

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TEXAS INSTRUMENTS INCORPORATED,
Petitioner,

v.

GREENTHREAD, LLC,
Patent Owner.

IPR2024-00771
Patent 8,421,195 B2

Before GRACE KARAFFA OBERMANN, JON B. TORNQUIST, and
MONICA S. ULLAGADDI, *Administrative Patent Judges*.

OBERMANN, *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. § 42.122(b)

I. INTRODUCTION

Petitioner filed a petition (Paper 2, “Pet.”) to institute an *inter partes* review of claims 1–6 of U.S. Patent No. 8,421,195 B2 (Ex. 1001, “the ’195 patent”). 35 U.S.C. § 311. Along with the Petition, Petitioner filed a Motion for Joinder with *Cirrus Logic, Inc. and Omnivision Technologies, Inc. v. Greenthread LLC*, IPR2024-00017 (“the Cirrus IPR”). Paper 3 (“Mot.”). Patent Owner filed a Preliminary Response (Paper 13, “Prelim. Resp.”) and an Opposition to the Motion for Joinder (Paper 7, “Opp.”).

Petitioner filed a Preliminary Reply that addresses privity issues raised in the Preliminary Response. Paper 18. Patent Owner did not file a sur-reply, although authorized to do so. *See* Ex. 3003 (authorizing email).

For reasons explained below, we institute *inter partes* review and grant the Motion for Joinder.

A. *Real Parties-in-Interest*

Petitioner identifies itself (Texas Instruments Incorporated) as the real party-in-interest. Pet. 1. Patent Owner identifies itself (Greenthread, LLC) as the real party-in-interest. Paper 5, 1.

B. *Related Matters*

The parties identify numerous district court litigations as related matters, including the following parallel litigation: *Greenthread, LLC v. Texas Instruments Incorporated*, No. 2:23-cv-00157 (E.D. Tex., April 6, 2023). Pet. 2; Paper 5, 1.¹

¹ The Mandatory Notices of Petitioner and Patent Owner identify other pending infringement actions against the ’195 Patent. Pet. 1–2; Paper 5, 1–2.

C. The '195 Patent (Ex. 1001)

The '195 patent, titled “Semiconductor Devices with Graded Dopant Regions,” issued on April 16, 2013. Ex. 1001, codes (45), (54). The '195 patent “relates to all semiconductor devices and systems.” *Id.* at 1:13–14. According to the '195 patent, in bipolar junction transistors, “[e]fforts have been made in graded base transistors to create an ‘aiding drift field’ to enhance the diffusing minority carrier’s speed from emitter to collector” versus the standard “uniformly doped base.” *Id.* at 1:32–51.

According to the specification, the invention of the '195 patent implements graded dopant concentration in semiconductor devices, causing “[t]wo important performance enhancements.” *Id.* at 2:49–3:9. These include sweeping electrons “from source to drain rapidly” and simultaneously causing holes to “be recombined closer to the n^+ buffer layer,” which “can improve t_{on} and t_{off} in the same device.” *Id.* at 3:10–13.

D. Illustrative Claim

We reproduce below claim 1, which is the sole challenged claim written in independent form.

1. A CMOS Semiconductor device comprising:
 - a surface layer;
 - a substrate;
 - an active region including a source and a drain, disposed on one surface of said surface layer;
 - a single drift layer disposed between the other surface of said surface layer and said substrate, said drift layer having a graded concentration of dopants extending between said surface layer and said substrate,

said drift layer further having a first static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate; and

at least one well region disposed in said single drift layer, said well region having a graded concentration of dopants and a second static unidirectional electric drift field to aid the movement of minority carriers from said surface layer to said substrate.

Ex. 1001, 4:13–29.

E. The Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–6 are unpatentable based on the following grounds.

Claims Challenged	35 U.S.C. § ²	Reference(s)/Basis
1, 2, 4–6	103	Payne ³
1–6	102	Onoda ⁴
1–6	103	Onoda, Wolf ⁵
2, 3	103	Payne, Wolf
3	103	Payne, Parillo ⁶

Pet. 5–6. The Petition is supported by the declaration of Dr. Sanjay Banerjee. Ex. 1003.

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 102 and § 103, effective March 16, 2013. Because applications from which the ’195 patent claims priority were filed before this date, the pre-AIA version of § 102 and § 103 applies.

³ US 4,684,971, issued Aug. 4, 1987 (Ex. 1005).

⁴ Japanese Unexamined Patent Application Publication No. H8-279598, published Oct. 22, 1996 (Ex. 1043). A certified translation, to which we cite, is provided. Ex. 1042.

⁵ STANLEY WOLF & RICHARD N. TAUBER, SILICON PROCESSING FOR THE VLSI ERA, Vols. 1–4 (Lattice Press 2000) (Ex. 1008).

⁶ US 4,435,896, issued Mar. 13, 1984 (Ex. 1025).

II. TIMELINESS OF THE PETITION UNDER 35 U.S.C. § 315(B)

Pursuant to 35 U.S.C. § 315(b), “[a]n inter partes review may not be instituted if the petition requesting the proceeding is filed more than 1 year after the date on which the petitioner, real party in interest, or privy of the petitioner is served with a complaint alleging infringement of the patent.” Patent Owner argues that the Petition is untimely under 35 U.S.C. § 315(b) because Petitioner is in privity with time-barred entities. Prelim. Resp. 10–30. However, 35 U.S.C. § 315(b) also provides that the one-year time bar “shall not apply to a request for joinder under subsection (c).” *See also* 37 C.F.R. § 42.122(b). Because the Petition is accompanied by a timely request for joinder (Paper 2) to the instituted proceeding (IPR2024-00017), which we grant as further discussed below, Patent Owner’s argument that the Petition is time-barred under 35 U.S.C. § 315(b) is moot, irrespective of whether Petitioner is in privity with time-barred entities.

III. MOTION FOR JOINDER

A party in an *inter partes* review may be joined as a party in another *inter partes* review, subject to certain statutory provisions:

(c) JOINDER.—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 an inter partes review under section 314.

35 U.S.C. § 315(c); *see also* 37 C.F.R. § 42.122 (“Any request for joinder must be filed, as a motion under § 42.22, no later than one month after the institution date of any *inter partes* review for which joinder is requested.”).

“To join a party to an instituted [*inter partes* review (IPR)], the plain language of § 315(c) requires two different decisions.” *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1332 (Fed. Cir. 2020). “First, the statute requires that the Director (or the Board acting through a delegation of authority) . . . determine whether the joinder applicant’s petition for IPR ‘warrants’ institution under § 314.” *Id.* “Second, to effect joinder, § 315(c) requires the Director to exercise [] discretion to decide whether to ‘join as a party’ the joinder applicant.” *Id.*

A. Whether the Petition Warrants Institution

Petitioner argues that its Petition challenges the same claims of the same patent on the same grounds as those before us in the Cirrus IPR. Mot. 1. In particular, according to Petitioner, the “supporting materials” cited in the Petition—including the “supporting expert declaration, exhibits, and exhibit numbering—are identical to those presented in the Cirrus IPR.” *Id.* at 6 (citing IPR2024-00017, Paper 1).

Because the Preliminary Response in the instant case includes arguments pertaining to the sufficiency of the asserted prior art references, which were not raised in the preliminary response in the Cirrus IPR, we briefly address below the patentability of the challenged claims.

1. Overview of the Challenges

The Petition challenges the patentability of claim 1–6 of the ’195 patent. Pet. 5–6. Each challenge identified in the Petition is based on Payne or Oneda, alone or in combination with other references. *Id.*

Patent Owner does not challenge the sufficiency of the evidence asserted in the Petition to support institution of review, except to argue that

the prior art does not teach or suggest the claim 1 limitation directed to aiding “the movement of minority carriers.” Prelim. Resp. 1–10.

2. *Payne (Ex. 1005)*

Payne “relates to complementary field effect transistors formed by ion implantation, and in particular to a structure and method of fabrication which permit high packing density.” Ex. 1005, 1:5–8.

Payne’s “device is fabricated in an ‘N--’ conductivity type” silicon semiconductor substrate that “is typically approximately 20 mils thick.” Ex. 1005, 2:56–60. Payne describes an approach that may reduce the spacing between “source and drain regions of adjacent devices” from 12 microns to 5 microns. *Id.* at 5:56–6:19, Figs. 12, 13.

3. *Onoda (Ex. 1043)*

Onoda is titled “Semiconductor Integrated Circuit Device, Nonvolatile Semiconductor Storage Device, and Manufacturing Method” and describes “a nonvolatile semiconductor storage device with improved latch-up resistance and punch-through breakdown voltage and improved junction breakdown voltage between the well regions and the semiconductor substrate.” Ex. 1042, codes (54), (57). Onoda, “in particular, relates to a nonvolatile semiconductor storage device wherein a triple-well structure is formed in an epitaxial substrate.” *Id.* ¶ 1.

4. *Undisputed Claim Limitations*

Patent Owner does not contest the sufficiency of the evidence to support institution of review, except to argue that Petitioner does not show sufficiently that the asserted prior art teaches or suggests the claim 1 limitations directed to aiding “the movement of minority carriers.” Prelim.

Resp. 1–10. Accordingly, for the same reasons stated in our decision instituting review in the Cirrus IPR, we find Petitioner shows sufficiently that the prior art teaches or suggests the other limitations of claims 1–6.

5. “*Aid the Movement of Minority Carriers*”

Patent Owner argues that the Petition fails to show that the applied prior art references disclose the claim limitations “requiring ‘aid the movement of minority carriers,’” as twice recited in claim 1.

Prelim. Resp. 8. Patent Owner summarizes this dispute as follows:

The challenged patent discloses and claims a semiconductor device with (among other things) a “drift layer having a graded concentration of dopants . . . [and] further having a first static unidirectional electric drift field to ***aid the movement of minority carriers.***”[] The Petition should not be instituted, because (among other deficiencies) it fails to show that the prior art discloses the “aid the movement of minority carriers” claim limitation.

Rather than pointing to anything in the prior art that would teach this claim limitation, the Petition assumes that *any* “graded concentration of dopants” would *necessarily* “aid the movement of minority carriers.” The Petition contains no analysis explaining why the “graded concentration of dopants” in the prior art meet the “aid the movement of minority carriers” limitation, apart from the fact that they *are* “graded concentration of dopants.” In other words, Petitioner reads the “aid the movement of minority carriers” limitation out of the claims completely.

Id. at 1–2. Patent Owner includes additional details in support of its view that the asserted prior art fails to establish obviousness of the “aid carrier movement” limitations of claim 1. Prelim. Resp. 1–10.

Patent Owner raises similar, if not identical, arguments in the Cirrus IPR. *Compare id.*, with IPR2024-00017, Paper 47 at 1–4, 7–16

(Patent Owner's response in the Cirrus IPR) (public version). We decline to resolve the material issue of fact surrounding this limitation on the preliminary record, because the trial in the Cirrus IPR is the better proceeding in which to do so. Specifically, as compared to the preliminary phase of this case, the instituted trial in the Cirrus IPR affords the parties a better opportunity to fully and fairly brief, argue, and develop evidence in support of their positions. We observe only that, on this record, the dispute is inadequate to undermine the sufficiency of Petitioner's evidence to support institution of review.

B. Whether to Join Petitioner as a Party to the Cirrus IPR

Joinder may be authorized when warranted, but the decision to grant joinder is discretionary. *See* 35 U.S.C. § 315(c); 37 C.F.R. § 42.122. A motion for joinder should (1) set forth reasons why joinder is appropriate; (2) identify any new grounds of unpatentability asserted in the petition; (3) explain what impact (if any) joinder would have on the trial schedule for the existing review; and (4) address specifically how briefing and discovery may be simplified. *See, e.g., Kyocera Corp. v. Softview LLC*, IPR2013-00004, Paper 15 (PTAB April 24, 2013). As the moving party, Petitioner bears the burden of proving that it is entitled to the requested relief. 37 C.F.R. § 42.20(c).

As an initial matter, we find the Motion for Joinder meets the timing requirements of 37 C.F.R. § 42.122(b) because Petitioner filed it on April 4, 2024, no later than one month after the Cirrus IPR was instituted on May 1, 2024.

Petitioner asserts that the four *Kyocera* factors favor joinder here because Petitioner seeks to join the Cirrus IPR in an understudy role. Mot. 2. Petitioner explains that the joinder will have no impact on the pending schedule because Petitioner “will not seek additional depositions or deposition time” and “agrees to be bound by the scheduling order in the Cirrus IPR proceeding.” *Id.* Further, Petitioner “agrees to rely entirely on, and be bound by, the expert declarations and depositions in the Cirrus IPR” unless the current petitioner in that proceeding “ceases to participate.” *Id.* at 8. Petitioner (referring to itself as “TI”) also agrees that:

(a) TI shall not make any substantive filing and shall be bound by the filings of the Cirrus IPR Petitioner, unless a filing concerns termination and settlement, or issues solely involving TI;

(b) TI shall not present any argument or make any presentation at oral hearing unless an issue solely involves TI, or when addressing Board-approved motions that do not affect the Cirrus IPR Petitioner, or its respective position;

(c) TI shall not seek to cross-examine or defend the cross-examination of any witness, unless the topic of cross-examination concerns issues solely involving TI;

(d) TI shall not seek discovery from Patent Owner on issues not solely involving TI;

(e) TI will not rely on expert testimony beyond that submitted by the Cirrus IPR Petitioner unless the Cirrus IPR Petitioner is terminated from the case.

Id. at 7. Petitioner “will also abide by any additional conditions the Board deems appropriate for an ‘understudy’ role.” *Id.* at 8.

Patent Owner opposes joinder on two grounds. First, Patent Owner argues that joinder would be prejudicial to Patent Owner and contrary to

public policy favoring settlement. Opp. 3–4. Second, Patent Owner submits that joinder would be unavailable if Patent Owner prevails on a request for Director Review of the Decision on Institution in the Cirrus IPR. *Id.* at 5–7.

Patent Owner’s first argument is not persuasive because it is based on speculation, without any evidence, that Petitioner “is trying to block settlement with *any* of these defendants unless [Patent Owner] *also* settles with” Petitioner. Opp. 5. Accordingly, Patent Owner identifies no undue prejudice that would flow from joinder in this case. Moreover, even in a situation where the petitioner and patent owner in the proceeding to be joined had settled (*Code200 v. Bright Data Ltd.*, IPR2022-00861, Paper 17 at 5 (PTAB July 25, 2022) (vacated)), the Director nevertheless vacated a decision to deny a motion for joinder. *Code200 v. Bright Data Ltd.*, IPR2022-00861, Paper 18 at 7 (Vidal Aug. 23, 2022) (precedential); *see eBay, Inc. v. Lexos Media IP, LLC*, IPR2024-00336, Paper 11 at 13–15 (PTAB Feb. 23, 2024).

Patent Owner’s second argument is moot because Patent Owner’s Request for Director Review in the Cirrus IPR has been denied. *See* IPR2024-00017, Paper 35 (May 30, 2024).

Based on the facts and circumstances discussed above, we determine that Petitioner has established good cause for joining the Cirrus IPR. Specifically, we find that joining Petitioner to the Cirrus IPR is unlikely to require any delay or modification to the scheduling order already in place for that proceeding. We also determine that Patent Owner will not be prejudiced unduly by the joinder of this proceeding. Thus, we determine that granting the Motion for Joinder would help “secure the just, speedy,

and inexpensive resolution” of these proceedings. *See* 37 C.F.R. § 42.1(b). Accordingly, we grant Petitioner’s Motion for Joinder and join Petitioner as a party to the Cirrus IPR.

IV. CONCLUSION

For the above reasons, we determine that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition. Accordingly, we institute an *inter partes* review of all challenged claims based on the grounds asserted in the Petition. In addition, we grant Petitioner’s Motion for Joinder. Patent Owner’s argument that the Petition is time-barred under 35 U.S.C. § 315(b) is moot because it is accompanied by a request for joinder to an instituted proceeding, which we grant.

V. ORDER

It is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of the ’195 patent is hereby instituted, commencing on the entry date of this Order, and 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.

FURTHER ORDERED that the trial is authorized on all grounds set forth in the Petition;

FURTHER ORDERED that Petitioner’s Motion for Joinder with IPR2024-00017 is granted, and Petitioner is hereby joined as a petitioner in IPR2024-00017;

FURTHER ORDERED that there are no changes to the grounds on which trial in IPR2024-00017 was instituted, and no other grounds are added in IPR2024-00017;

FURTHER ORDERED that the Scheduling Order entered in IPR2024-00017, including any schedule changes agreed to by the parties in that proceeding pursuant to the Scheduling Order, shall govern the trial schedule in IPR2024-00017;

FURTHER ORDERED that Petitioner's role in IPR2024-00017 shall be limited as stated by Petitioner in the Motion for Joinder unless and until Cirrus Logic, Inc. and Omnivision Technologies, Inc. are terminated from that proceeding;

FURTHER ORDERED that the case caption in IPR2024-00017 shall be changed to reflect joinder of Texas Instruments Incorporated as a petitioner in accordance with the attached example;

FURTHER ORDERED that a copy of this Decision be entered into the record of IPR2024-00017; and

FURTHER ORDERED that all further filings shall be made in IPR2024-00017.

IPR2024-00771
Patent 8,421,195 B2

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IPR2024-00771
Patent 8,421,195 B2

[Sample Case Caption]

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CIRRUS LOGIC, INC.;
OMNIVISION TECHNOLOGIES, INC.; AND
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Petitioner,

v.

GREENTHREAD, LLC,
Patent Owner.

IPR2024-00017*
Patent 10,734,195 B2

* Texas Instruments Inc., which filed a petition in IPR2024-00771, has been joined as a party to this proceeding.