the step of **incorporating the solid-state image sensor (25) into the packaging substrate (20)** to which the **light transmitting glass plate (22) has already been hermetically bonded**.

Pet. 18 (citing Ex. 1003, 3; Guidash Decl. ¶ 107).

Petitioner annotates Figure 1 of Yoshino to demonstrate that limitation 1d is taught by Yoshino. This annotation of Figure 1 is reproduced below.

#### Annotation of Figure 1 of Yoshino (Pet. 18)



Petitioner’s annotation of Yoshino’s Figure 1 shows “the glass plate (highlighted purple) and the image sensor (yellow) inserted into the wider opening of the through hole (green) of the package (blue).” Pet. 18 (citing Guidash Decl. ¶ 107). For that portion of limitation 1d reciting “secured to said package via an adhesive,” Petitioner points to its annotation of Figure 1

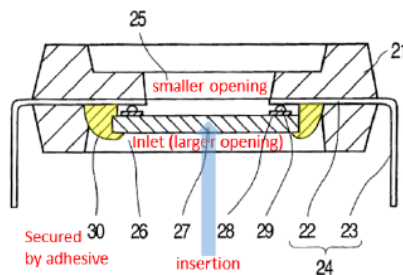
as “depict[ing] the bottom opening sealed by an adhesive (‘molded resin (28)’).” *Id.* (citing Ex. 1003, 3; Guidash Decl. ¶ 108).

*3. Patent Owner’s Arguments and Evidence and Petitioner’s Reply*

Patent Owner argues the Yoshino does not disclose limitation 1d, i.e., that the image sensing device is “inserted from an inlet of said opening which has a wider area” or is “secured to said package via an adhesive.” PO Resp. 19, 21–30. Patent Owner further contends that “no embodiment of Yoshino shows ‘all of the limitations **arranged or combined in the same way** as recited in the claim’” and “Yoshino cannot anticipate claim 1 of the ’714 Patent.” *Id.* at 21; *see also id.* at 19–21 (citing *Net MoneyIn*, 545 F.3d at 1371).

Patent Owner’s argument that Yoshino does not disclose limitation 1d’s recitation of “mounted in said package by inserted from an inlet of said opening which has a wider area” starts with an annotation of Figure 2 of the ’714 patent, which is reproduced below.

**Annotation of Figure 2 of ’714 Patent (PO Resp. 22)<sup>19</sup>**



Patent Owner argues the above annotation of Figure 2 shows that “opening 26 has the wider opening area and opening 25 has the smaller opening area” as recited in limitation 1d. PO Resp. 23. Patent Owner cites to other parts

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<sup>19</sup> This annotation is of the same Figure 2 of the ’714 patent as Petitioner annotated in section II.D.2. above. *See* Pet. 17.



of the Specification of the '714 patent as showing the “relative area of the openings of its through hole.” *Id.* (citing Ex. 1001, col. 4, ll. 53–58, Fig. 1).

In contrast to the specific disclosure of the '714 patent, Patent Owner criticizes the “single conclusory sentence” from the Guidash Declaration, which is Petitioner’s basis for alleging Yoshino discloses the “wider area” limitation. *Id.* at 24 (citing Pet. 17–18 (citing Guidash Decl. ¶ 106)). Patent Owner reiterates its position discussed in section II.B. above that the Guidash Declaration should be entitled to no weight. *Id.* Even if given weight, according to Patent Owner, the Guidash Declaration does not address relative areas and does not analyze the openings areas. *Id.* at 25 (citing Guidash Decl. ¶ 106; Afromowitz Decl. ¶ 35). Patent Owner concludes that Mr. Guidash “believes insertion should take place without regard to the relative areas of the openings.” *Id.* (citing Guidash Decl. ¶ 106).

Patent Owner’s position on Petitioner’s annotation of Yoshino’s Figure 1 (Pet. 24) is that it “does not address the opening’s area at all.” PO Resp. 24 (citing Afromowitz Decl. ¶ 34). Furthermore, Patent Owner alleges Yoshino discloses no length dimension, and includes no information on the relative sizes of the through hole. *Id.* at 24–25 (citing Afromowitz Decl. ¶ 34). Patent Owner alleges that Petitioner ultimately relies on inherency or obviousness to show the “wider area” limitation. *Id.* at 25 (citing Pet. 19).

Patent Owner concludes with the assertion that:

one having ordinary skill in the art would not have found the limitation [1d] inherent, because solid-state image sensor packages are produced in a variety of shapes and configurations, several examples of which are in the petitioner’s own references

where a cross-section would not necessarily provide information about the area of an opening.

PO Resp. 25–26 (citing Ex. 1016, 5, Fig. 1; Ex. 1024, 4–5, Figs. 2–3; Ex. 1020, Figs. 3 and 5).

Petitioner’s Reply begins with its annotation of Figure 1 of Yoshino arguing “Yoshino teaches that the upper, narrower opening is sealed with glass plate 22 *before* the image sensor is inserted, the sensor must be inserted in the lower, wider opening.” Pet. Reply 12 (citing Ex. 1003, 3; annotation of Figure 1 of Yoshino reproduced at section II.D.2. above). Petitioner also contends that Patent Owner’s position on “wider area” assumes the width dimension of the opening is wider when the claim has no such language. *Id.* at 12–13. Regardless, Petitioner argues Yoshino discloses that “[t]he smallest **area** of the opening (23) formed by this is set to the size that can at least cover the effective photosensitive section of the solid state image sensor (25).” *Id.* at 13 (citing Ex. 1003, 3). Petitioner argues that in order for the sensor to fit into the bottom opening of Yoshino it must “*also* have a greater area than the top opening.” *Id.* Thus, Petitioner concludes the evidence and common sense dictate that the opening in which the chip or sensor is inserted must be large enough for the chip and the upper opening must be smaller to correspond to the shape of the chip along either axis. *Id.* at 13–14 (citing Ex. 1003, 3–4; Afromowitz Dep., 32:2–6).

Patent Owner’s next argument is that Yoshino does not disclose limitation 1d’s recitation that the image sensing device is “secured to said package via an adhesive.” PO Resp. 27–30. The argument begins with its annotation of Figure 2 of the ’714 patent, reproduced above. *Id.* at 27. Patent Owner argues:

the adhesive 30 highlighted in Figure 1 [2], the image sensing device is glued into place inside the inlet cavity 26. In contrast, Yoshino, does not glue or “secure” the imaging device to the package except in perhaps an unreasonably broad sense.

*Id.* at 28.

Relying on the Afromowitz Declaration, Patent Owner argues Yoshino does not disclose how the sensor is secured. PO Resp. 28 (citing Afromowitz Decl. ¶ 36). Patent Owner also contends “[a] person having ordinary skill in the art would not have understood a molded resin used in this way to constitute an ‘adhesive.’” *Id.* (citing Afromowitz Decl. ¶ 36). Dr. Afromowitz testifies that he has “never heard of molded resin as adhesive” and there are substrate adhesives, which are conductive. Afromowitz Decl. ¶¶ 32, 36; *see also* PO Resp. 29 (citing Ex. 1003, 2, Fig. 2 (“Yoshino itself uses the term ‘secured . . . via conductive adhesive’”)).

Thus, Patent Owner argues that molded resin is not an “adhesive,” as limitation 1d requires, and that we should use Patent Owner’s claim construction that securing must be by “gluing with an adhesive.” PO Resp. 29. Patent Owner points out that “Yoshino does not glue the imaging device to the package as Yoshino simply fills the molded cavity with resin.” *Id.* (citing Afromowitz Decl. ¶ 32). Patent Owner cites to the Afromowitz Declaration, asserting that “one having ordinary skill in the art would not understand Yoshino’s molded resin to disclose the claimed ‘adhesive.’” *Id.* at 29–30 (citing Afromowitz Decl. ¶ 32). Patent Owner concludes “Yoshino’s Figure 1 does not show ‘all of the limitations arranged or combined in the same way as recited in the claim’ (*Net MoneyIN* at 1371), and Yoshino Figure 1 does not anticipate claim 1 of the ’714 patent.” *Id.* at 30.

Petitioner's Reply argues "Yoshino's resin is an adhesive," pointing out that "Dr. Afromowitz could not define 'glue' more specifically than an 'adhesive substance' except to say that this would not include a molding process." Pet. Reply 15 (citing Afromowitz Dep., 67:6–68:17). Petitioner argues "Yoshino's resin serves to **secure** the image sensor to the package (even if the sensor is *also* held in place by 'conductive bonding material (27),' which bonds the sensor's pads to the lead frame)." *Id.* (citing Ex. 1003, 3). Further, Petitioner argues, if Yoshino's molded resin was not an adhesive, the sensor would "slip out of place, rendering it unsuitable for 'supporting' the sensor." *Id.* (citing Ex. 1003, 3).

Mr. Guidash testifies that Yoshino's molded resin functions as an adhesive. Guidash Decl. ¶ 69. Petitioner alleges Dr. Afromowitz supports its position when he admits that resins are used in adhesives and "remain adhesive even when used in molds." Pet. Reply 16 (citing Afromowitz Dep., 53:10–15, 38:2–39:12).

Petitioner questions the credibility of Dr. Afromowitz's testimony about a person of ordinary skill, pointing to the following testimony and contrasting it with Mr. Guidash's testimony discussed above. "There's very little information about [Yoshino's] molded resin 28. In fact, it just says molded resin 28. And that's all we know about it." Pet. Reply 16 (quoting Afromowitz Dep., 76:25–77:3). Petitioner interprets the preceding deposition testimony, as "read[ing] into Yoshino molding processes not taught by Yoshino and speculat[ing] about how one of skill would have understood such processes." *Id.* at 16–17. Petitioner concludes the more credible testimony is that of Mr. Guidash. *Id.*

#### 4. Analysis and Conclusion

We are persuaded that Petitioner has shown Yoshino anticipates claim 1. We are not persuaded by Patent Owner's argument, based on *Net MoneyIn*, that Yoshino does not disclose the claim limitations as arranged in the claim. PO Resp. 19–21. Patent Owner does not sufficiently explain how the limitations are arranged in claim 1 and how that arrangement is missing in Yoshino. Patent Owner's only reference to *Net MoneyIn* is in connection with the “adhesive” limitation, where it states in conclusory fashion that Yoshino does not show “all of the limitations arranged or combined in the same way as recited in the claim.” *Id.* at 30. Accordingly, we turn to Patent Owner's assertion that Yoshino does not disclose the two parts of limitation 1d, “wider area” and “adhesive.” The “wider area” limitation is read in conjunction with limitation 1b, which recites “a package having a through hole therein, opening on both end faces thereof, and *different opening areas of said openings.*”

Patent Owner first argues Yoshino does not disclose the recited “wider area” of limitation 1d. PO Resp. 21–27. In its Response, Patent Owner does not argue that “wider area” should be construed. By contrast, Patent Owner did offer a construction of “adhesive.” *See* section II.A. above. At the final hearing Patent Owner declined to construe the “wider area” term or allege it should be construed. *See* Tr. 31:6–33:15. Patent Owner therefore had an opportunity to argue a construction for “wider area” but did not do so.

We determine that “wider area” has its plain and ordinary meaning, i.e., that the opening “area” is “wider” where the image sensor is inserted. This is consistent with the claim language, which recites that the package has “*different opening areas of said openings*” (1b) and the image sensor is

“inserted from an inlet of said opening which has a *wider area*, and *thereby sealing said through hole*” (1d).

As to whether Yoshino discloses the recited “wider area” part of limitation 1d, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. Specifically, we have analyzed Yoshino’s Figure 1 and find that, taking into account “the common knowledge of technologists,” a person of ordinary skill viewing Yoshino’s Figure 1 would conclude that the bottom opening is wider, i.e., a “wider area,” than the upper opening. *See* Pet. 17–18 (citing Ex. 1003, 2; Guidash Decl. ¶¶ 106–107; annotated Fig. 1 of Yoshino at section II.D.2. above); *see Cont’l Can*, 948 F.2d at 1268–69. The meaning is also consistent with the geometry necessary to seal the image sensor into the package. *See* Pet. 17 (citing Ex. 1003, 3, Fig. 1).

Patent Owner’s annotation of Figure 2 of the ’714 patent is argued as exemplary of the “wider area” term as used in limitation 1d. *See* PO Resp. 22–23; section II.D.3. above. Figure 2 of the ’714 as annotated by both parties is strikingly similar to the annotation of Figure 1 of Yoshino relied on by Petitioner. *See* Pet. 17 (annotated Fig. 2 of the ’714 patent and Fig. 1 of Yoshino at section II.D.2. above). Although Patent Owner’s annotated Figure 2 supports Patent Owner’s argument about the disclosure of relative areas in the ’714 patent, Petitioner’s annotated Figure 1 of Yoshino also discloses relative areas where the bottom opening area is larger in the horizontal plane than the upper opening area because it is “wider.” We specifically find that Figure 1 of Yoshino discloses the bottom opening where the sensor is inserted has a “wider area” than the other “opening area” of the “through hole.” *See* claim 1, limitation 1b (“a package having a

*through hole* therein, openings on both end faces thereof, and *different opening areas* of said openings”).

Patent Owner’s arguments regarding “wider area” do not distinguish what is disclosed in Yoshino from the claim limitation. *See* Tr. 32:15–20 (“We looked at it as an area period. . . . [W]e thought of wider area and greater area as the same thing . . .”). Neither are we persuaded that the lack of showing on the dimensions of Yoshino’s openings is relevant to the claim language, which makes no mention of dimensions other than in a relative sense, i.e., “wider.” Thus, the Afromowitz Declaration testimony regarding lack of dimensional analysis in the Guidash Declaration is not persuasive. *See* Afromowitz Decl. ¶ 34. We do not find the Guidash Declaration testimony that Yoshino discloses a “wider area” is conclusory, because it relies on disclosure from Yoshino and is illustrated by Petitioner’s annotation of Figure 1 of Yoshino. *See* Guidash Decl. ¶¶ 106–107 (citing Ex. 1003, 2; annotated Fig. 1 of Yoshino, shown at section II.D.2. above). We therefore credit the Guidash Declaration that Yoshino discloses the “wider area” limitation. *Id.*

As to whether Yoshino discloses the recited “adhesive” part of limitation 1d, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. As discussed in section II.A. above, we do not construe “secured via adhesive” to be limited to “gluing.” Thus, Patent Owner’s arguments relying on that construction are rejected for reasons discussed above.

Moreover, we find Dr. Afromowitz’s testimony that “[a] person having ordinary skill in the art would not have understood a molded resin used in this way to constitute an ‘adhesive’” is conclusory. *See* Afromowitz Decl. ¶ 36. Conclusory testimony is not credible or persuasive and,

accordingly, we give it little weight. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Indeed, to the extent the Afromowitz Declaration provides an underlying basis, it suggests we give little weight to his testimony. For example, Dr. Afromowitz’s testimony about “glue” amounts to no more than glue is an adhesive and excludes a molding process. Afromowitz Dep., 67:6–68:17; *see also* Pet. Reply 15 (raising other questions about credibility of Dr. Afromowitz’s testimony).

Given his tenure, relevant, and extensive experience in the subject matter area of this proceeding, Mr. Guidash is very qualified to testify regarding photographic image sensors and the packaging thereof and, accordingly, we find his testimony highly credible. *See* Mr. Guidash Curriculum Vitae (Ex. 1026), 1–5. In contrast, since 1974 Dr. Afromowitz’s primary experience is in academia and prior to that his experience was in materials characterization and, therefore, we find his testimony much less credible. *See* Afromowitz Decl. ¶¶ 3–7.

In sum, we credit the Guidash Declaration testimony that “molded resin” is “sometimes used in the fabrication of package bodies that *functions here as an adhesive*.” Guidash Decl. ¶¶ 69, 108 (emphasis added); *see* Pet. 18. Furthermore, the plain and ordinary meaning of adhesive supports Petitioner’s argument, namely that an adhesive tends to adhere.<sup>20</sup> We are persuaded that the molded resin that secures the sensor in Yoshino is an

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<sup>20</sup> THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE, 16 (New College Edition 1979) (Ex. 3001) defines “adhesive” as “tending to adhere; sticky.” *See also* section II.A. above (analyzing Patent Owner’s proposed construction of “adhesive”).



adhesive as claimed. *See* Ex. 1003, 3 (bottom opening of Fig. 1 sealed by molded resin); Guidash Decl. ¶ 108.

Petitioner’s arguments and evidence have shown by a preponderance of the evidence that claim 1 is anticipated by Yoshino.

*E. Obviousness Grounds*

A patent claim is unpatentable as obvious if the differences between the claimed subject matter and the prior art are “such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a).

The ultimate determination of obviousness is a question of law, but that determination is based on underlying factual findings . . . . The underlying factual findings include (1) “the scope and content of the prior art,” (2) “differences between the prior art and the claims at issue, (3) the level of ordinary skill in the pertinent art,” and (4) the presence of secondary considerations of nonobviousness such “as commercial success, long felt but unsolved needs, failure of others,” and unexpected results.

*In re Nuvasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (citing *inter alia* *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966)).

“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Furthermore, in assessing the prior art, the Board must consider whether a person of ordinary skill would have been motivated to combine the prior art to achieve the claimed invention. *Nuvasive*, 842 F.3d at 1381. As observed by our reviewing court in

*Personal Web Technologies, LLC v. Apple, Inc.*, 848 F.3d 987, 991–992  
(Fed. Cir. 2017):

The Supreme Court in *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 127 S.Ct. 1727, 167 L.Ed.2d 705 (2007), explained that, “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,” “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.”

*1. Person of Ordinary Skill in the Art*

The Guidash Declaration describes the person of ordinary skill in the art at the time as having the following education and experience:

Bachelor’s degree in electrical engineering, physics, or material science and approximately 3–5 years of industrial experience or equivalent research or teaching experience, or a Master’s degree in the same fields and 1–3 years of industrial experience or equivalent research or teaching experience. The levels of education, experience and knowledge can trade off against one another.

Guidash Decl. ¶ 53. As discussed in section II.B. above, under the circumstances here, the Guidash Declaration was not improperly incorporated into the Petition and may be referenced to establish the level of ordinary skill in the art. Accordingly, we find the Guidash Declaration, which is supported by the prior art itself, states the level of ordinary skill.

*F. Obviousness of Claim 6 Under § 103(a) Over Yoshino and Izumi (Ground 2)*

Petitioner alleges that independent claim 6 would have been obvious over Yoshino and Izumi. Pet. 19–25. Petitioner supports its position with the Guidash Declaration. *See* Guidash Decl. ¶¶ 115–135. Patent Owner

disagrees. PO Resp. 30–36. Patent Owner’s position is supported by the Afromowitz Declaration. Afromowitz Decl. ¶¶ 37–46.

### 1. Izumi Overview (*Ex. 1016*)

Izumi discloses a first embodiment including a package made of ceramic material. *Ex. 1016*, 4.<sup>21</sup> “Solid state imaging element chip 2 comprises a two dimensional photo sensor.” *Id.* The package has two concave cavities, one to receive the chip and one to receive peripheral circuit chips 3 and 4A–4D. *Id.* at Fig. 1.

Figure 2 is a cross section of a second embodiment of the same structure as the first embodiment differing in that the package is formed of a resin material. *Ex. 1016*, 5. Figure 2 of Izumi is reproduced below.

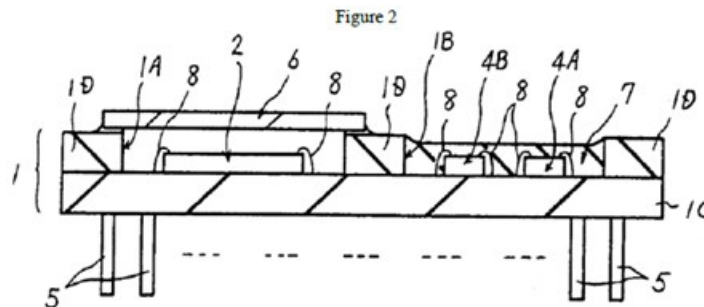


Figure 2 includes base substrate 1C on which chip 2 and peripheral circuit chips 4A and 4B are mounted. *Id.* at 4–5, Fig. 2. Figure 1 shows the other peripheral chips 4C, 4D, and 3 referenced above. *Id.* at 4, Fig. 1.

### 2. Petitioners Arguments and Evidence

Claim 1 limitations 1a–c are identical to claim 6 limitations 6a–c. *Compare Ex. 1001*, col. 9, ll. 20–25, *with id.* at col. 9, l. 59–col. 10, l. 3. Petitioner cites to the showing made for claim 1 to show limitations 6a–6c. *Pet. 20.*

<sup>21</sup> References are to stamped numbers 002–007, exclusive of “00” and certificate of translation, overlaid on printed numbers 333–338.

Limitation 6d recites “a substrate on which a solid-state image sensing device and a peripheral circuit chip are mounted being inserted into the package from a wider opening thereof.” For the relatively wider opening, Petitioner cites to the showing made for claim 1 and Yoshino. *Id.* (citing Guidash Decl. ¶ 121).

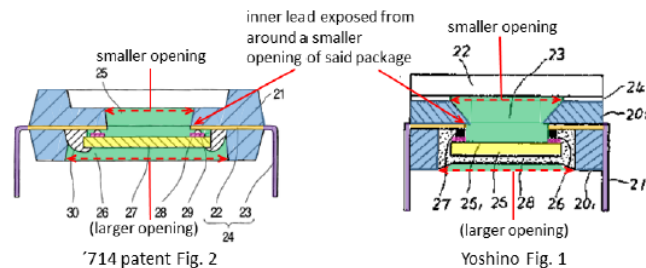
As to the “peripheral circuit chip” recitation in limitation 6d, Petitioner relies on Izumi, asserting that it would have been obvious to mount a solid state sensing device and peripheral circuit chip to a substrate. *Id.* at 21 (citing Ex. 1016, 4–5, Fig. 2; Guidash Decl. ¶ 122). Petitioner argues that in Izumi Figure 2, “the image sensor and peripheral chip are in separate ‘cavity part(s)’ of the package.” *Id.* (citing Ex. 1016, 5; Guidash Decl. ¶ 125). Petitioner argues that claim 6 only requires the image sensor and peripheral circuit to be in the same package, which is taught in Izumi. *Id.* at 21–22 (citing Guidash Decl. ¶ 125).

Petitioner concludes that one of ordinary skill “would have been motivated to use the substrate (and package divider) disclosed in Izumi with Yoshino’s package.” Pet. 21–22 (citing Ex. 1016, 3 (Problems to be Solved); Guidash Decl. ¶ 126). Reasons for the combination of Yoshino and Izumi include that a peripheral chip and image sensor on a common substrate reduces noise, provides a shorter signal path, increases speed, and takes up less space, all of which are desirable in a commercial product. *Id.* at 22 (citing Ex. 1016, 3 (Problems to be Solved); Guidash Decl. ¶ 126). Petitioner contends Izumi provides the advantage of reducing package size over a package with wire bonds, was a known variation to a base system like Yoshino and yields no unexpected results and is therefore obvious under *KSR*, 550 U.S. at 402-03. *Id.* (citing Guidash Decl. ¶ 126).

Limitation 6e recites “an electrode pad of said substrate being connected to said inner lead exposed from around a smaller opening of said package.” Petitioner cites to Yoshino’s “electrode leads” as meeting the “inner lead” language. Pet. 22–23 (citing Ex. 1003, 3; Guidash Decl. ¶ 127). In addition Petitioner argues “Yoshino’s ‘bonding pads (26)’ electrically connect ‘solid-state image sensor (25)’ to the leads, thus they are electrical connection points on a semiconductor device, *i.e.*, electrode pads.” *Id.* at 23 (citing Guidash Decl. ¶ 128).

Concerning the “smaller opening” language, Petitioner compares, as it did in section II.D.2. above, the ’714 patent Figure 2 and Yoshino Figure 1 which are reproduced below.

**Second Annotated Figure 2 of the ’714 Patent  
and Figure 1 of Yoshino (Pet. 23)**



The second annotation of Figure 2 of the ’714 patent and Figure 1 of Yoshino, according to Petitioner, shows “Yoshino’s inner lead is **exposed from around a smaller opening of said package** in the same way as in the ’714 patent,” like elements highlighted in the same color. Pet. 23 (citing Guidash Decl. ¶ 129). Irrespective of the comparison above, Petitioner concludes the “smaller opening” is shown by Figure 1 of Yoshino. *Id.* (citing Guidash Decl. ¶ 129).

Limitation 6f recites “said substrate being secured to said package via an adhesive.” Petitioner cites to its showing regarding limitation 1d

discussed in section II.D.2 above. Pet. 24–25. Petitioner also argues “it would have been obvious to use Izumi’s substrate in place of Yoshino’s image sensor.” *Id.* at 25 (citing Guidash Decl. ¶ 134).

*3. Patent Owner’s Arguments and Evidence and Petitioner’s Reply*

Patent Owner raises very similar arguments to those it made in connection with claim 1, including that the Yoshino/Izumi combination do not teach “different opening areas” (6b), “a substrate [with] a solid-state image sensing device and peripheral circuit chip . . . inserted into the package from a wider opening thereof” (6d), and “secured to said package via an adhesive” (6f). *See* PO Resp. 30 (emphasizing certain claim 6 language).

As to limitations 6b and 6d, Patent Owner references arguments it made in connection with claim 1. *Id.* at 30–31 (citing to section V(A)(2), of its Response, pages 21–26). Patent Owner makes specific arguments that a person of ordinary skill in the art would not be motivated to combine Izumi with Yoshino. PO Resp. 31–32 (citing Ex. 1016, Figs. 1, 2; Afromowitz Decl. ¶ 40). Patent Owner points out that the Izumi package has a left-hand cavity for an imaging chip and a right-hand cavity for a peripheral circuit chip. *Id.* at 32–33.

Citing the Afromowitz Declaration, Patent Owner argues that Izumi has several structural differences over Yoshino, the most relevant to the claim being that “Izumi’s substrate is not ‘inserted into the package from a wider opening thereof’ but is attached under the package, and Izumi’s numerous peripheral chips, located in a separate cavity (for which Izumi has several good reasons) provide serious complications.” *Id.* at 33 (citing Afromowitz Decl. ¶¶ 42–43). Thus, based on structural differences

requiring “extreme modification” of either Izumi or Yoshino that “[a] person of ordinary skill would not have been motivated to use Izumi’s substrate with Yoshino.” *Id.* at 33–34 (citing Afromowitz Decl. ¶¶ 43, 45). Patent Owner relies on Dr. Afromowitz’s testimony that Izumi’s mounting of the image sensor to its substrate would prevent the sensor from being positioned, negating a principal advantage of the ’714 patent. *Id.* (citing Afromowitz Decl. ¶ 43).

Patent Owner also argues “[t]he reasons to modify Izumi simply do not exist for the device when considering the actual device.” PO Resp. 35 (citing Afromowitz Decl. ¶ 46). Further, Patent Owner contends the principle of operation would be changed or Izumi would be inoperable for the intended purpose. *Id.*

In its Reply, Petitioner argues that obviousness does not require the references to be physically incorporated. Pet. Reply 17 (citing Guidash Decl. ¶ 133; Guidash Dep. 74:7–75:12; *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . .”))). Petitioner also argues that the modification would not be difficult, as Yoshino shows how to connect its image sensor through a lead frame and locate the pads. *Id.* at 17–18 (citing Pet. 24; Ex. 1003, Fig. 1). Mr. Guidash testifies “a person of ordinary skill would have known to use the existing wiring of Izumi’s substrate to route electrical connections to points where they connect to the leads of Yoshino’s package (rather than routing the connections to points where they connect to Izumi’s leads (5)).” Guidash Decl. ¶ 133.

Petitioner argues Patent Owner’s optical positioning argument is not a part of claim 6. Pet. Reply 18. Furthermore, the substrate in the alleged combination is a result of a connection between pads and a lead frame so the entire substrate can be moved within the package for purposes of positioning. *Id.* (citing Pet. 24).

#### *4. Analysis and Conclusion*

Petitioner’s arguments and evidence have shown that claim 6 is obvious over Yoshino and Izumi. We are not persuaded by Patent Owner’s arguments. To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to the remainder of claim 6, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. As Petitioner notes, physically combining the references is not necessary. Petitioner cites to Izumi only to show the “peripheral circuit chip.” *See* Pet. 21. As noted above, we credit the Guidash Declaration testimony over the Afromowitz Declaration testimony because, among other reasons, the declarants’ relative experience in the art. As to what would have been known by one of ordinary skill, we credit the Guidash Declaration testimony regarding reasons one of ordinary skill would combine Izumi with Yoshino. Guidash Decl. ¶ 133; *see* Pet. 22.

Petitioner’s arguments and evidence have shown by a preponderance of the evidence that claim 6 would have been obvious over Yoshino and Izumi.

#### *G. Obviousness of Claim 7 Under § 103(a) Over Yoshino, Nagano, and Wakabayashi (Ground 3)*

Petitioner alleges that independent claim 7 would have been obvious over Yoshino, Nagano, and Wakabayashi. Pet. 25–28. Petitioner cites the



Guidash Declaration in support of its positions. Guidash Decl. ¶¶ 136–153. Patent Owner disagrees. PO Resp. 36–40. Patent Owner’s position is supported by the Afromowitz Declaration. Afromowitz Decl. ¶¶ 47–66.

*1. Nagano Overview (Ex. 1018)*

Nagano discloses a chip having a light-receiving part, which may be circular, and a circuit chip disposed on an upper surface thereof. Ex. 1018 ¶¶ 8, 9. Nagano has a substrate that is provided with electrodes for connection to another circuit. *Id.* ¶ 8.

*2. Wakabayashi Overview (Ex. 1004)*

Wakabayashi discloses a semiconductor image sensor enclosed in a plastic packaging material. Ex. 1004, Abstract.

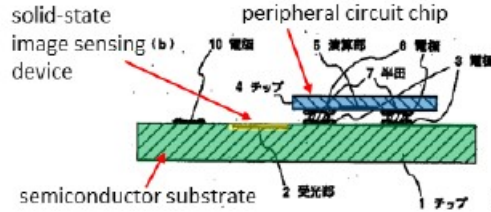
*3. Petitioner’s Arguments and Evidence*

Similar to the discussion above in connection with claim 6, claim 1 limitations 1a–c are identical to claim 7 limitations 7a–c. Petitioner cites to the showing made for claim 1 to show limitations 7a–7c. Pet. 25.

As discussed below, Patent Owner contests the showing made in connection with limitation 7d. Limitation 7d recites “a semiconductor substrate having a solid-state image sensing device and a peripheral circuit chip disposed on an upper surface thereof, said semiconductor substrate being inserted into a plastic package via the larger of two openings formed in said package.” Pet. 25.

For its showing of limitation 7d, Petitioner cites, in part, to an annotated version of Nagano Figure 1(b), reproduced below.

**Annotation of Figure 1(b) of Nagano-Limitation 7d (Pet. 26)**



Petitioner explains that Figure 1(b) of “Nagano discloses a **semiconductor substrate** (‘chip 1’, highlighted green) **having a solid-state image sensing device** (‘light-receiving part 2’, yellow) **and a peripheral circuit chip** (‘chip 4 having a computing part 5’, blue) **disposed on an upper surface thereof.**” Pet. 26–27 (citing Ex. 1018 ¶ 8, claim 1; Guidash Decl. ¶¶ 146–148). Petitioner argues that the preceding discloses that portion of limitation 7d reciting “a peripheral circuit chip disposed on an upper surface thereof.” *Id.* Petitioner cites its rationale in connection with claim 6 for the reason to combine Yoshino and Nagano. *Id.* at 27 (citing Guidash Decl. ¶ 149).

Wakabayashi is relied on to show the “plastic package” recitation of limitation 7d. Pet. 26 (citing Ex. 1004, Abstract). Petitioner concludes that using Wakabayashi’s plastic package for the package of Yoshino would be understood by a person of ordinary skill and would have achieved predictable results. *Id.* (citing Guidash Decl. ¶ 145). Patent Owner does not separately contest Wakabayashi as part of the combination.

Limitation 7e recites “an electrode pad of said semiconductor substrate being connected to the inner lead exposed from around the smaller opening of said package.” Petitioner references its showing for limitation 6e above. Pet. 27–28 (citing Guidash Decl. ¶ 150). Petitioner also argues “it would have been obvious to use Nagano’s semiconductor substrate in place of Yoshino’s image sensor.” *Id.* at 28 (citing Guidash Decl. ¶ 150).

Petitioner concludes Nagano’s substrate includes “electrodes 10” serving

“the same function as the pads in Yoshino, and it would have been obvious to connect them to the inner leads of Yoshino. *Id.* (citing Ex. 1019 ¶ 8; Guidash Decl. ¶ 151).

Limitation 7f recites “said semiconductor substrate being secured to said package via an adhesive.” Petitioner references its showing in connection with limitation 1d based on Yoshino and its rationale for combining Yoshino and Nagano as it argued in connection with limitation 1d. Pet. 28 (citing Guidash Decl. ¶ 152).

*4. Patent Owner’s Arguments and Evidence and Petitioner’s Reply*

Patent Owner’s arguments focus on limitation 7d, reproduced in section II.G.3. above. PO Resp. 36. As to limitations 7b and 7f, Patent Owner references arguments it made in connection with claim 1 limitations 1b and 1d. *Id.* at 36–37. Thus, the issue presented by Patent Owner is the combination of Yoshino and Nagano.

Patent Owner argues Nagano is a photodiode and not a “solid-state image sensing device” as recited in limitation 7d. PO Resp. 37 (citing Afromowitz Decl. ¶¶ 50, 52). Thus, according to Patent Owner, “a person of ordinary skill in the art of image sensor design and manufacture would simply not look to Nagano for prior art teachings.” *Id.* Patent Owner argues Nagano’s photodiode or “light-receiving part 2” (*see* Ex. 1018, Fig. 1) should not be considered the claimed “image sensing device” because it is unreasonably broad, beyond our broadest reasonable interpretation standard of construction. *Id.* at 38–39 (citing Ex. 1018 ¶ 8, Figs. 1a. and 1b; Afromowitz Decl. ¶ 62).

Patent Owner also contests Petitioner’s rationale and motivation for the combination. PO Resp. 39–40. Patent Owner contends, through

Dr. Afromowitz, that the combination would be “nonsensical” because Nagano has no wire bonds to “make use of Yoshino’s package device advantageous.” *Id.* at 40 (citing Afromowitz Decl. ¶ 64). The references are “disparate” and there would be no motivation to combine them. *Id.*

Petitioner responds that, even if a photodiode is not considered the claimed image sensing device, Nagano is cited for its peripheral circuit chip. Pet. Reply 19. Petitioner argues Nagano is in the same field as Yoshino, and is thus analogous art, because both sense and compute incident light and have the same packaging requirements. *Id.* at 20. Citing to the Guidash Declaration, Petitioner adds that motivation is provided by a desire to “reduce the length of electrical connections, reduce noise, and reduce package size.” *Id.* (citing Guidash Decl. ¶ 149; Ex. 1018 ¶ 17 (compact and reduce noise); Ex. 1003, 4 (size reduction goal)).

#### *5. Analysis and Conclusion*

Petitioner’s arguments and evidence have shown claim 7 would have been obvious over Yoshino, Nagano, and Wakabayashi. We are not persuaded by Patent Owner’s arguments to the contrary. To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to the remainder of claim 6, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. We specifically find that Nagano’s photodiode is analogous art to the image sensing device claimed and taught in Yoshino. Based on his years and quality of experience in the field, we credit the testimony of Mr. Guidash regarding reasons one of ordinary skill would combine Nagano with Yoshino. Guidash Decl. ¶ 149; *see* Pet. 27. Petitioner’s arguments and evidence have shown by a preponderance of the

evidence that claim 7 would have been obvious over Yoshino, Nagano, and Wakabayashi.

*H. Obviousness of Claim 8 Under § 103(a) Over Yoshino, Izumi/Nagano, Hirosawa, and Nita (Ground 4)*

Petitioner alleges that claim 8 would have been obvious over Yoshino, Izumi/Nagano, Hirosawa, and Nita. Pet. 28–31. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 154–166. Patent Owner disagrees. PO Resp. 40–45. Patent Owner’s position is supported by the Afromowitz Declaration. Afromowitz Decl. ¶¶ 67–77.

*1. Hirosawa Overview (Ex. 1020)*

Hirosawa discloses semiconductor chip 2 on which a light detection semiconductor element and a signal processing circuit element are formed. Ex. 1020, 3, Fig. 1. The components described are mounted in a package having light-shielding film 3.<sup>22</sup> *Id.*

*2. Nita Overview (Ex. 1011)*

Nita discloses a package in which a light receiving section and storage section are mounted on chip 1, and a light shielding section is located above the substrate, on “transparent [glass] lid 4” of “package 2.” Ex. 1011 ¶¶ 15–16.

*3. Petitioner’s Arguments and Evidence*

Claim 8 depends from claim 6 or claim 7 and recites “a shading film covers an entire upper surface of said substrate except an upper surface of the solid-state image sensing device.” Petitioner relies on its prior assertions

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<sup>22</sup> Petitioner points out that Hirosawa’s Figure 1 labels the shading film “3” while the specification erroneously refers to it as “8.” Pet. 29.

Yoshino in view of Izumi for claim 6 and Yoshino and Nagano for claim 7.  
Pet. 28.

Petitioner argues that Hirosawa’s Figure 1 depicts shading film 3 “**on the entire upper surface of the substrate except an upper surface of the solid-state image sensing device**, section 2L.” Pet. 29–30 (citing Ex. 1020, 3, Fig. 1; Guidash Decl. ¶¶ 160–161). Nita, it is argued, discloses that a light receiving section, i.e., the claimed “image sensing device,” and a storage section, i.e., the claimed “peripheral circuit chip,” are mounted on the chip, i.e., the claimed “substrate,” and that the light shielding section is located “**above the substrate**, on the ‘transparent glass lid 4’ of ‘package 2.’” *Id.* at 30 (citing Ex. 1011 ¶¶ 15–16, Figs. 3, 4; Guidash Decl. ¶ 162). Petitioner argues that “[u]sing a light-shading film, such as that of Hirosawa or Nita, over the entire area of the substrate not having the image sensor would have the predictable advantage of protecting the peripheral chip from light (or of minimizing light reaching the peripheral chip that might obtain with partial coverage).” *Id.* (citing Guidash Decl. ¶ 164). In addition, Petitioner notes that with regard to claim 6, where the combination of Yoshino and Izumi is asserted for unpatentability, Izumi describes blocking light by use of “resin sealing material 7.” *Id.* (citing Ex. 1016, 4; Guidash Decl. ¶ 165).

Petitioner notes that, with respect to base claim 6, “Izumi itself describes blocking light to the peripheral chips by covering the peripheral chip section with resin sealing material 7, thus demonstrating that the function of blocking light to the peripheral chip was common and obvious.” Pet. 30 (citing Ex. 1016, 4; Guidash Decl. ¶ 165). Petitioner concludes that “a person of ordinary skill would have known that a light-shading layer was an equivalent—or additional—way to block light from reaching the

peripheral circuitry, and the substitution or additional use of light-shading layer would have been obvious.” *Id.* at 30–31 (citing Guidash Decl. ¶ 165).

*4. Patent Owner’s Arguments and Evidence and Petitioner’s Reply*

Patent Owner first argues that neither Hirosawa nor Nita discloses “a shading film [that] covers an entire upper surface of said substrate except an upper surface of the solid-state image sensing device.” PO Resp. 40–45. Next, Patent Owner argues that Nita’s shading film would not protect against light entering at an angle because of vertical space between the shading film and the substrate. *Id.* at 44–45. Patent Owner then argues that Hirosawa fails to teach this limitation because connection points for leads on substrate 2 are not depicted as shaded. *Id.* at 42. Last, Patent Owner argues that Hirosawa teaches transmission means that might not be covered by the shading film. *Id.* at 41–42.

Petitioner’s Reply argues that Patent Owner does not address the position taken in the Petition that using light-shading film over areas other than the image sensor area would have the predictable advantage of “minimizing light reaching the peripheral chip that might obtain with partial coverage.” Pet. Reply 21 (citing Pet. 30–31). Petitioner concludes that Patent Owner’s argument that neither Nita nor Hirosawa teach the limitation of claim 8 alone is irrelevant. *Id.*

Petitioner argues that the space between the shading film and substrate in Nita is depicted is “precisely the arrangement depicted in Fig. 7 of the ’714 patent.” Pet. Reply 22 (comparing Ex. 1011 Fig. 1 and ’714 patent Fig. 7). Petitioner points out that claim 8 recites the light shielding film is on the upper surface and Hirosawa’s bonding pads or transmission means

are not on the upper surface, making Patent Owner's argument irrelevant to the claim. *Id.* at 23.

### *5. Analysis and Conclusion*

Petitioner's arguments and evidence have shown claim 8 would have been obvious over Yoshino, Izumi/Nagano, Hirosawa, and Nita. We are not persuaded by Patent Owner's arguments to the contrary. To the extent Patent Owner relies on arguments made in connection with independent claims 6 and 7, we refer to our conclusions there. As to claim 8, we adopt Petitioner's arguments and evidence in the Petition and its Reply to Patent Owner's Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration testimony that applying a shading film was a well-known technique that would have been an obvious step in an image-sensing package. Guidash Decl. ¶ 159; *see* Pet. 29. Petitioner's arguments and evidence have shown by a preponderance of the evidence that claim 8 would have been obvious over Yoshino, Izumi/Nagano, Hirosawa, and Nita.

#### *I. Obviousness of Claim 9 Under § 103(a) Over Yoshino and Izumi/Nagano (Ground 5)*

Petitioner alleges that claim 9 would have been obvious over Yoshino and Izumi/Nagano. Pet. 31–32. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 167–174. Patent Owner disagrees based on its arguments and evidence relating to claim 1. PO Resp. 45–46.

Claim 9 depends from claim 6 or claim 7 and recites “an electrode pad formed on the substrate is connected to the inner lead via a bump.” We have reviewed Petitioner's arguments and evidence regarding claim 9. Pet. 31–32; Guidash Decl. ¶¶ 168–174.



To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to claim 9, we adopt Petitioner's arguments and evidence in the Petition and its Reply to Patent Owner's Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration testimony that, as taught by Yoshino, indium is a metal used in press fit bump-bonding. Guidash Decl. ¶ 170; *see* Pet. 31–32. Petitioner's arguments and evidence have shown by a preponderance of the evidence that claim 9 would have been obvious over Yoshino and Izumi/Nagano.

*J. Obviousness of Claim 10 Under § 103(a) Over Yoshino, Izumi/Nagano, and Wakabayashi (Ground 6)*

Petitioner alleges that claim 10 would have been obvious over Yoshino, Izumi/Nagano, and Wakabayashi. Pet. 32–34. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 175–180. Patent Owner disagrees based on its arguments and evidence relating to claim 1. PO Resp. 45–46.

Claim 10 depends from claim 6 or claim 7 and recites “an electrode pad formed on the substrate is connected to the inner lead via an anisotropic conductor which has only vertical conductivity.” We have reviewed Petitioner's arguments and evidence regarding claim 10. Pet. 32–34; Guidash Decl. ¶¶ 175–180.

To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to claim 10, we adopt Petitioner's arguments and evidence in the Petition and its Reply to Patent Owner's Response. We specifically find an anisotropic conductor is one which is conductive only in one direction. Guidash Decl. ¶ 178; *see* Pet. 33. We further find that “Wakabayashi's conductor has **only vertical**

**conductivity**, because Wakabayashi’s Fig. 2 shows the connection between the sensor and the inner lead made in vertical plane.” Pet. 33 (citing Ex. 1004, Fig. 2; Guidash Decl. ¶ 178). We adopt the rationale for the combination that “an anisotropic conductor allows for a fine pitch—*i.e.*, the connection points on the sensor can be close together, allowing for more connection points and/or a reduced footprint.” *Id.* (citing Guidash Decl. ¶ 179). Petitioner’s arguments and evidence have shown by a preponderance of the evidence that claim 10 would have been obvious over Yoshino, Izumi/Nagano, and Wakabayashi.

*K. Obviousness of Claim 11 Under § 103(a) Over Yoshino, Izumi/Nagano, and Onishi (Ground 7)*

Petitioner alleges that claim 11 would have been obvious over Yoshino, Izumi/Nagano, and Onishi. Pet. 34–35. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶ 181. Patent Owner disagrees based on its arguments and evidence relating to claim 1. PO Resp. 45–46.

*1. Onishi Overview (Ex. 1014)*

Onishi discloses “imaging equipment” with a transparent portion and conductive patterns connected to an imaging element including a body and a light receiving surface. Ex. 1014 ¶ 7. A space between the body and light-receiving surface is sealed by resin. *Id.* In a “second invention” embodiment, leads extend into this space, allowing the leads to flex so the stress during the hardening of the sealing resin can be absorbed. *Id.* ¶¶ 16–17.

*2. Petitioner’s Arguments and Evidence*

Petitioner alleges that claim 11 would have been obvious over Yoshino, Izumi/Nagano, and Onishi. Pet. 34–35. Petitioner cites the

Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 181–188.

Claim 11 depends from claim 6 or claim 7 and recites “an electrode pad formed on the substrate is connected to the inner lead at an outer portion of said lead, said outer portion of said lead extending into the openings of the package.” We have reviewed Petitioner’s arguments and evidence regarding claim 11. Pet. 34–35; Guidash Decl. ¶¶ 181–188.

Petitioner contends that “it would have been obvious to use Onishi’s extended inner lead with Yoshino’s package, or the package for an image sensor/peripheral chip substrate as rendered obvious by the combination of Yoshino/Izumi or Yoshino/Nagano.” Pet. 34–35 (citing Ex. 1014 ¶¶ 16–17; Guidash Decl. ¶ 187). Petitioner concludes that all that is required would have been to detach the inner lead of Yoshino from the package, allowing the lead to flex. *Id.* (citing Guidash Decl. ¶ 187).

### *3. Analysis and Conclusion*

To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to claim 11, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration testimony that “[i]t would have been obvious to use Onishi’s extended inner lead with Yoshino’s package, or the package for an image sensor/peripheral chip substrate as rendered obvious by the combination of Yoshino/Izumi or Yoshino/Nagano.” Pet. 35 (citing Guidash Decl. ¶ 187). Petitioner’s arguments and evidence have shown by a preponderance of the evidence that claim 11 would have been obvious over Yoshino, Izumi/Nagano, and Onishi.

*L. Obviousness of Claim 12 Under § 103(a) Over Yoshino and Tobase (Ground 8)*

Petitioner alleges that independent claim 12 would have been obvious over Yoshino and Tobase. Pet. 35–39. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 189–205. Patent Owner disagrees based on its arguments and evidence relating to claim 1. PO Resp. 45–46.

### 1. Tobase Overview (Ex. 1022)

Figure 1 of Tobase is reproduced below.

Fig. 1

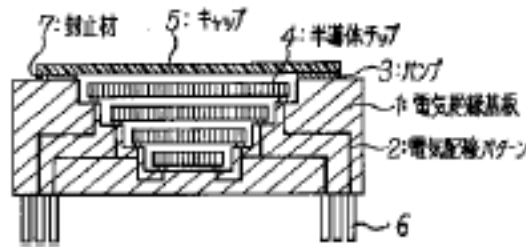


Figure 1 depicts semiconductor chips 4 mounted multi-step-wise in the vertical direction. Ex. 1022 ¶ 9. Bumps 3 are formed on the steps where semiconductor chips 4 are disposed. *Id.*

## 2. *Petitioner's Arguments and Evidence*

Similar to the discussion above in connection with claim 6, claim 1 limitations 1a–c are identical to claim 12 limitations 12a–c. Petitioner cites to the showing made for claim 1 to show limitations 12a–12c. Pet. 35–36. The remaining limitation of claim 12 is 12d, which recites:

a solid-state image sensing device and a peripheral circuit chip both mounted in said package, said solid-state image sensing device being connected to a first inner lead exposed beneath a *first step surface* formed in said package, said solid-state image sensing device being secured to said package via an adhesive, and said peripheral circuit chip being connected to a second inner lead exposed beneath a *second step surface* formed in said

package, said peripheral circuit chip being secured to said package via an adhesive.

*Id.* at 36 (emphasis added). Petitioner argues that “Tobase discloses multiple ‘semiconductor chips’ mounted in a package with multiple **step surfaces**.” Pet. 36–37 (citing Ex. 1022 ¶ 9, Fig. 1).

Petitioner’s rationale for the combination is that “[i]t would have been obvious to use Tobase’s step structure in Yoshino’s package” to provide additional space savings benefit. Pet. 37–38 (citing Guidash Decl. ¶ 199). Further, Petitioner argues that Tobase suggests such a combination in explaining that “mounting density can be increased and the interconnector path lengths of the electrical interconnectors can be shortened and the signal propagation time thereby shortened, and high-speed operation of the multi-chip module thereby made possible.” *Id.* (citing Ex. 1022 ¶ 18; Guidash Decl. ¶ 199). Other benefits cited by Petitioner include eliminating the need for shading film. *Id.* at 38 (citing Guidash Decl. ¶ 200).

Petitioner also contends that it would have been obvious to make one of the chips of Tobase a peripheral circuit chip such as disclosed by Yoshino’s solid state image sensor. Pet. 38 (citing Guidash Decl. ¶ 202). Further, Petitioner contends that “[i]f Yoshino were modified by using a stepped structure like Tobase’s Fig. 1, the first and second inner leads would be **exposed beneath a first and a second step surface formed in said package**.” *Id.* (citing Guidash Decl. ¶ 203). Petitioner references its showing for step 1d for securing the peripheral chip to the package by an adhesive. *Id.* (citing Guidash Decl. ¶ 203).

### *3. Analysis and Conclusion*

To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to claim 12, we adopt

Petitioner's arguments and evidence in the Petition and its Reply to Patent Owner's Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration testimony cited above. *See* Guidash Decl. ¶ 203. Petitioner's arguments and evidence have shown by a preponderance of the evidence that claim 12 would have been obvious over Yoshino and Tobase.

*M. Obviousness of Claim 13 Under § 103(a) Over Yoshino and Hikosaka (Ground 9)*

Petitioner alleges that independent method claim 13 would have been obvious over Yoshino and Hikosaka. Pet. 39–44. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 206–230. Patent Owner disagrees based on its arguments and evidence relating to claim 1. PO Resp. 45–46.

*1. Hikosaka Overview (Ex. 1005)*

Hikosaka discloses a process for producing a solid-state image sensing apparatus in which an image sensor is mounted in a through hole via face bonding of the image sensor via bumps. Ex. 1005, 2. Hikosaka's process includes using a video display and reference marks to position and connect the image sensor. *Id.* at 3–4. An image of a first reference mark captured by the image sensor is aligned with a second reference mark on the screen of the video display. *Id.*

*2. Petitioner's Arguments and Evidence*

Petitioner argues that Yoshino discloses the elements of method claim 13 that are common to apparatus claim 1. Pet. 39. Petitioner argues that claim 13 adds an additional step of “simultaneously adjusting the optical positioning of said solid-state image sensing device,” and alleges that this step is taught by Hikosaka. *Id.* Specifically, Petitioner argues that “[i]t

would have been obvious to use Hikosaka's simultaneous optical positioning to improve the positioning of the image sensor within Yoshino's package." *Id.* (citing Guidash Decl. ¶ 206).

### 3. Conclusion

To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to claim 13, we adopt Petitioner's arguments and evidence in the Petition and its Reply to Patent Owner's Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration that the recitations of claim 13 generally and optical positioning specifically are shown in Hikosaka. Guidash Decl. ¶¶ 213–230; *see* Pet. 40–44. Petitioner's arguments and evidence have shown by a preponderance of the evidence that claim 13 would have been obvious over Yoshino and Hikosaka.

#### *N. Obviousness of Claim 15 Under § 103(a) Over Yoshino, Izumi, Nagano, and Hikosaka (Ground 10)*

Petitioner alleges independent method claim 15 would have been obvious over Yoshino, Izumi, Nagano, and Hikosaka. Pet. 44–47. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 231–240. Patent Owner disagrees based on its arguments and evidence relating to claim 1. PO Resp. 45–46.

Petitioner argues that Yoshino, Izumi, Nagano, and Hikosaka as applied to prior claim elements and steps disclose the steps of claim 15. For example, step 15b recites “mounting said solid-state image sensing device and said peripheral circuit chip on a substrate where a group of wirings is disposed in order to connect the solid-state image sensing device and the peripheral circuit chip to the group of wirings.” Petitioner cites to its

showing on Yoshino relative to step 13a and the showing relating to Izumi for step 6d. Pet. 44–45 (citing Guidash Decl. ¶ 232).

To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to claim 15, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration that “one of ordinary skill would have been motivated to use Izumi’s substrate in place of Yoshino’s image sensor” in this claim. Guidash Decl. ¶ 237; *see* Pet. 46. Petitioner’s arguments and evidence have shown by a preponderance of the evidence that claim 15 would have been obvious over Yoshino, Izumi, Nagano and Hikosaka.

*O. Obviousness of Claim 16 Under § 103(a) Over Yoshino, Tobase, and Hikosaka (Ground 11)*

Petitioner alleges that independent method claim 16 would have been obvious over Yoshino, Tobase, and Hikosaka. Pet. 47–49. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 241–251. Patent Owner disagrees based on its arguments and evidence relating to claim 1. PO Resp. 45–46.

Petitioner argues that Yoshino, Tobase, and Hikosaka as applied to prior claim elements and steps disclose the steps of claim 16. For example, step 16b recites “inserting said solid-state image sensing device into the through hole.” Petitioner cites to its showing on Yoshino relative to element 1d. Pet. 48 (citing Guidash Decl. ¶ 243).

To the extent Patent Owner relies on arguments made in connection with claim 1, we refer to our conclusion there. As to claim 16, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent



Owner's Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration as cited above in connection with Petitioner's assertions regarding claim 16. Petitioner's arguments and evidence have shown by a preponderance of the evidence that claim would have been obvious over Yoshino, Tobase, and Hikosaka.

*P. Obviousness of Claim 1 Under § 103(a) Over Wakabayashi  
(Ground 12)*

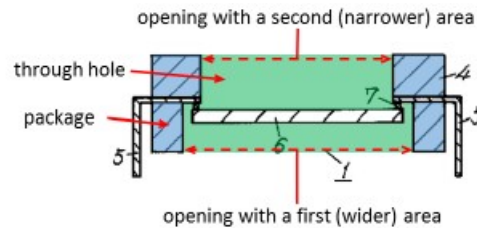
Petitioner alleges that independent claim 1 would have been obvious over Wakabayashi. Pet. 49–53. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 252–266. Patent Owner disagrees. PO Resp. 46–51. Patent Owner's position is supported by the Afromowitz Declaration. Afromowitz Decl. ¶¶ 78–91.

*1. Petitioner's Arguments and Evidence*

Limitation 1a in the Petition, recites “[a] solid-state image sensing apparatus.” Petitioner argues Wakabayashi teaches a solid-state image sensing apparatus as a “solid-state image pickup device” with a “CCD chip.” Pet. 50 (citing Ex. 1004 ¶ 1; Guidash Decl. ¶ 253).

Limitation 1b recites “a package having a through hole therein, openings on both end faces thereof, and different opening areas of said openings.” Petitioner points to Figure 1 of Wakabayashi, showing a package with openings on both end faces thereof, and different opening areas of said openings. Pet. 50–51 (citing Ex. 1004, Abstract, ¶ 5; Guidash Decl. ¶ 255). Petitioner's annotation of Figure 1 is reproduced below.

**Petitioner's Annotation of Wakabayashi Figure 1 (Pet. 51)**



Annotated Figure 1 shows the narrower and wider openings (in red dotted line) and “the through hole is shown in green, the package body in blue.” *Id.* at 51.

Limitation 1c recites “a lead frame comprising inner leads and outer leads, said lead frame being sealed in said package.” *Id.* at 51.

Wakabayashi teaches that “[t]he solid-state image pickup device according [to] the invention has . . . a **package . . . interposing a lead frame** and having, in its interior, a space for disposing a CDD chip, the **inner lead sections of the lead frame** being exposed to the space.” Ex. 1004 ¶ 5.

Petitioner relies on the preceding disclosure and paragraph 10 of Wakabayashi, which describes leads 5 (shown in annotated Figure 1 above), to show limitation 1c. Pet. 51 (citing Ex. 1004 ¶¶ 5, 10; Guidash Decl. ¶¶ 256–257).

Limitation 1d recites “a solid-state image sensing device mounted in said package by being inserted from an inlet of said opening which has a wider area, and thereby sealing said through hole, said solid-state image sensing device being secured to said package via an adhesive.” *Id.* at 51–52. To show limitation 1d, Petitioner relies on Wakabayashi’s disclosure that “[t]he solid-state image pickup device according the invention has the basic construction of comprising a CCD chip joined via bumps to the inner lead sections of a package.” *Id.* at 52 (citing Ex. 1004 ¶ 5; Guidash Decl. ¶ 258). Petitioner acknowledges that “Wakabayashi does not expressly disclose that

the image sensor is mounted **by being inserted from an inlet of said opening which has a wider area,**” but asserts this would have been obvious. *Id.* (citing Guidash Decl. ¶ 259). Petitioner explains, among other arguments, that the wider opening would be seen by the person of ordinary skill as the most predictable result for achieving success. *Id.* (citing Guidash Decl. ¶ 260).

As to that part of limitation 1d requiring that “said solid-state image sensing device being secured to said package via an adhesive,” Petitioner cites to Wakabayashi’s disclosure that the “basic structure discussed above, the back face side of the chip is further **sealed with an adhesive resin 7.**”<sup>23</sup> *Id.* at 53.

*2. Patent Owner’s Arguments and Evidence and Petitioner’s Reply*

Patent Owner argues that “like Yoshino this ground under Wakabayashi fails for the same reasons as Ground 1 with respect to claim 1.” PO Resp. 46. Patent Owner argues the “wider area” limitation is missing from Wakabayashi. *Id.* at 45–51. Patent Owner also argues the “secured via an adhesive” limitation is missing from Wakabayashi, based on its construction of the term as limited to being secured by glue. *Id.* at 50–51.

Petitioner counters Patent Owner’s argument on “wider area” as being based on “an implicit construction of ‘wider area’ as ‘greater area.’” Pet. Reply 25. Petitioner argues “claim 1 only requires that the bottom opening through which the image sensor is inserted have a larger *width* than the upper opening, as demonstrated in Fig. 1 of Wakabayashi.” *Id.*

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<sup>23</sup> Petitioner persuades us that Wakabayashi uses “7” when “9” is correct, as shown in Figure 2 of Wakabayashi. *See* Pet. 53 (citing Guidash Decl. ¶ 268).

Petitioner relies on the Guidash Declaration testimony that “it would have been obvious to insert the image sensor through the opening shown as wider in Fig. 1 of Wakabayashi.” *Id.* at 24–25 (citing Guidash Decl. ¶¶ 259–260; annotation of Fig. 1 of Wakabayashi).

As to the secured via an adhesive limitation, Petitioner argues Patent Owner’s construction limiting the term to gluing is wrong. Pet. Reply 25–27. As such, Wakabayashi’s teaching of a resin sealing the sensor into the package meets the “adhesive” limitation. *Id.* at 26 (citing Ex. 1004 ¶ 16, Fig. 2; Guidash Decl. ¶¶ 262–265).

### 3. Conclusion

To the extent Patent Owner relies on arguments made in connection with ground 1 (anticipation by Yoshino) for claim 1, we refer to our conclusion there. In addition, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration testimony cited above. Specifically, we credit the Guidash Declaration testimony over that of the Afromowitz Declaration testimony for reasons previously discussed. As Mr. Guidash explained, “it would have been obvious to insert the image sensor through the opening shown as wider in Fig. 1 of Wakabayashi.” *See* Pet. Reply 24 (citing Guidash Decl. ¶¶ 259–260). Further, Patent Owner’s arguments with respect to the secured via an adhesive limitation are premised on a claim construction that we did not adopt, as discussed in section II.A. above. Petitioner’s arguments and evidence have shown by a preponderance of the evidence that claim 1 would have been obvious over Wakabayashi.

*Q. Obviousness of Claims 2–4 Under § 103(a) Over Wakabayashi and Fujii (Ground 13)*

Petitioner alleges that independent claim 2 would have been obvious over Wakabayashi and Fujii. Pet. 53–57. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 267–284. Patent Owner disagrees. PO Resp. 52–53. Patent Owner’s position is supported by the Afromowitz Declaration. Afromowitz Decl. ¶¶ 92–95.

*1. Fujii Overview (Ex. 1024)*

Fujii discloses a package for a solid-state image sensing device. Ex. 1024, Abstract. The package features a “ledge” projecting into its interior space that serves to hold the package’s transparent lid. *Id.* at Fig. 4; *see also* Pet. 54 (citing annotation of Fujii Fig. 4 with “ledge” in yellow (reproduced below, section II.Q.2.)); Guidash Decl. ¶¶ 272–273).

*2. Petitioner’s Arguments and Evidence – Claim 2*

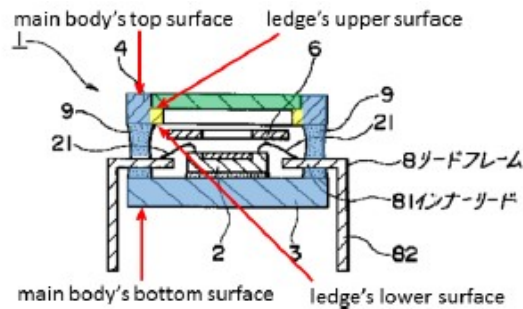
Petitioner cites to its prior showings that claim 1 would have been obvious over Wakabayashi to meet elements 2a, 2c, 2d, and 2e. Pet. 54–57 (citing Guidash Decl. ¶¶ 270, 279–283). The remaining issue raised by Patent Owner below is whether limitation 2b is shown by Wakabayashi.

Limitation 2b recites:

a package comprising a main body having a through hole therein, said main body having a top surface and a bottom surface, said package further comprising a ledge formed on said main body so as to extend inwardly toward the center of said through hole, said ledge comprising an upper surface and a lower surface.

*Id.* at 54. Petitioner relies on the disclosure of Figure 4 of Fujii. Petitioner’s annotation of Figure 4 is reproduced below.

**Petitioner's Annotation of Fujii Figure 4 (Pet. 54)**



Petitioner's annotation of Fujii's Figure 4 depicts Fujii's package in blue **"having a top surface and a bottom surface and a ledge (yellow) formed on said main body so as to extend inwardly toward the center of the package."** Pet. 54–55 (citing Guidash Decl. ¶¶ 272–275). Petitioner argues that Fujii has a ledge that holds transparent cap 5, highlighted in green.<sup>24</sup> *Id.*

Petitioner concludes "[i]t would have been obvious to use Fujii's ledge in Wakabayashi's package, such that the ledge extends inwardly toward the center of said through hole, as illustrated below using Wakabayashi's Fig. 2." *Id.* at 55 (citing Guidash Decl. ¶¶ 276–277).

*3. Petitioner's Arguments and Evidence – Claims 3 and 4*

Petitioner alleges that claims 3 and 4, each of which depends from claim 2, would have been obvious over Wakabayashi and Fujii. Pet. 57–58. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 285–288.

*4. Patent Owner's Arguments and Evidence*

Patent Owner argues that "Petitioner gives no reason to combine Fujii's ledge with Wakabayashi's package in this manner." PO Resp. 53 (citing Afromowitz Decl. ¶ 95).

<sup>24</sup> Petitioner persuades us that the number "5" was omitted from Figure 4. Pet. 54–55 (citing Ex. 1024 ¶ 10; Guidash Decl. ¶¶ 276–277).

5. *Conclusion*

To the extent Patent Owner relies on arguments made in connection with claim 1 regarding Wakabayashi, we refer to our conclusion there. In addition, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration testimony cited above. Specifically, we credit the Guidash testimony over that of the Afromowitz Declaration testimony. As Mr. Guidash explained, “[o]ne of ordinary skill would have known to extend the edge of Wakabayashi’s package upward in order to hold Wakabayashi’s transparent lid (‘sealing glass’ 8), creating the ledge disclosed in Fujii.” *See* Pet. 55 (citing Guidash Decl. ¶ 276). Petitioner’s arguments and evidence have shown by a preponderance of the evidence that claim 2 would have been obvious over Wakabayashi and Fujii.

*R. Obviousness of Claim 5 Under § 103(a) Over Wakabayashi, Fujii, and Onishi (Ground 14)*

Petitioner alleges that claim 5, which depends from claim 2, would have been obvious over Wakabayashi, Fujii, and Onishi. Pet. 58. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 289–292. Patent Owner does not separately argue claim 5 beyond its arguments on claim 2, discussed at section II.Q.4. above.

To the extent Patent Owner relies on arguments made in connection with claim 1 regarding Wakabayashi, we refer to our conclusion there. In addition, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration testimony cited above. Petitioner’s arguments and evidence have shown by a preponderance

of the evidence that claim 5 would have been obvious over Wakabayashi, Fujii, and Onishi.

*S. Obviousness of Claim 13 Under § 103(a) Over Wakabayashi and Hikosaka (Ground 15)*

Petitioner alleges that independent method claim 13 would have been obvious over Wakabayashi and Hikosaka. Pet. 58–60. Petitioner cites the Guidash Declaration in support of its positions. *See* Guidash Decl. ¶¶ 293–302. Patent Owner disagrees based on its arguments discussed in section II.P. above, regarding obviousness of claim 1 over Wakabayashi. PO Resp. 54.

To the extent Patent Owner relies on arguments made in connection with claim 1 regarding Wakabayashi, we refer to our conclusion there. In addition, we adopt Petitioner’s arguments and evidence in the Petition and its Reply to Patent Owner’s Response. Based on his years and quality of experience in the field, we credit the Guidash Declaration testimony cited above. Petitioner’s arguments and evidence have shown by a preponderance of the evidence that claim 13 would have been obvious over Wakabayashi and Hikosaka.

### III. ORDER

For the reasons given, it is:

ORDERED that claims 1–13, 15, and 16 of U.S. Patent No. 5,952,714 have been shown by a preponderance of the evidence to be unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.



IPR2016-00941  
Patent 5,952,714

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