

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROCHIP TECHNOLOGY INC.,
Petitioner,

v.

HD SILICON SOLUTIONS LLC,
Patent Owner.

IPR2022-00105
Patent 6,774,033 B1

Before FRANCES L. IPPOLITO, ROBERT L. KINDER, and
ARTHUR M. PESLAK, *Administrative Patent Judges*.

IPPOLITO, *Administrative Patent Judge*.

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

I. INTRODUCTION

Microchip Technology Inc. (“Petitioner”) filed a Petition (Paper 3, “Pet.”) requesting an *inter partes* review of claims 1–3, 5, 8–11, 13, 15, and 17 of U.S. Patent No. 6,774,033 B1 (Ex. 1001, “the ’033 patent”). HD Silicon Solutions LLC (“Patent Owner”) filed a Preliminary Response to the Petition (Paper 11, “Prelim. Resp.”).

To institute an *inter partes* review, we must determine that the information presented in the Petition shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). The Board, however, has discretion to deny a petition even when a petitioner meets that threshold. *Id.*; *see, e.g., Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 272 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *General Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (PTAB Sept. 6, 2017) (precedential as to § II.B.4.i) (recognizing the same) (“*General Plastic*”); *see also* Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019) (“CTPG”) 55–63, available at <https://www.uspto.gov/TrialPracticeGuideConsolidated> (identifying considerations that may warrant exercise of this discretion).

For the reasons discussed below, after considering the parties’ submissions and the evidence of record, we determine it is appropriate to exercise our discretion and decline to institute *inter partes* review.

A. *Related Proceedings*

The parties indicate that the ’033 patent has been asserted in *HD Silicon Solutions LLC v. Microchip Technology Inc.*, No. 6:20-cv-01092

(W.D. Tex), filed November 30, 2020 (“District Court Litigation”). Pet. 1; Paper 5, 2. On October 25, 2021, the District Court Litigation was transferred to the Northern District of California from the Western District of Texas. Ex. 1043 (Judge Albright’s Order Granting Microchip Technology Inc.’s Motion to Transfer Venue).

The parties also identify IPR2021-00752 (“IPR752”) challenging all claims of the ’033 patent, filed by Petitioner on April 23, 2021, and instituted by the Board on November 9, 2021. Pet. 2–3; Paper 5, 2; Paper 2 (Petitioner’s Petition Ranking and Explanation of Material Differences Between Petitions); IPR752, Paper 9 (Institution Decision, hereafter “IPR752 Dec.”).

B. The ’033 Patent

The ’033 patent, titled “Metal Stack for Local Interconnect Layer,” is directed to an improved technique “for forming a local interconnect layer in an integrated circuit.” Ex. 1001, code (54), 1:48–50. Figure 5 of the ’033 patent, reproduced below, illustrates a side cross-sectional view of an embodiment of an integrated circuit. *See* Ex. 1001, 1:65–67.

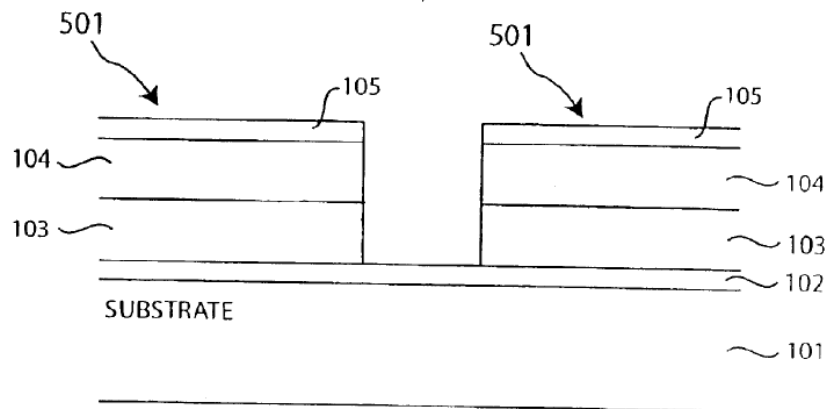


FIG. 5

As shown in Figure 5, the integrated circuit comprises substrate 101, which may be a semiconductor substrate. Ex. 1001, 2:53–54. Oxide layer 102 is deposited on substrate 101. *Id.* at 2:52–53. Film 103 is deposited over oxide layer 102. *Id.* at 2:63–64. According to the '033 patent, film 103 may comprise titanium nitride that is deposited using a sputtering process such as reactive sputtering. *Id.* at 2:64–3:1. Film 104 is deposited over film 103. *Id.* at 3:11. Film 104 may comprise tungsten and may be deposited using a sputtering process. *Id.* at 3:11–13. Further, masks 105 may be formed over film 104 using conventional lithography techniques. *Id.* at 3:60–63. Masks 105 may be a resist material, such as a negative or positive photoresist. *Id.* at 3:61–62.

In one embodiment, the '033 patent teaches that tungsten film 104 is deposited in-situ after the deposition of titanium nitride film 103. *Id.* at 3:21–22. More specifically, tungsten film 104 may be deposited using the same multi-chamber physical vapor deposition system used to deposit titanium nitride film 103. *Id.* at 3:23–25. The '033 patent explains that one advantage of this process is that depositing both tungsten and titanium nitride in-situ using the same physical vapor deposition system allows for an efficient process flow. *Id.* at 3:36–40. The '033 patent adds that another advantage is that because tungsten has a relatively low resistivity compared to titanium nitride, the metal stack may be relatively thin, while keeping resistivity relatively low. *Id.* at 3:41–44. The '033 patent teaches that a thin metal stack reduces the aspect ratio of the resulting interconnect line, thereby allowing for better sidewall and bottom coverage during deposition. *Id.* at 3:44–46.

C. Illustrative Claims

Petitioner challenges claims 1–3, 5, 8–11, 13, 15 and 17 of the '033 patent. Pet. 1. Claim 1 is the sole independent claim and claims 2–17 depend from claim 1. Claim 1 is reproduced below.

A method of forming a local interconnect layer in an integrated circuit, the method comprising:

depositing a first film over an oxide layer, the first film comprising titanium nitride; and

depositing a second film over the first film, the second film comprising tungsten, the first film and the second film forming a metal stack of the local interconnect layer.

Ex. 1001, 5:55–6:4.

D. The Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–3, 5, 8–11, 13, 15, and 17 would have been unpatentable on the following grounds:

Claims Challenged	35 U.S.C. §¹	Basis
1	103	Lin ²
2	103	Lin, Huang ³
3, 5, 9–11, 15	103	Lin, Peng ⁴
2, 15	103	Lin, Peng, the Knowledge of a POSITA
8, 13	103	Lin, Lo ⁵

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102, 103. Because the '033 patent has an effective filing date prior to the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of §§ 102, 103.

² Lin et al. (US 6,083,827, issued July 4, 2000) (Ex. 1004).

³ Huang et al. (US 2002/0137356 A1, published Sept. 26, 2002) (Ex. 1005).

⁴ Peng et al. (US 6,043,148, issued Mar. 28, 2000) (Ex. 1006).

⁵ Lo (US 5,643,632, issued July 1, 1997) (Ex. 1007).

Claims Challenged	35 U.S.C. § ¹	Basis
17	103	Lin, Peng, Lo

See Pet. 5. In support of its unpatentability arguments, Petitioner relies on the declaration testimony of Jack Lee, Ph.D. (Ex. 1002).

II. DISCUSSION

We examine below the parties' arguments for and against the exercise of discretionary denial. As explained below, we determine based on the record before us, and in view of the policy goals articulated in *General Plastic*, that it is appropriate in this proceeding to exercise our discretion under 35 U.S.C. § 314(a) to deny the Petition.

In IPR752, we instituted an *inter partes* review of all claims (claims 1–17) of the '033 patent based on the following asserted prior art and grounds:

Basis	35 U.S.C. §	Claims Challenged
Trivedi ⁶	103	1, 9, 10, 14
Trivedi, Joo ⁷	103	2–6, 15, 16
Trivedi, Yang ⁸	103	8
Trivedi, Joo, Yang	103	7
Trivedi, Lien ⁹	103	2, 11, 12
Trivedi, Johnson ¹⁰	103	13
Trivedi, Joo, Johnson	103	17

⁶ Trivedi et al. (US 5,847,463, issued Dec. 8, 1998) (Ex. 1004).

⁷ Joo et al. (US 6,534,401 B2, issued Mar. 18, 2003) (Ex. 1005).

⁸ Yang et al., *A Comparison of TiN Processes for CVD W/TiN Gate Electrode on 3nm Gate Oxide*, International Electron Devices Meeting 459–462, IEEE (1997) (Ex. 1006).

⁹ Lien et al. (US 6,103,623, issued Aug. 15, 2000) (Ex. 1007).

¹⁰ Johnson et al. (US 6,815,959 B2, issued Nov. 9, 2004) (Ex. 1008).

IPR752 Dec. 5. In IPR752, the petition was filed on April 23, 2021.

Nearly seven months after filing the IPR752 petition, Petitioner filed a second petition challenging some claims of the '033 patent on November 4, 2021. *See generally* Pet. That second petition is at issue in this proceeding. Pet. 1.

Also, on November 4, 2021, Petitioner filed the Petition Ranking and Explanation of Material Differences Between Petitions (Paper 2, “Ranking”) in which Petitioner ranked the second petition over that submitted in IPR752. Ranking 3. Nonetheless, due to the nearly seven month filing gap between the petitions, the instant proceeding was awaiting docketing and paneling when the decision on institution in IPR752 issued on November 9, 2021. IPR752 Dec. Indeed, the Notice of Filing Date (Paper 4) in this case did not issue until November 16, 2021, after the Decision on Institution was entered in IPR752.

Here, in the instant Petition, Petitioner argues that we should not exercise our discretion to deny institution under 35 U.S.C. § 314(a), discussing the *General Plastic* factors. Pet. 78–82 (citing *General Plastic*, IPR2016-01357, Paper 19 at 16). Patent Owner argues otherwise.

We turn first to 35 U.S.C. § 314(a), which states that

[t]he Director may not authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 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.

The language of § 314(a) expressly provides the Director with discretion to deny institution of an *inter partes* review. *See Cuozzo*, 579 U.S. at 272 (“[T]he agency’s decision to deny a petition is a matter committed to the

Patent Office’s discretion.”); CTPG 55. Further, the Director has delegated discretionary authority under 35 U.S.C. § 314(a) to the Board. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1356 (2018); 37 C.F.R. § 42.4(a).

In *General Plastic*, the Board articulated a list of non-exclusive factors to be considered in determining whether to exercise discretion under § 314(a) to deny a petition:

1. whether the same petitioner previously filed a petition directed to the same claims of the same patent;
2. whether at the time of filing of the first petition the petitioner knew of the prior art asserted in the second petition or should have known of it;
3. whether at the time of filing of the second petition the petitioner already received the patent owner’s preliminary response to the first petition or received the Board’s decision on whether to institute review in the first petition;
4. the length of time that elapsed between the time the petitioner learned of the prior art asserted in the second petition and the filing of the second petition;
5. whether the petitioner provides adequate explanation for the time elapsed between the filings of multiple petitions directed to the same claims of the same patent;
6. the finite resources of the Board; and
7. the requirement under 35 U.S.C. § 316(a)(11) to issue a final determination not later than 1 year after the date on which the Director notices institution of review.

General Plastic, Paper 19 at 16 (citing *NVIDIA Corp. v. Samsung Elec. Co.*, IPR2016-00134, Paper 9 at 6–7 (PTAB May 4, 2016)). The *General Plastic* factors “are not dispositive, but part of a balanced assessment of all relevant circumstances in the case, including the merits.” CTPG 58.

With these factors in mind, we discuss the parties’ arguments and supporting evidence.

1. Whether the Same Petitioner Previously Filed a Petition Directed to the Same Claims of the Same Patent

As explained above, before us is Petitioner's second petition challenging the claims of the '033 patent. Pet. 3¹¹; Prelim. Resp. 3. We understand that Petitioner initially filed this later Petition because "[b]y instituting an IPR of Petition 1 (ranked #2) in addition to that of Petition 2 (ranked #1), the Board may have the opportunity to evaluate all claims of the '033 patent." Ranking 3.

Nonetheless, as stated above, we have already instituted *inter partes* review in the first filed proceeding, IPR752. Moreover, IPR752 involves *all* claims 1–17 of the '033 patent and the second petition here involves only claims 1–3, 5, 8–11, 13, 15, and 17. Thus, contrary to Petitioner's position, more claims (in fact all the claims) are challenged in the instituted IPR752.

Further, Petitioner provides no persuasive explanation why it is again challenging claims 1–3, 5, 8–11, 13, 15, and 17 here or why Petitioner needs two instituted *inter partes* reviews on the common claims. *See generally* Pet. 78–82. Petitioner does not explain persuasively why the "Board should exercise its discretion to institute additional petitions," short of saying that "[i]n contrast to the primary references cited in Petition 1, the primary reference [Lin] cited in Petition 2 more clearly describes and depicts a local interconnect." Ranking 3. However, Petitioner also asserts that "the respective disclosures in Trivedi and Joo (both cited in Petition 1 [of IPR752]) are not inadequate in any manner as they both disclose local interconnects." *Id.* In IPR752, for the purposes of institution and based on

¹¹ Petitioner incorrectly refers to IPR2021-01420 as the earlier filed proceeding involving the '033 patent. Petitioner's citation is incorrect. That proceeding involves U.S. Patent No. 7,260,731. Pet. 2 (chart).

the record then before us, we agreed with Petitioner's position as discussed in that proceeding. IPR 752 Dec. 26–32 (discussing limitations recited in claim 1). Thus, at best, in this proceeding, Lin is duplicative of what Petitioner relies upon in Trivedi to teach local interconnects.

Additionally, we observe that Petitioner does not identify any circumstances identified in the Trial Practice Guide supporting a need for a second petition, such as a large number of claims in litigation or a potential dispute about priority date. CTPG 59. Accordingly, based on the record before us, we agree with Patent Owner that this *General Plastic* factor weighs in favor of denying institution of the proceeding. *See* Prelim. Resp. 8.

2. *Whether at the Time of Filing of the First Petition the Petitioner Knew, or Should Have Known, of the Prior Art Asserted in the Second Petition*

Petitioner asserts that it was not aware of references Lin, Peng, Lo, and Huang, when it filed the IPR752 Petition. Pet. 79–80. Petitioner further asserts that it used a third-party for its initial invalidity searches, but that the “typical keyword searches” yielded a significant number of “non-relevant results” with titanium nitride and tungsten layers. *Id.* at 79. Because of these results, Petitioner contends that it relied on subsequent manual searching by counsel. *Id.* at 80. According to Petitioner, “[o]nly after the primary reference Lin was selected, [was] Petitioner . . . able to identify secondary references that complement Lin’s teachings.” *Id.*

We agree with Patent Owner that Petitioner has not adequately explained why it should not have known of Lin, Peng, Lo, and Huang prior to filing its first Petition or even shortly thereafter. Although Petitioner contends that it filed the second Petition less than three weeks after discovering Lin, there is no explanation for why it took Petitioner several

months to conduct the manual search, which was done by Petitioner's own counsel. *Id.* at 81. In fact, Petitioner's second Petition was not filed until after Patent Owner's Preliminary Response was entered in IPR752 and not until nearly seven months had passed since the first Petition was filed. Thus, in the absence of a persuasive explanation, we conclude that this second *General Plastic* factor weighs in favor of denying institution of the proceeding.

3. *Whether at the Time of Filing of the Second Petition the Petitioner Already Received the Patent Owner's Preliminary Response to the First Petition or Received the Board's Decision on Whether to Institute Review in the First Petition*

The Preliminary Response for IPR752 was filed on August 16, 2021 — about three months before the second petition was filed on November 4, 2021. IPR752, Paper 6. The Decision to Institute in IPR752 was entered on November 9, 2021, after this Petition was filed but before the Notice of Filing Date was issued on November 16, 2021. IPR752 Dec.; Paper 4. Petitioner argues that it did not rely on the IPR752 Preliminary Response and did not “unjustly benefit therefrom.” *Id.* at 81.

Petitioner's argument is unpersuasive because the third *General Plastic* factor addresses whether Petitioner had access to a Board decision or a preliminary response concerning a prior petition, such that Petitioner would have been in a position to gain a benefit, “unjust” or otherwise, from having that information before filing another petition. The timing of events here shows that Petitioner indeed had the benefit of the first Preliminary Response months before filing its second Petition, while Petitioner's counsel was manually searching for additional prior art references. Consequently,

we conclude that the third *General Plastic* factor weighs in favor of denying institution of this proceeding.

4. The Length of Time that Elapsed Between the Time the Petitioner Learned of the Prior Art Asserted in the Second Petition and the Filing of the Second Petition

According to Petitioner, it “has been diligent in its search and, in less than three weeks after the new primary reference Lin was discovered, Petitioner filed the second petition.” Pet. 81.

Nevertheless, as discussed above, Petitioner has not adequately explained its diligence as it took several months for Petitioner’s counsel to conduct a manual search. Pet. 81. Even discounting the three weeks between when Petitioner discovered Lin and the second Petition’s filing in November 2021, there is essentially a five month delay that Petitioner has not sufficiently accounted for.

On the whole, we determine that this factor is neutral.

5. Whether the Petitioner Provides Adequate Explanation for the Time Elapsed Between the Filings of Multiple Petitions Directed to the Same Claims of the Same Patent

For this factor, Petitioner asserts that it has been engaged in selecting and evaluating candidate prior art “[f]rom April 23, 2021 through October, 2021.” Pet. 81. Be that as it may, it is unclear why it has taken Petitioner six months to evaluate the particular prior art that has been asserted in this IPR. As Patent Owner observes, “the prior art cited in this second Petition consists of publicly available U.S. patents and one published U.S. patent

application. Petitioner provides no explanation of the delay in the additional searching.” Prelim. Resp. 12. Thus, this factor weighs in favor of denying institution.

6. Factors 6 and 7: The Finite Resources of the Board; and the Requirement Under 35 U.S.C. § 316(a)(11) to Issue a Final Determination Not Later than 1 Year After the Date on Which the Director Notices Institution of Review

For these factors, Petitioner contends that “the total number of asserted claims is small, and each independent claim recites only three limitations. As such, Petitioner believes that the Board’s resources would not be overstrained by the second IPR.” Pet. 81–82.

Patent Owner responds that because the “second Petition was filed almost seven months after the first Petition [] [t]here is no possibility of coordination or consolidation. Moreover, the first Petition will reach Final Written Decision before briefing is complete on the second Petition, if instituted.” Prelim. Resp. 15.

We agree with Patent Owner that instituting trial on the present Petition would not be an efficient use of the Board’s resources. In IPR752, we instituted trial about five months ago on all the claims challenged in this Petition, and Patent Owner has already filed its Patent Owner Response. IPR752, Paper 16. If we were also to institute an *inter partes* review on the current Petition, it would be too late for us to consolidate the two cases on the same schedule, while still issuing a final written decision by November 9, 2022 as required under 35 U.S.C. § 316(a)(11). Thus, the two cases would be on different schedules in entirely separate proceedings, and have different evidentiary records.

Thus, we determine *General Plastic* factors 6 and 7 weigh in favor of denying institution.

B. Conclusion as to General Plastic Factors

After a holistic review of the *General Plastic* factors and the arguments presented for and against the exercise of discretionary denial, we conclude that the factors weigh in favor of denying institution of this proceeding. On balance and in view of the policy goals articulated in *General Plastic*, we conclude that it is appropriate here to exercise our discretion under 35 U.S.C. § 314(a) to deny the Petition.¹²

III. ORDER

Upon consideration of the record before us, it is:
ORDERED that, pursuant to 35 U.S.C. § 314(a), the Petition is denied.

¹² Because Petitioner's petition is denied on a discretionary basis per our discussion of *General Plastic* factors, we decline to reach Patent Owner's separate arguments for denial based on *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 5-6 (P.T.A.B. Mar. 20, 2020). See Prelim. Resp. 16–20.

IPR2022-00105
Patent 6,774,033 B1

PETITIONER:

Sanjeet Dutta
sdutta@goodwinlaw.com

Suhrid Wadekar
swadekar@goodwinlaw.com

PATENT OWNER:

Justin Oliver
joliver@venable.com

Sarah Brooks
ssbrooks@venable.com