

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CANADIAN SOLAR (USA) INC.,
Petitioner,

v.

TRINA SOLAR CO., LTD.,
Patent Owner.

IPR2025-00918
Patent 9,722,104 B2

Before GRACE KARAFFA OBERMANN, AVELYN M. ROSS, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

ROSS, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314
Granting Motion for Joinder
35 U.S.C. §315(c); 37 C.F.R. § 42.112(b)

I. INTRODUCTION

Canadian Solar (USA) Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–11 of U.S. Patent No. 9,722,104 B2 (Ex. 1001, “the ’104 patent”). Petitioner also filed a Motion for Joinder and Request for Expedited Consideration thereof (Paper 3, “Mot. for Joinder”). Trina Solar Co., Ltd. (“Patent Owner”) did not file a brief requesting discretionary denial of institution or a Preliminary Response to the Petition.

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314 (2012); 37 C.F.R. § 42.4(a). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless the Director determines . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least [one] of the claims challenged in the petition.”

For the reasons set forth below, upon considering the Petition and evidence of record, we determine that Petitioner has established a reasonable likelihood of prevailing with respect to at least one challenged claim. Accordingly, we grant the Petition and institute an *inter partes* review.

A. *Real Parties-in-Interest*

Petitioner identifies Canadian Solar Inc., CSI Solar Co., Ltd., Canadian Solar Manufacturing (Thailand) Co., Ltd., Canadian Solar US Module Manufacturing Corporation, and Recurrent Energy Development Holdings, LLC as the real parties-in-interest. Pet. 2.

B. *Related Proceedings*

Petitioner identifies the following legal proceedings as involving the ’104 patent:

Runergy USA Inc., et al. v. Trina Solar Co., Ltd., IPR No. 2025–00006 (trial instituted April 21, 2025);

Adani Solar USA Inc., et al. v. Trina Solar Co., Ltd., IPR No. 2025–00187 (joined with IPR2025-00006 May 6, 2025);

Trina Solar Co., Ltd. v. Canadian Solar (USA) Inc., et al., Case No. 1-24-cv-01115 (D. Del.) (currently stayed);

Trina Solar Co., Ltd. v. Runergy USA Inc. and Runergy Alabama Inc., 24-cv-557-JCG (D. Del.) (currently stayed);

Trina Solar Co., Ltd. v. Jiangsu Runergy New Energy Technology Co., Ltd., 2-24-cv-07694-MCS (C.D. Cal.) (currently stayed).

Certain TOPCon Solar Cells, Modules, Panels, Components Thereof, and Products Containing Same, Inv. No. 337-TA-1422 (U.S.I.T.C.) (Respondents are Adani Green Energy Ltd., Adani Solar USA Inc., and Mundra Solar PV Ltd.).

Pet. 2–3.

Petitioner states that the '104 patent was also involved in *Certain TOPCon Solar Cells, Modules, Panels, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-1425, naming Petitioner and Real Parties in Interest listed above as Respondents. Pet. 3. Petitioner reports that Patent Owner filed motions to terminate the investigation against Petitioner and Real Parties in Interest listed above on March 21, 2025, which the Administrative Law Judge granted and issued initial determinations on April 3, 2025. *Id.* According to Petitioner, on April 21, 2025, the Commission decided not to review the initial determination. *Id.*

Petitioner further identifies IPR2025-00918, relating to U.S. Patent No. 10,230,009 (the "'009 patent"), as a related matter. Pet. 4. Petitioner identifies that '009 patent as also being challenged in:

Runergy Alabama Inc. et al. v. Trina Solar Co., Ltd., IPR No. 2025-00006 (trial instituted April 21, 2025); and

Adani Solar USA Inc. et al. v. Trina Solar Co., Ltd., IPR No. 2025-00187.

Id.

C. The '104 patent

The '104 patent, titled “Solar Cell and Method for Manufacturing the Same,” issued on August 1, 2017. Ex. 1001, codes (45), (54). The '104 patent describes a solar cell as an alternative energy source that generates electric power from solar energy. *Id.* at 1:22–29. A solar cell “includes substrates made of semiconductors having different conductive types, such as a p type and an n type, a second conductive type semiconductor region (or emitter layer), and electrodes respectively connected to the substrates and the second conductive type semiconductor region.” *Id.* at 1:30–35. A “p-n junction is formed at the interface of the substrate and the second conductive type semiconductor region.” *Id.* at 1:35–37. When light strikes the solar cell, “a plurality of electron-hole pairs are generated from the semiconductors.” *Id.* at 1:38–41. The electrons and holes move toward the n type and p type semiconductor regions, respectively, and are collected by electrodes electrically connected to the substrates and the second conductive type semiconductor region. *Id.* at 1:41–47. “The electrodes are connected by lines, thereby obtaining power.” *Id.* at 1:47–48.

Figure 2 of the '104 patent is illustrative and reproduced below.

FIG. 2

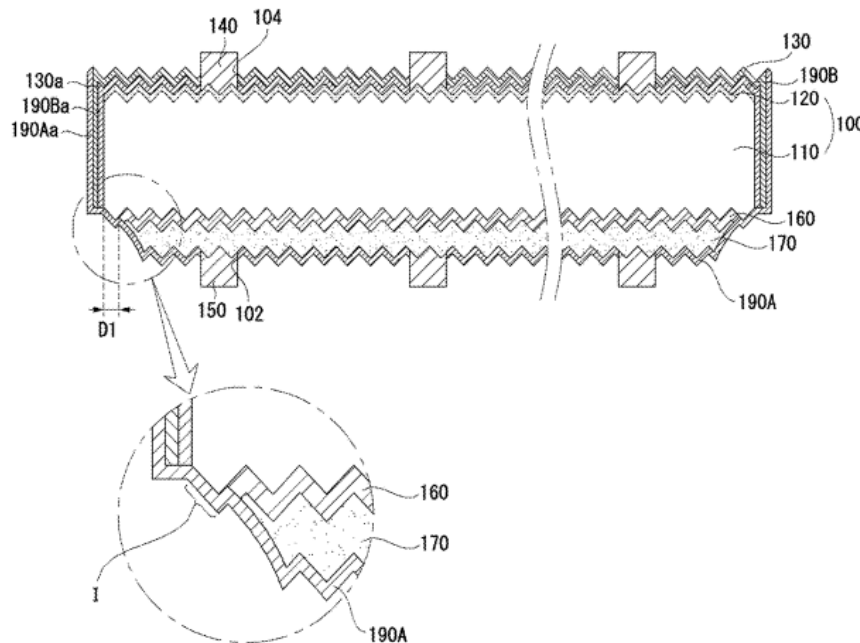


Figure 2 “illustrat[es] a solar cell according to a first embodiment of the present invention.” *Id.* at 4:66–67. Figure 2 shows substrate 100 that includes base region 110 doped with impurities (“dopants”) of a first or second conductive type at a low doping concentration. *Ex. 1001*, 7:31–35. On the back surface of the substrate (bottom side in Figure 2), tunnel layer 160 may be formed, and first conductive type semiconductor region 170 (having the same conductive type as the substrate) may be formed on the tunnel layer. *Id.* at 7:42–48. “[T]unnel layer **160** may function as a kind of barrier for electrons and holes,” and may include oxides. *Id.* at 7:49–51, 7:60–62. If the base region 110 has the first conductive type, the first conductive type semiconductor region 170 may form a back surface field (“BSF”) region, which has a higher doping concentration than the semiconductor substrate 100. *Id.* at 10:10–16. The second conductive type semiconductor region 120, having a conductive type different from that of the base region may form an emitter region, forming a p-n junction along with the base region. *Id.* at 10:13–20.

Passivation films 190A and 190B are formed on the first and second conductor regions 170 and 120, other than opening portions 102 and 104, corresponding to the first and second electrodes 150 and 140. *Id.* at 10:61–65.

The solar cell has an “isolation portion I” (shown magnified in Figure 2’s inset) formed by removing the tunnel layer 160 placed on one side of the semiconductor substrate and an edge portion of the first conductive type semiconductor region 170. Ex. 1001, 4:36–41. Also as shown in the inset, the first passivation film 190A may cover the first surface of the semiconductor substrate along with the isolation portion and also as the white space along the solar cell’s periphery in Figure 3. *Id.* at 14:22–28. The isolation portion I may block a short circuit between the first conductive type semiconductor region 170 and the second conductive type semiconductor region 120 that may have resulted when “impurities of the second conductive type may be diffused into the side or the edge of the back surface of the semiconductor substrate **100**.” *Id.* at 13:16–35.

D. Illustrative Claim

Petitioner challenges claims 1–11 of the ’104 patent. Independent claim 1 is representative of the challenged claims and is reproduced below with Petitioner’s annotations¹:

- [1.a] A solar cell comprising:
- [1.b] a semiconductor substrate;
- [1.c] a tunnel layer on a first surface of the semiconductor substrate;
- [1.d] a first conductive type semiconductor region on the tunnel layer and containing impurities of a first conductive type;
- [1.e] a second conductive type semiconductor region on a second surface opposite to the first surface of the semiconductor substrate and

¹ For convenience, we adopt Petitioner’s annotated claim format.

containing impurities of a second conductive type opposite to the first conductive type;

[1.f] a first passivation film on the first conductive type semiconductor region;

[1.g] a first electrode formed on the first passivation film and connected to the first conductive type semiconductor region through an opening formed in the first passivation film;

[1.h] a second passivation film on the second conductive type semiconductor region;

[1.i] a second electrode formed on the second passivation film and connected to the second conductive type semiconductor region through an opening formed in the second passivation film; and

[1.j] an isolation portion for preventing a contact between the first conductive type semiconductor region and the second conductive type semiconductor region, wherein the isolation portion excludes the tunnel layer and the first conductive type semiconductor region, and is in an edge portion of the first surface of the semiconductor substrate, and

[1.k] wherein the first passivation film covers the first surface of the semiconductor substrate and the isolation portion together.

Ex. 1001, 37:66–38:32.

E. The Asserted Unpatentability Challenges

Petitioner asserts that claims 1–11 would have been unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–6, 9, 10	103	Jin, ² Feldmann ³
1–6, 9, 10	103	Chang, ⁴ Jin

² US 2013/0056051 A1, published Mar. 7, 2013 (Ex. 1009, “Jin”).

³ F. Feldmann et al., *Passivated rear contacts for high-efficiency n-type Si solar cells providing high interface passivation quality and excellent transport characteristics*, Solar Energy Materials & Solar Cells, Vol. 120, pp. 270–274 (Ex. 1012, “Feldmann”).

⁴ US 2014/0299187 A1, published Oct. 9, 2014 (Ex. 1013, “Chang”).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
7, 8	103	Jin, Feldmann, Seo ⁵
7, 8	103	Chang, Jin, Seo
11	103	Jin, Feldmann, Watabe ⁶
11	103	Chang, Jin, Watabe

Pet. 3–4. Petitioner also relies on declaration testimony of Dr. Sanjay Banerjee (Ex. 1003).

II. ANALYSIS

A. Principles of Law

In an *inter partes* review, “the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

Obviousness is a question of law based on underlying determinations of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966); *Richardson-Vicks, Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479 (Fed. Cir. 1997). A claim is unpatentable as obvious, under 35 U.S.C. § 103, if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have

⁵ US 8,647,914 B2, issued Feb. 11, 2014 (Ex. 1015, “Seo”).

⁶ JP 2010-186862 A, published Aug. 26, 2010 (Ex. 1014, “Watabe”).

been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.⁷ *Graham*, 383 U.S. at 17–18.

Consideration of the Graham factors “helps inform the ultimate obviousness determination.” *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (en banc), cert. denied, 138 S. Ct. 420 (2017). Subsumed within the Graham factors are the requirements that all claim limitations be found in the prior art references and that the skilled artisan would have had a reasonable expectation of success in combining the prior art references to achieve the claimed invention. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007). “Obviousness does not require absolute predictability of success . . . all that is required is a reasonable expectation of success.” *In re O’Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988) (citations omitted). But, a petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 17.

Petitioner contends that a person of ordinary skill in the art:

⁷ Petitioner asserts that the objective factors in the record support a conclusion of obviousness. Pet. 90–91.

would have been someone with an advanced degree involving the disciplines of electrical engineering, applied physics, chemistry, or materials science, and at least two years of experience designing, developing, or researching in the field. Alternatively, that person would have had a bachelor's degree in electrical engineering, applied physics, or materials science, and at least three years of experience designing, developing, or researching in the field.

Pet. 5 (citing Ex. 1003 ¶ 49).

In light of the record before us, and for purposes of this Decision, we adopt Petitioner's proposal regarding the level of ordinary skill in the art. Based on our review of the '104 patent and the prior art of record, we determine that the definition offered by Petitioner comports with the qualifications a person would have needed to understand the '104 patent and the prior art. We will make any final determination pertaining to the level of ordinary skill in the art, however, on the full trial record.

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc); 37 C.F.R. § 42.100(b). Under *Phillips*, we give claim terms “their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312. “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313. “Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.*

Petitioner contends that “[n]o claim construction is believed to be necessary to resolve this Petition.” Pet. 24.

For purposes of this Decision, we need not expressly construe any claim terms. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that “only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

D. Institution of Inter Partes Review

Petitioner contends that the Petition is substantially the same as the petition on which we instituted review in IPR2025-00007. Mot. for Joinder 1, 4–5. In particular, Petitioner contends that its Petition “challenges the same claims, on the same grounds, relies on the same prior art, and includes the exact substantive arguments as the Runergy IPR [i.e., IPR2025-00007] and therefore would create no additional burden for the PTAB, Runergy, or Patent Owner if joined.” *Id.* at 1–2.

We instituted review of claims 1–11 of the ’104 patent in IPR2025-00007 after a review of all arguments and evidence presented by the parties, including Patent Owner’s arguments in its preliminary response. For the reasons discussed in the Institution Decision in IPR2025-00007, we determine that Petitioner demonstrates a reasonable likelihood of showing at least one claim of the ’104 patent is unpatentable. Thus, we find that the Petition warrants institution of *inter partes* review on all claims and grounds set forth in the Petition.

E. Motion for Joinder

Pursuant to 35 U.S.C. § 315(c),

If the Director institutes an inter partes review, the Director, in his or her discretion, may join as a party to that inter partes review any person who properly files a petition under section 311 that the Director, after

receiving a preliminary response under section 313 or the expiration of the time for filing such a response, determines warrants the institution of any inter partes review under section 314.

In considering a motion for joinder, and whether such joinder is appropriate, the Board may consider “whether a new ground of unpatentability is raised in the second petition, how the cost and schedule of the first proceeding will be impacted if joinder is granted, and whether granting joinder will add to the complexity of briefing and/or discovery.” Patent Trial and Appeal Board Consolidated Trial Practice Guide November 2019⁸ at 76 (citing *Kyocera Corp. v. SoftView LLC*, IPR2013-00004, Paper 15 at 4 (PTAB Apr. 24, 2013)).

Petitioner contends that no new grounds of unpatentability are raised in the Petition. Mot. for Joinder 6–7. Petitioner further agrees to an “understudy” role and “will not assume an active role unless Runergy ceases to participate in the Runergy IPR proceeding.” *Id.* at 2; *see also id.* at 3, 8, 9, 11, 12, 13. Petitioner argues that it raises no new issues of unpatentability and the Petition will not impose any additional burden on the PTAB or Patent Owner, or complexity to the case. *Id.* at 7.

Patent Owner did not file an opposition to Petitioner’s Motion for Joinder.

Upon consideration of Petitioner’s arguments, we are persuaded that it is appropriate under these circumstances to join Petitioner to the proceeding in IPR2025-00007. Petitioner’s agreement to accept an “understudy” role and to not actively participate in IPR2025-00007 unless the current petitioner ceases to participate will limit any potential impact on the trial schedule and will avoid increasing the costs or complexity of the proceeding. Therefore, joinder of

⁸ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

Petitioner to IPR2025-00007 will further the goals of a just, speedy, and inexpensive resolution of Petitioner's challenge. 37 C.F.R. § 42.1(b).

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail with respect to at least one of the claims challenged in the Petition. Accordingly, we order an *inter partes* review of the '104 patent and grant Petitioner's Motion for Joinder.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–11 of U.S. Patent No. 9,722,104 B2 is ordered with respect to all grounds set forth in the Petition;

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

FURTHER ORDERED that Petitioner's Motion for Joinder with IPR2025-00007 is granted, and Petitioner is joined as a Petitioner in that proceeding;

FURTHER ORDERED that Petitioner's role in IPR2025-00007 is limited as set forth in Petitioner's Motion for Joinder unless and until the petitioner in that proceeding ceases to participate in IPR2025-00007;

FURTHER ORDERED that the Scheduling Order in IPR2025-00007 shall govern the schedule of the joined proceedings;

FURTHER ORDERED that all further filings shall be made in IPR2025-00007;

FURTHER ORDERED that the case caption in IPR2025-00007 shall be changed to reflect joinder of Canadian Solar (USA) Inc. as petitioners in accordance with the attached example (*see* below);

FURTHER ORDERED that a copy of this Decision shall be entered in the record of IPR2025-00007; and

FURTHER ORDERED that the instant proceeding is terminated under 37 C.F.R. § 42.72.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

RUNERGY USA INC., RUNERGY ALABAMA INC., MUNDRA SOLAR PV
LTD., ADANI SOLAR USA INC., and CANADIAN SOLAR (USA) INC.
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Patent Owner.

IPR2025-00007
Patent 9,722,104 B2

⁹ Mundra Solar PV Ltd. and Adani Solar USA Inc. were joined as petitioners in this proceeding based on a petition and motion for joinder filed in IPR2025-00186, which was granted. Canadian Solar (USA) Inc. was joined as a petitioner in this proceeding based on a petition and motion for joinder filed in IPR2025-00918, which was granted.