

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

ACORN SEMI, LLC,
Patent Owner.

IPR2020-01182
Patent 7,084,423 B2

Before BRIAN J. McNAMARA, JOHN R. KENNY, and
AARON W. MOORE, *Administrative Patent Judges*.

McNAMARA, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Samsung Electronics Co., Ltd. (“Petitioner”) filed a petition, Paper 2 (“Petition” or “Pet.”), to institute an *inter partes* review of claims 62–64 and 66 (the “challenged claims”) of U.S. Patent No. 7,084,423 B2 (“the ’423 patent”). *See* 35 U.S.C. § 311. Acorn Semi LLC (“Patent Owner”) filed a Preliminary Response, Paper 9 (“Prelim. Resp.”), contending that the Petition should be denied as to all challenged claims. Pursuant to our authorization, Petitioner filed a Preliminary Reply, Paper 10, and Patent Owner filed a Preliminary Sur-reply, Paper 11. In response to an inquiry by the panel (*see* Paper 14), Petitioner filed a Response to the Board’s Order Regarding the Conduct of the Proceeding in which Petitioner agreed to be bound by a stipulation proposed by the Board. Paper 15 (“Pet. Stip.”). Patent Owner filed Comments on Petitioner’s Answer to Board’s Stipulation Inquiry. Paper 16 (“PO Comments”).

We have authority to institute an *inter partes* review under 37 C.F.R. § 42.4(a) and 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted unless the information presented in the Petition “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

Having considered the arguments and the associated evidence presented in the Petition, the Preliminary Response, the Preliminary Reply, and the Preliminary Sur-reply, for the reasons described below, we do not institute *inter partes* review.

II. REAL PARTIES IN INTEREST

The Petitioner identifies itself (Samsung Electronics Co., Ltd.); Samsung Electronics America, Inc.; Samsung Semiconductor, Inc.; and

Samsung Austin Semiconductor, LLC as real parties-in-interest. Pet. 2.
Patent Owner identifies itself as the sole real party-in-interest. Paper 4, 1.

III. RELATED MATTERS

The Petition states that the '423 patent is asserted in *Acorn Semi, LLC v. Samsung Electronics Co. Ltd.*, No. 2:19-cv-347 (E.D. Tex.) (“the Acorn Litigation”) and that the complaint was served on October 24, 2019. Pet. 3 (citing Exs. 1021, 1022).

The Petition provides a list of patents and applications that claim priority to the '423 patent. *Id.* at 3–4.

Petitioner states that it will be filing petitions for *inter partes* review of the following related patents: U.S. Patent No. 8,766,336; U.S. Patent No. 9,209,261; U.S. Patent No. 9,461,167; U.S. Patent No. 9,905,691; and U.S. Patent No. 10,090,395. *Id.* at 4.

In addition, Patent Owner identifies the following petitions for *inter partes* review concerning the following patents related to the '423 patent that may be affected by the outcome of this proceeding:

U.S. Patent No. 9,209,261 (IPR2020-01183);

U.S. Patent No. 8,766,336 (IPR2020-01204 and IPR2020-01264);

U.S. Patent No. 9,209,261 (IPR2020-01183);

U.S. Patent No. 9,461,167 (IPR2020-01205 and IPR2020-01241); and

U.S. Patent No. 10,090,395 (IPR2020-01207 and IPR2020-01282).

Paper 4, 2–3.

IV. THE '423 PATENT

According to the '423 patent, “a classic metal-semiconductor junction is characterized by a Schottky barrier, the properties of which (e.g., barrier height) depend on surface states, MIGS and inhomogeneities.” *Id.* at 2:62–

65. The patent states that “[b]efore one can tune the barrier height . . . one must depin the Fermi level of the semiconductor.” *Id.* at 3:4–6. The ’423 patent seeks to depin the Fermi level of the semiconductor while still permitting substantial current flow between the metal and the semiconductor. *Id.* at 3:6:9. The ’423 patent describes depinning the Fermi level as follows:

By depinning the Fermi level, the present inventors mean a condition wherein all, or substantially all, dangling bonds that may otherwise be present at the semiconductor surface have been terminated, and the effect of MIGS has been overcome, or at least reduced, by displacing the semiconductor a sufficient distance from the metal.

Id. at 3:23–28.

The ’423 patent achieves this goal using thin interface layers disposed between a metal and a silicon based semiconductor to form a “metal-interface layer-semiconductor junction” whose thickness varies with a corresponding minimum specific contact resistance depending on the materials used and allows for depinning the Fermi level while permitting current to flow when the junction is appropriately biased. *Id.* at 3:12–23. “Minimum specific contact resistances of less than or equal to approximately $10 \Omega\text{-}\mu\text{m}^2$ or even less than or equal to approximately $1\Omega\text{-}\mu\text{m}^2$ may be achieved for such junctions in accordance with the present invention.” *Id.* at 3:29–33. Such low contact resistances are achieved by selecting a metal with a work function near the conduction band of the semiconductor for n-type semiconductors, or a work function near the valence band for p-type semiconductors. *Id.* at 5:16–20.

V. ILLUSTRATIVE CLAIM

Independent claim 62, reproduced below, is representative of the subject matter of the challenged claims:

62. An electrical device, comprising
a junction between a Si-based semiconductor and a conductor separated from the semiconductor by an interface layer
having a thickness sufficient to depin a Fermi level of the conductor in a vicinity of the junction
yet thin enough to provide the junction with a specific contact resistance that is generally dependent on the workfunction of the conductor.

VI. ASSERTED GROUND

Petitioner asserts that the challenged claims would have been unpatentable on the following ground:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
62–64, 66	103	Goodnick ¹

VII. ANALYSIS

We have discretion under § 314(a) to deny institution of any inter partes review. *See Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”).

¹ S.M. Goodnick et al., *Effects of a thin SiO₂ layer on the formation of metal-silicon contacts*, 18 J. VAC. SCI. & TECH. 949 (Apr. 1981) (Ex. 1004).

On October 16, 2020, Magistrate Judge Payne issue a Claim Construction Memorandum Opinion and Order in the Acorn Litigation finding, among other things, that the term “generally dependent” in claim 62 of the ’423 patent “is not reasonably certain” and is, therefore, indefinite. *See Ex. 2053*, 31–37. On December 10, 2020, Judge Gilstrap issued an order adopting the magistrate’s claim construction recommendations in full, including the determination that claim 62 is indefinite. *See Ex. 2057*. All of the claims challenged in the Petition depend, directly or indirectly, from claim 62, meaning that all are indefinite under the District Court’s ruling.

In its filing addressing the *Fintiv* stipulation proposed by the Board, Petitioner acknowledges that the proposed stipulation “may be moot” in view of the indefiniteness finding. *See Pet. Stip. 2*. Patent Owner responds that “[t]he Board should not waste its valuable time on an IPR trial” where the claims have been held indefinite. PO Comments 4. Patent Owner notes that the Board in the past has declined to institute on claims found indefinite by a district court. *Id.* at 4 (citing *Facebook v. Sound View Innovations*, IPR2017-00998, Paper 13 (Sept. 5, 2017); *Target v. Proxicom Wireless*, IPR2020-00903, Paper 11 (Nov. 10, 2020)).²

The District Court found that the recitation in claim 62 of “a specific contact resistance that is generally dependent on the workfunction of the

² In *Facebook*, the panel was “persuaded by the district court’s determination that [the claim was] indefinite and accept[ed] the district court’s factual findings in support of that determination.” IPR2017-00998, Paper 13, at 14. The *Target* panel instituted trial, but observed that the *Facebook* panel “had no reason to proceed because the district court had already determined the sole claim at issue was indefinite.” IPR2020-00903, Paper 11, at 14. A panel also declined to institute due to a district court indefiniteness finding in *H-E-B, LP v. Digital Retail Apps, Inc.*, IPR2020-00348, Paper 16 (July 6, 2020).

conductor” is indefinite because the patent “do[es] not specifically explain the standard for determining if a particular dependence qualifies as ‘generally dependent.’” Ex. 2053, 39.

Notably, neither of the parties to this proceeding has asserted before us that the District Court’s determination of indefiniteness was incorrect, or offered an alternative conclusion. Petitioner, having prevailed on the issue in the District Court, presumably believes that the District Court made the correct determination, and does not propose any contrary determination here. *See* Pet. 21–23 (only seeking a construction for “depin a Fermi level of the conductor in the vicinity of the junction”). We do not agree that Petitioner may properly approach this issue by simply asserting that, for this proceeding, whatever this phrase means, it is shown in the prior art. Patent Owner, although not endorsing the District Court’s determination of indefiniteness, does not contest that determination before us or argue for a construction of the phrase. *See* Prelim. Resp. 48–51 (arguing the limitation that includes the “generally dependent” language without offering a construction of that term).

Although the District Court’s finding is subject to appeal, proceeding with an *inter partes* review of claims already determined to be indefinite by the District Court would require us to assign a meaning to the claim language that is necessarily inconsistent with the determination by the District Court and the position advocated by Petitioner in the District Court. It would be particularly problematic in this case, because Patent Owner argues that the claims are patentable over the prior art at least in part due the same language the District Court has found to be indefinite. *See* Prelim. Resp. 48–51. Further, Petitioner has not set forth any explanation of how we

could address the limitation at issue consistently with the indefiniteness arguments Petitioner successfully advanced in the litigation.

Under these particular circumstances, we conclude that instituting an *inter partes* review to consider claims that have already been held indefinite in the parallel District Court case based on Petitioner's arguments would not be in the interests of justice or efficiency, and we accordingly exercise our discretion to deny institution.

VIII. CONCLUSION

For the above reasons, we exercise our discretion under 35 U.S.C. § 314(a) to deny institution of an *inter partes* review challenging claims 62–64 and 66 of the '423 patent.

IX. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a) an *inter partes* review of the '423 patent is not instituted.

IPR2020-01182
Patent 7,084,423 B2

FOR PETITIONER:

John Desmarais
Kevin McNish
Theodore Konstantakopoulos
DESMARAIS LLP
jdesmarais@desmaraisllp.com
kkm-ptab@desmaraisllp.com
tkonstantakopoulos@desmaraisllp.com

FOR PATENT OWNER:

Matthew Phillips
Kevin Laurence
Derek Meeker
Rachel Slade
LAURENCE & PHILLIPS IP LAW
mphilips@lpiplaw.com
klaurence@lpiplaw.com
dmeeker@lpiplaw.com
rslade@lpiplaw.com

Tarek Fahmi
ASCENDA LAW GROUP, PC
tarek.fahmi@ascendalaw.com