

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRON TECHNOLOGY, INC.,

Petitioner,

v.

YANGTZE MEMORY TECHNOLOGIES COMPANY, LTD.,

Patent Owner.

Case IPR2024-00909

Patent 10,658,378

PATENT OWNER'S SUR-REPLY

TABLE OF CONTENTS

LIST OF EXHIBITS	v
LIST OF ABBREVIATIONS	vi
I. INTRODUCTION	1
II. CLAIM CONSTRUCTION	2
A. “an isolation region of the substrate” (Claim 1)/“a substrate with an isolation structure” (Claim 15).....	2
B. “through array contacts (TACs) extending vertically through the dielectric and the isolation structures” (Claim 15)	7
C. “each local contact of the local contacts” (Claim 18).....	10
III. Ground 1: Toyama Does Not Disclose or Render Obvious Claims 1-7 and 18.....	13
A. All Challenged Claims	13
1. Toyama’s First Exemplary Structure (1A) and Toyama’s Second Modification (1B) Do Not Disclose or Render Obvious “an Isolation Region of the Substrate” ([1.c.ii]) / “a Substrate with an Isolation Structure” ([15.a]).....	13
2. Toyama’s First Exemplary Structure (1A) and Toyama’s Second Modification (1B) Do Not Disclose or Render Obvious “a Dielectric Structure on an Isolation Region” ([1.c.i-ii]) / “a Dielectric Structure on the Isolation Structure” ([15.c.i])	15
3. Toyama’s First Exemplary Structure (1A) and Second Modification (1B) Do Not Disclose or Render Obvious “Through Array Contacts (TACs) Extending Vertically Through the Dielectric and the Isolation Structures” ([1.d]/[15.h]).....	19
B. Claim 7: Toyama’s First Exemplary Structure (1A) and Second Modification (1B) Do Not Disclose or Render Obvious “the Dielectric Structure Defines a Through Array Contact Region Within the 3D Memory Device”	22
1. Claim 7 Expressly Requires that the Dielectric Structure “Defines” the TAC Region	23

2. Toyama’s Alleged TAC Region Is Not Defined by the Dielectric Structure and Instead Extends Beyond to Include the Alternating Stack.....26

C. Claim 18: Toyama’s First Exemplary Structure (1A) and Second Modification (1B) Do Not Disclose or Render Obvious “an Etch Stop Plug Interposed Between Each Local Contact of the Local Contacts and Each Channel Structure of the Channel Structures” 27

IV. CONCLUSION.....31

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>ABS Glob., Inc. v. Cytonome/St, LLC</i> , 84 F.4th 1034 (Fed. Cir. 2023)	9, 10
<i>Apple Inc. v. Omni MedSci, Inc.</i> , No. 2023-1034, 2024 WL 3084509 (Fed. Cir. June 21, 2024).....	13, 14
<i>Axonics, Inc. v. Medtronic, Inc.</i> , 75 F.4th 1374 (Fed. Cir. 2023)	13, 14
<i>Baldwin Graphic Sys., Inc. v. Siebert, Inc.</i> , 512 F.3d 1338 (Fed. Cir. 2008)	10
<i>Carrum Techs., LLC v. Ford Motor Co.</i> , No. CV 18-1647-RGA, 2023 WL 7407778 (D. Del. Nov. 9, 2023)	10
<i>Finjan LLC v. SonicWall, Inc.</i> , 84 F.4th 963 (Fed. Cir. 2023)	<i>passim</i>
<i>Gaus v. Conair Corp.</i> , 363 F.3d 1284 (Fed. Cir. 2004)	16
<i>KCJ Corp. v. Kinetic Concepts, Inc.</i> , 223 F.3d 1351 (Fed. Cir. 2000)	9
<i>Merck & Co. v. Teva Pharms. USA, Inc.</i> , 395 F.3d 1364 (Fed. Cir. 2005)	11
<i>ResONet.com, Inc. v. Lansa, Inc.</i> , 346 F.3d 1374 (Fed. Cir. 2003)	10
<i>Salazar v. AT&T Mobility LLC</i> , 64 F.4th 1311 (Fed. Cir. 2023)	8
Other Authorities	
37 C.F.R. §42.23(b)	1, 14

LIST OF EXHIBITS

Exhibit	Description
Ex. 2001	Joint Claim Construction Statement
Ex. 2002	<i>Reserved</i>
Ex. 2003	Micron’s Preliminary Claim Constructions
Ex. 2004	YMTC’s Proposed Claim Constructions
Ex. 2005	April 3, 2025, Declaration of Dr. Yang (“Yang”)
Ex. 2006	Decision Granting Institution of <i>Inter Partes Review</i> of U.S. Patent No. 10,937,806 (IPR2024-00791, Paper 11)
Ex. 2007	January 28, 2025, Deposition Transcript of Dr. Lee
Ex. 2008	U.S. Patent No. 10,937,806 (“’806”)
Ex. 2009	Petitioner’s Preliminary Reply for <i>Inter Partes Review</i> of U.S. Patent No. 10,937,806 (IPR2024-00911, Paper 10)
Ex. 2010	Patent Owner’s Preliminary Sur-Reply for <i>Inter Partes Review</i> of U.S. Patent No. 10,937,806 (IPR2024-00911, Paper 11)
Ex. 2011	Decision Granting Institution of <i>Inter Partes Review</i> of U.S. Patent No. 10,937,806 (IPR2024-00911, Paper 12)
Ex. 2012	Decision Granting Institution of <i>Inter Partes Review</i> of U.S. Patent No. 10,658,378 (IPR2024-00788, Paper 13)
Ex. 2013	Declaration of Andrew Radsch

LIST OF ABBREVIATIONS

Abbreviation	Term
'378 or '378 patent	U.S. Pat. No. 10,658,378
'378FH	File History of U.S. Pat. No. 10,658,378
Board or PTAB	Patent Trial and Appeal Board
Challenged Claims	'378 patent, claims 1-7, 18
DI	Decision Granting Institution for <i>Inter Partes</i> Review of U.S. Patent No. 10,658,378 (IPR2024-00909, Paper 12)
Office or USPTO	U.S. Patent and Trademark Office
Parallel district court litigation	<i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc.</i> , NDCA-3-23-cv-05792 (N.D. Cal.)
Patent Owner or PO	Yangtze Memory Technologies Company, Ltd.
Petition or Pet.	Petition for <i>Inter Partes</i> Review of U.S. Patent No. 10,658,378 (IPR2024-00909, Paper 1)
Petitioner	Micron Technology, Inc.
POR	Patent Owner Response for <i>Inter Partes</i> Review of U.S. Patent No. 10,658,378 (IPR2024-00909, Paper 15)
POSITA	Person of ordinary skill in the art
Reply	Petitioner's Reply for <i>Inter Partes</i> Review of U.S. Patent No. 10,658,378 (IPR2024-00909, Paper 17)
Toyama	U.S. Patent Publication No. 2017/0179026

I. INTRODUCTION

As explained in Patent Owner’s Response (POR), the Petition fails to establish that the Challenged Claims are disclosed or rendered obvious. Petitioner’s Reply does not cure the defects of the trial grounds; instead, it fails to address the proper constructions of multiple claim terms, ignores PO’s arguments, presents irrelevant evidence, and—contrary to 37 C.F.R. §42.23(b) and *Henny Penny Corp. v. Frymaster LLC*—introduces new theories that expand the case beyond the grounds set forth in the Petition. 938 F.3d 1324, 1330–31 (Fed. Cir. 2019). The validity of all Challenged Claims should be upheld.

Ground 1A relies on Toyama’s First Exemplary Structure, which fails to teach: (1) “an isolation region of the substrate”/“a substrate with an isolation structure,” because the feature mapped to the “isolation [region/structure]” is extending all the way through and beyond the surfaces of the substrate, and is therefore not “part of” the substrate; (2) “a dielectric structure on the isolation [region/structure],” because Petitioner arbitrarily and improperly divides Toyama’s single dielectric structure into two regions and maps different regions to two separately claimed structures; and (3) the “etch stop plug” limitation of claim 18 because the alleged plugs are not between **each** local contact and each channel structure, as required by the plain meaning of the term. The Reply relies on faulty claim construction arguments that contradict the ’378 and binding Federal Circuit law.

Ground 1B relies on Toyama’s Second Modification, which fails to teach (1) “an isolation region of the substrate”/“a substrate with an isolation structure” for the same reasons as above; (2) “[TACs] extending vertically through the dielectric and the isolation structures” because Toyama’s alleged TACs do not extend through the **same** dielectric structure; and (3) the “etch stop plug” limitation of claim 18 for the same reasons as above. Petitioner’s arguments again ignore binding Federal Circuit precedent.

II. CLAIM CONSTRUCTION

A. “an isolation region of the substrate” (Claim 1)/“a substrate with an isolation structure” (Claim 15)

The terms “an isolation region of the substrate” and “a substrate with an isolation structure” should be construed—consistent with the claim language and every ’378 embodiment—as requiring that ***the isolation region/structure is “part of” the substrate***. The word “of” is “used as a function word to indicate the whole that includes the part,” and the plain meaning of “with” is “having” or “inclusive of.” Ex. 1038, 6, 8. Consistent with these meanings, claims 1 and 15 introduce the “isolation [region/structure]” only in reference to and within the confines of a substrate, rather than as a separate limitation. POR, 14 (claim 1 recites “an isolation region of the substrate” and claim 15 recites “a substrate with an isolation structure”). Furthermore, the specification consistently depicts and describes the isolation structure in the upper portion of the substrate, such that it does not extend beyond

the top surface of the substrate, making it a “part of” the substrate. POR, 15-16 (citing ’378, 12:54-66, 20:38-42, 21:7-13, 21:64, 22:27-28, Figs. 2, 4-13); Yang, ¶¶47-48. This is shown, for example, in Figure 2:

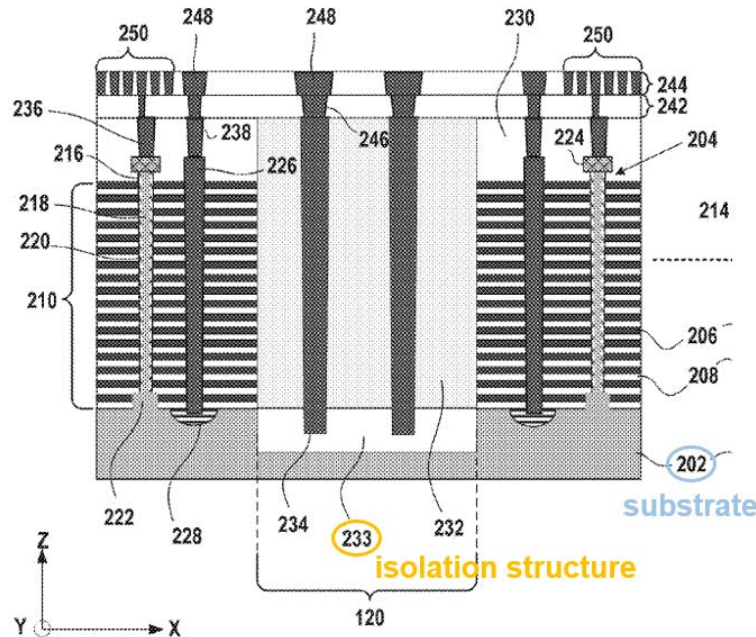


FIG. 2

Thus, the isolation region/structure must be “part of” the substrate, and if it extends beyond the confines of the substrate (e.g., extends beyond the top or bottom surface of the substrate), then it is not part of the substrate.

Petitioner’s arguments in opposition to PO’s construction (1) are inconsistent with Petitioner’s own extrinsic evidence, (2) misinterpret the specification, (3) misinterpret PO’s construction, and (4) improperly focus on function in lieu of the structural claim term.

First, Petitioner’s assertion that “part of” is a “depart[ure] from the ordinary meaning of ‘with’ and ‘of’” (Reply, 3) is belied by its own extrinsic evidence, which states that “of” is “used as a function word to indicate the whole that includes the part” (Ex. 1038, 6), and lists definitions of “with” as “having” and “inclusive of” (*id.*, 8). Thus, Petitioner’s assertions that PO’s construction is a “depart[ure],” “redefin[ition],” “disavowal,” or “narrowing” of the plain meaning (Reply, 3-5) are baseless. Tellingly, the Reply never quotes a definition of “of” or “with” or explains its interpretation of the purported plain meaning. Petitioner’s apparent interpretation would merely require that both elements are present in the device, or something similarly broad and unsupported.

Second, Petitioner misinterprets the specification; the excerpted quotes (Reply, 3-5) are fully consistent with and support PO’s construction. As discussed, **every embodiment** depicts the isolation region/structure as within and not extending beyond the upper portion of the substrate. ’378, Figs. 2, 4-13. Petitioner quotes 10:36-40 (“STI structure 233 is formed on a top portion of substrate 202”), but this refers to forming a recess in the substrate that is then “filled with a dielectric material” to form an STI that does not extend beyond the top surface of the substrate (*id.*), making the STI part of the substrate. POR, 18. Similarly, 21:7-12 (“forming an isolation structure on a substrate”) is consistent with PO’s construction, as depicted in Figs. 4-13.

To the extent Petitioner is suggesting these usages of “on” are inconsistent with “part of,” that is incorrect because the terms are not mutually exclusive. An isolation region/structure that is “part of” the substrate can also be “on” it if above a portion of the substrate in the z-direction, but merely being “on” the substrate is insufficient to show that the isolation region/structure is “part of” the substrate (e.g., if the isolation region/structure extends beyond the top surface of the substrate then it is not part of the substrate). Indeed, claims 1 and 15 separately recite “of”/“with” and “disposed on” to describe two separate spatial relationships to the substrate, confirming that the terms are not interchangeable.¹

Petitioner contorts the claim language to cover a configuration where the isolation region/structure extends all the way through the substrate (Reply, 4 (DI, 15-16)). Such a configuration is inconsistent with the claim language and unsupported by the specification because it involves completely removing the substrate by its entire thickness in the region of the cut, such that the isolation region/structure is not a part of the substrate because the isolation region/structure is

¹ Thus, to the extent the Board’s preliminary finding in the first IPR of the ’378 (IPR2024-00789) that any additional structures disposed on the substrate “could be considered part of...the substrate” (Ex. 2012, 12-13) was suggesting that “on” is **sufficient** to show “part of,” PO respectfully disagrees. POR, 17-22.

no longer confined by the substrate in a vertical direction, such that it extends beyond the top and/or bottom surfaces of the substrate (for example, as in Figs. 13A and 44A of Toyama, see POR, 40, 64). The '378 never describes or shows the isolation region/structure as merely next to or abutting a through hole of the substrate (POR, 39), or extending beyond the surface of the substrate, and does not contemplate such configurations.

Petitioner concedes—as it must—that the specification also describes that the substrate “**includes** an isolation structure” (Reply, 4),² which supports PO’s construction. Petitioner argues that the specification’s descriptions vary too much to reach the level of “intent to redefine” or “disavowal” (*id.*). However, as discussed, PO’s construction is consistent with the plain meaning of “with” and “of” as read in light of the specification—indeed, as depicted in **every** embodiment—and thus is not redefinition or disavowal.

Third, Petitioner’s assertion that the isolation structure cannot be part of the substrate because the former is typically a dielectric and the latter might be a semiconductor (Reply, 4) misinterprets PO’s construction, which does not require the structures to be the same material but instead limits the spatial relationship between the two structures.

² All emphasis added unless otherwise indicated.

Finally, Petitioner argues that the isolation structure’s function does not “require” it to be part of the substrate (Reply, 4-5), but PO’s construction is limited by the claim language (“an isolation region of the substrate”/“a substrate with an isolation structure”) consistent with the disclosed embodiments. PO’s construction does not necessarily encompass every possible structure that performs an isolation function, regardless of spatial limitations. Indeed, it would be improper to reduce the component to only its function and ignore the claimed spatial relationship.

B. “through array contacts (TACs) extending vertically through the dielectric and the isolation structures” (Claim 15)

The phrase “the dielectric and the isolation structures” should be construed—consistent with its antecedent terms and the specification—as “the dielectric structure and the isolation structure.” Thus, in accordance with binding Federal Circuit precedent, the claimed TACs must extend through the **same** dielectric structure.

First, Petitioner concedes that the antecedent claim terms are “a dielectric structure” and “an isolation structure” (Reply, 5). The use of the plural “structures” in the later limitation is merely because there are two types of structures—a dielectric structure and an isolation structure.

Second, the disclosed embodiments with multiple TACs in the ’378 depict the TACs extending through the **same** dielectric, e.g. as shown in Figure 2:

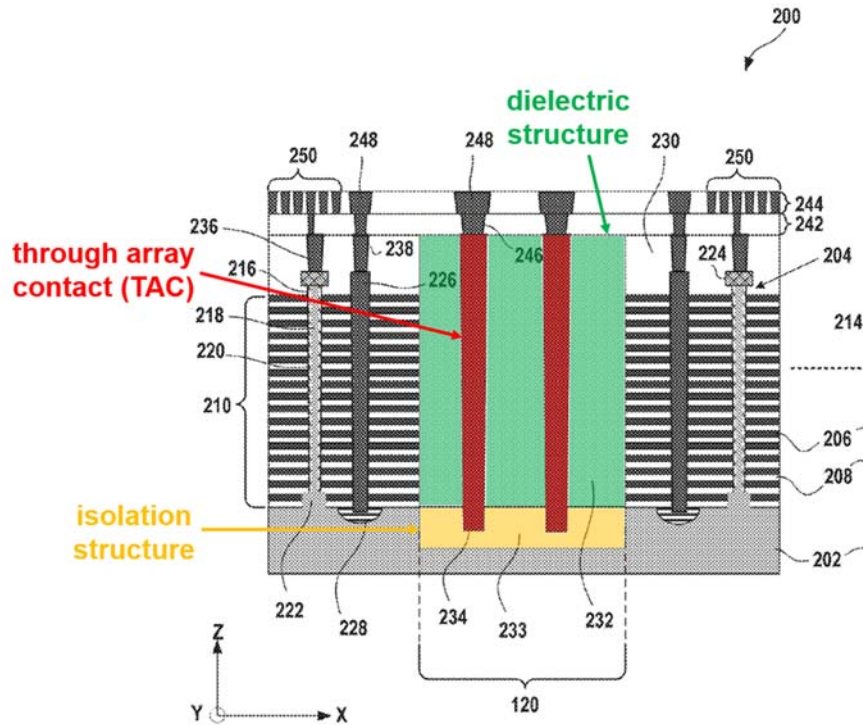


FIG. 2

The embodiment with a single TAC in a dielectric structure ('378, 21:17-25; Reply, 6) is irrelevant, since it does not include the claimed plurality of TACs. POR, 25-26.

Third, Petitioner's understanding of Federal Circuit precedent is flawed. While the indefinite article "a" does not preclude more than one, there must still be at least one instance of the element that meets all the requirements of the claim applicable to that element. *See Finjan LLC v. SonicWall, Inc.*, 84 F.4th 963, 974-975 (Fed. Cir. 2023) ("Even if an infringing system can use 'one or more computers,' the plain language of the claims requires at least one of those computers to perform all the functions listed in the claims...."); *Salazar v. AT&T Mobility LLC*, 64 F.4th 1311, 1317 (Fed. Cir. 2023) (similar but regarding "microprocessors"). Thus, here

one dielectric structure must meet all the requirements applicable to it, i.e. having TACs (plural) extending through it. The Board correctly concluded as much in its Institution Decision regarding a related patent that shares the same specification: “[w]hile the open-ended language may permit the claimed memory device to have more than one dielectric structure, this does not change the claim language that requires multiple TACs to extend vertically through a single dielectric structure.” Ex. 2006, 17-18; *see also* POR, 67-68. Petitioner’s suggestion that the claim at issue in *Finjan* could have been met by multiple computers working together (Reply, 9) flatly contradicts the Federal Circuit’s holding. The Federal Circuit rejected *Finjan*’s argument that multiple computers working together could infringe—holding that the claim “requires that the **same computer** perform each of the claimed steps.” 84 F.4th at 973-75.

Petitioner’s cited cases (Reply, 7-8) are inapposite, as they were not addressing the *Finjan* issue applicable here. *KCJ* merely addressed whether “a...continuous...chamber” encompasses one or more chambers, and not whether the same chamber must satisfy each reference to the chamber throughout the claim. *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1355-57 (Fed. Cir. 2000). Similarly, *ABS* addressed whether the claimed flow channel’s focusing region must be “configured for only a single sample stream” (i.e., whether the term excludes a second stream) which is a separate issue from whether the same sample stream must

meet all claimed requirements. *ABS Glob., Inc. v. Cytonome/St, LLC*, 84 F.4th 1034, 1040-43 (Fed. Cir. 2023); *Carrum Techs., LLC v. Ford Motor Co.*, No. CV 18-1647-RGA, 2023 WL 7407778, at *5 (D. Del. Nov. 9, 2023) (“Plaintiff’s reliance on *ABS Global* is misplaced because the Federal Circuit addressed a different issue there.”).

Petitioner’s reliance on *Baldwin* (Reply, 8) fares no better, and indeed the Federal Circuit expressly distinguished *Baldwin* as merely addressing the principle that the indefinite article *a* means one or more, and “***not...whether the use of a definite article to refer to the initial antecedent phrase requires the same component to perform the later limitation.***” *Finjan*, 84 F.4th at 974 (citing *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008)).

C. “each local contact of the local contacts” (Claim 18)

The term “each local contact of the local contacts” of claim 18 should be afforded its plain and ordinary meaning: the term refers to the same antecedent “local contacts disposed on the channel structures ***and the slit structures***” recited in independent claim 15, from which claim 18 depends.

Contrary to Federal Circuit precedent defining “each” as “each and every,” *ResONet.com, Inc. v. Lansa, Inc.*, 346 F.3d 1374, 1379 (Fed. Cir. 2003), Petitioner seeks to reinterpret “***each*** local contact of the local contacts” to mean only ***some*** of the claimed local contacts. Reply 10-13. Petitioner does not and cannot dispute that the antecedent basis for “***the*** local contacts” is claim 15’s “local contacts disposed

on the channel structures **and** the slit structures.” *See id.* Nonetheless, Petitioner improperly ignores this antecedent basis by contending that claim 18’s “**each** local contact of the local contacts” is limited to the subset of local contacts—i.e., only those on the channel structures. Reply, 13. This interpretation improperly reads the word “each” out of the claim. *See Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) (“A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.”).

Petitioner’s position rests on a mischaracterization of the specification and its embodiments. Petitioner incorrectly assumes that a local contact must be either on a channel structure or on a slit structure, but not both. Reply, 10-11. As PO has explained (POR 29), nothing precludes a local contact from being above both the channel structures and the slit structures. Indeed, the bit lines are local contacts disposed on both the channel structures and the slit structures (POR 31-33).

Petitioner asserts that “‘bit lines 250’ are not ‘local’ contacts” because they are not “in physical and electrical contact with the various memory array structures” as the ’378 requires. Reply 11-12. But the specification explains that the bit lines are “electrically connected to NAND strings 204, respectively, by corresponding contacts 246 and NAND string contacts 236.” ’378, 12:4-9. Therefore, at a minimum, the bit lines are physically and electrically connected to memory array structures—namely “contacts 246”—which Petitioner ignores. Petitioner does not,

and cannot, dispute that contacts 246 are themselves “memory array structures” because they are structures within the memory array, just like the “NAND strings, gate line slits, [and] word lines.” ’378, 5:35-40, 20:9-16.

Petitioner’s argument that “bit lines” are not “local contacts” because bit lines are in an interconnect layer and the ’378 allegedly “describes ‘local contacts’ as distinct from ‘interconnect contacts’” (Reply 12-13 (citing ’378, 11:56-59, 12:4-7)) is directly contradicted by the specification. The ’378 defines the term “contact” as including interconnects: “the term ‘contact’ can broadly include any suitable types of interconnects including vertical interconnect access (via) lines and lateral lines (interconnect lines).” ’378, 11:27-30. Dr. Lee agreed with this broad understanding (Ex. 2007, 66:11-14), and his subsequent attempts to retreat from that opinion (Ex. 1037, ¶¶34-35) should be dismissed. The specification nowhere suggests that local contacts cannot reside within a labeled contact layer (e.g., layers 242 or 244).

III. GROUND 1: TOYAMA DOES NOT DISCLOSE OR RENDER OBVIOUS CLAIMS 1-7 AND 18

A. All Challenged Claims

1. Toyama's First Exemplary Structure (1A) and Toyama's Second Modification (1B) Do Not Disclose or Render Obvious "an Isolation Region of the Substrate" ([1.c.ii]) / "a Substrate with an Isolation Structure" ([15.a])

Toyama fails because under the proper construction (§II.A), it is undisputed that the alleged isolation region/structure identified in the Petition is not "part of" the alleged substrate. POR, 39-46, 62-64; Reply, 14-17.

Petitioner instead presents an improper new mapping that identifies a new alleged substrate (Reply, 14-17), which in any event still fails to meet the claim. Petitioner argues that its new mapping is permitted because PO proposed a construction in the POR. Reply, 14-15. However, the cited *Apple* case permits new arguments only "where a patent owner in an IPR ***first proposes a claim construction in a patent owner response.***" *Apple Inc. v. Omni MedSci, Inc.*, No. 2023-1034, 2024 WL 3084509, at *5 (Fed. Cir. June 21, 2024) (quoting *Axonics, Inc. v. Medtronic, Inc.*, 75 F.4th 1374, 1384 (Fed. Cir. 2023)). That is not the situation here, because PO first raised the claim construction earlier, in the Preliminary Response. POPR, 4 ("the claims require that the 'isolation region' or 'isolation structure' is part of the substrate"), 26, 29. This distinction is important, because the Federal Circuit's narrowly tailored holding addressed the unique concern regarding estoppel if a new

construction is held back and raised for the first time *after* institution. *See Apple*, 2024 WL 3084509, at *6; *Axonics*, 75 F.4th at 1384. Moreover, Petitioner could have requested a Preliminary Reply here, but did not. Therefore, Petitioner’s new claim mapping is improper and should not be considered, as Petitioner was required to make its case in the Petition and Petitioner has not cited any applicable exception that would permit consideration of its entirely new mapping. 37 C.F.R. §42.23(b); *Henny Penny*, 938 F.3d at 1330-31.

Regardless, Petitioner’s new mapping fails because it simply purports to fold the alleged isolation region/structure into the substrate (Reply, 14-17 (arguing that the components are “collectively a substrate”)), which does not alter the fundamental deficiency with *Toyama*—the alleged isolation region/structure extends all the way through and beyond the surfaces of the substrate, instead of being part of the substrate.³ POR, 39-46, 62-64. As explained in §II.A, PO’s construction excludes a configuration like *Toyama*’s.

³ Petitioner’s argument appears to be based on a misunderstanding of PO’s construction. The specific geometry of the alleged isolation region/structure relative to the substrate determines whether it is “part of” the substrate (*see* §II.A), and so merely labelling an alleged isolation region/structure as a “substrate” does nothing to address this issue.

Petitioner’s new mapping is also nonsensical and fails to address related claim limitations. For example, in Toyama’s First Exemplary Structure, if 430 and 10 are “collectively a substrate” as alleged (Reply, 15), then Petitioner is now pointing to the same structure (430) for the claimed isolation structure, substrate, and dielectric region/structure. And in both embodiments, Petitioner has not even attempted to show how its new mappings satisfy the other claim elements that refer to the isolation region/structure and/or substrate. Thus, Petitioner has failed to meet its burden under its new mappings.

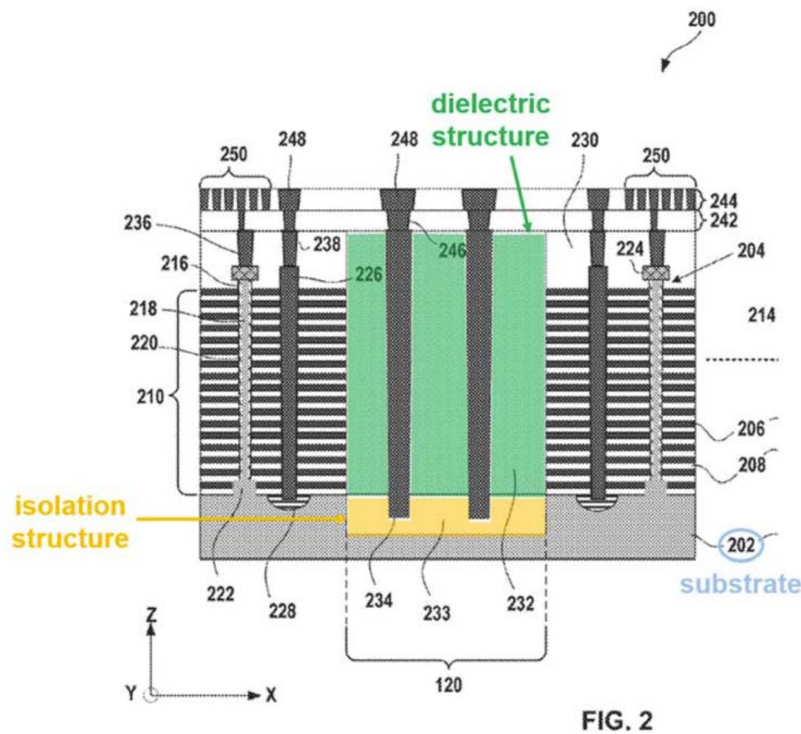
2. Toyama’s First Exemplary Structure (1A) and Toyama’s Second Modification (1B) Do Not Disclose or Render Obvious “a Dielectric Structure on an Isolation Region” ([1.c.i-ii]) / “a Dielectric Structure on the Isolation Structure” ([15.c.i])

As an initial matter, Toyama’s First Exemplary Structure (1A) and Toyama’s Second Modification (1B) do not disclose or render obvious the claimed isolation region/structure (*see* §III.A.1), and as a result, do not disclose or render obvious the claimed dielectric structure on the isolation region/structure. POR 47, 65.

In addition, Toyama’s First Exemplary Structure fails because Petitioner arbitrarily and improperly divides Toyama’s single dielectric structure into two regions and maps them to two separately claimed features. POR 46-54.

Petitioner asserts that the two separately recited structures—the “dielectric structure” and “isolation structure”—may be formed at the same time from a unitary

material (Reply, 17), but this argument ignores that the structures are separate and distinct in the '378 claims, figures, and specification (POR, 47-50). *Gaus v. Conair Corp.*, 363 F.3d 1284, 1288 (Fed. Cir. 2004) (where “claim lists” elements “separately,” it provides “clear implication” they are “separate” and “distinct” elements). For example, the '378 illustrates two separate structures:



'378, Fig. 2; *see also* '378, Figs. 4-13. The dielectric structure is “formed so that it is aligned to or covers at least a portion of,” is “in contact with,” and “can cover only portion of” the isolation structure. '378, 10:30-43. These descriptions are inconsistent with Petitioner’s interpretation—for example, a single unitary structure does not have a dielectric structure in contact with an isolation region/structure, and a single structure cannot cover itself—nor can it be “on” itself.

Petitioner’s analogy to a paper plane (Reply, 17-18) merely reinforces that the claims do not encompass a unitary dielectric—unlike the paper plane, the unitary dielectric does not have any boundaries or separately identifiable structures in Petitioner’s prior art. In addition, the analogy is inapposite because it does not pertain to the claimed memory device, which is composed of many separate layers or structures. By Petitioner’s logic, the entire “memory device” could be a single unitary material—something PO certainly does not purport to have invented. Moreover, unlike in the *Retractable Techs.* case (Pet. 53), there is no teaching in the ’378 that the two components may be formed as a single integral structure. *Cf.* 653 F.3d 1296, 1303. Indeed, Petitioner does not even attempt to respond to PO’s detailed arguments regarding *Retractable Techs.* (POR, 51-53) in full, and cites no other legal authority for its improper interpretation.

The ’378 disclosure that “[t]he boundaries of these functional building blocks have been **arbitrarily defined**” (’378, 22:65-23:5; Reply, 18) does not mean that boundaries may or may not exist—there still must be a “defined” boundary. Indeed, the next sentence clarifies that “**alternate boundaries can be defined**” (*id.*), which confirms that there is a boundary. Nothing in the ’378 suggests a single unitary structure without a boundary.

Petitioner cites the Board’s Institution Decision (Reply, 18-19 (citing DI, 16-19)), but the Board’s preliminary analysis does not address several key problems

with Petitioner's construction. **First**, the Board cited *Retractable Techs.*, which as discussed is inapposite. **Second**, even when the same material is used, the '378 describes two separate structures such that one is "aligned to" and "in contact with" another ('378, 10:35-36), and are formed at different steps ('378, Figs. 4-7, 15:12-50), which is inconsistent with a single unitary structure. **Third**, contrary to the Board's preliminary assessment, the '378 does not teach forming the structures "in the same deposition step." DI, 18. Rather, "the **etch process** used to form opening 600 may also remove (recess) portion of the top surface of STI structure 233" ('378, 15:18-19) and "opening 600 can be **filled with a dielectric layer 702**" ('378, 15:42-43). Thus, after the isolation structure has already been created and then etched, a separate process deposits the dielectric structure. **Fourth**, the argument that a single unitary structure performs a common isolation function (DI, 19) ignores that the claims are directed to two structures with a claimed spatial relationship, and do not necessarily encompass every possible structure that performs an isolation function.

In Reply, Petitioner has no argument under PO's construction, and instead argues that it would have been obvious to form Toyama's "dielectric fill material portion 430" in two steps. Reply, 19-20. But Petitioner has still failed to show a motivation to modify Toyama. For example, Petitioner cites electrical isolation (Reply, 20), but isolation is provided regardless of whether "dielectric fill material portion 430" is formed in two steps, and thus cannot motivate the modification. In

addition, in response to PO's identification of factors that would have dissuaded a POSITA, Petitioner merely asserts that "using isolation structures on a substrate...was well-known," which, even assuming were accurate, does not address the motivation issue. As explained by Dr. Yang, Petitioner does not address, e.g., "how the process of etching an opening for the dielectric structure would be controlled to stop at the location of the alleged isolation structure, which is an added complication that would have dissuaded a [POSITA] from making the proposed modification." Ex. 2005, ¶107. Likewise, Dr. Lee's "mere substitution" argument (Ex. 1037, ¶49) fails to address these issues. Dr. Yang's testimony remains un rebutted.

3. Toyama's First Exemplary Structure (1A) and Second Modification (1B) Do Not Disclose or Render Obvious "Through Array Contacts (TACs) Extending Vertically Through the Dielectric and the Isolation Structures" ([1.d]/[15.h])

As an initial matter, Toyama's First Exemplary Structure (1A) and Toyama's Second Modification (1B) do not disclose or render obvious these limitations because Toyama does not disclose or render obvious the isolation region/structure or a dielectric structure on the isolation region/structure (*see* §§III.A.1-2). POR, 54-55, 65.

In addition, for claim 15, it is undisputed that Toyama's Second Modification (1B) fails to expressly teach TACs extending through the *same* dielectric structure

(see §II.B). POR, 65-69; Reply, 21-22 (Petitioner arguing instead that the limitation is met “if...[15.H] permits the [TACs] to extend through multiple dielectric structures”). Petitioner’s analysis (Reply, 21-22) again misapplies *Finjan*. See §II.B.

Petitioner’s fallback obviousness argument that Toyama’s discrete liners collectively form a dielectric structure (Reply, 22-25) also misses the mark. This argument still relies on the multiple discrete elements (each TAC has its own separate, unconnected liner) and therefore is the same flawed mapping that is improper under *Finjan*. Petitioner is simply trying to reframe the issue as an end-run around Federal Circuit precedent, which should be rejected. Moreover, the Board already rejected this theory when Petitioner could not “sufficiently explain how multiple constructed items can be considered...a single structure” under Petitioner’s own definition (“something...that is constructed”). Ex. 2006, 17-18. As the Board recognized, “[e]very component of Toyama’s memory device” could be combined under such a broad definition. Switching definitions—now quoting “something arranged in a definite pattern of organization” (Reply, 22-23)—does not fix the problem. Every component in a semiconductor device like Toyama’s could be considered patterned (e.g., because of the design and manufacturing process).

Unable to ground its position in intrinsic evidence, Petitioner cites the below photographs of a wooden fence and staircase (Reply, 22-25), which are inapposite:



Ex. 1042



Ex. 1043

Unlike Toyama’s liner, which independently serves as a dielectric isolating the TAC, a single post or step cannot function as a wall or staircase structure, respectively. Also, Petitioner claims the wall’s “components [] are not all touching each other,” but the posts visibly do touch; moreover as Dr. Yang testified, a wall would include additional material binding the posts together—otherwise they would “fall over.” Ex. 1040, 47:23-25, 52:7-53:8. Likewise, Dr. Yang explained that “integral to the staircase structure” above is a “strong anchoring structure built into the wall” connecting the steps. See Ex. 1040, 48:2-50:16. The cited structures therefore consist of contiguous, integrated elements, and Petitioner’s reliance on them is misplaced.

Finally, Petitioner’s reliance on testimony from Dr. Yang (Reply, 22-25) is likewise misplaced. Dr. Yang was asked about the unrelated term “wall structure,” and regardless ultimately agreed only that the fence was a “wall” not a “wall

structure.” Ex. 1040, 44:23-25, 47:3-17. Moreover, unlike Toyama’s separate liners, Petitioner’s obscure fence and stair designs are actually connected, as discussed above. *Id.*, 28:10-31:8, 47:23-25, 48:2-50:16, 52:7-53:8. And regardless, these purported usages of “structure” in building construction are not relevant to how a POSITA would have understood the term in the context of memory devices or the ’378. *See* Yang, ¶¶129-132.

B. Claim 7: Toyama’s First Exemplary Structure (1A) and Second Modification (1B) Do Not Disclose or Render Obvious “the Dielectric Structure Defines a Through Array Contact Region Within the 3D Memory Device”

Toyama’s First Exemplary Structure (1A) fails because it does not teach the claimed dielectric structure (*see* §III.A.2), and as a result, does not disclose or render obvious a TAC region that is defined by the dielectric structure.

Toyama’s Second Modification (1B) fails because the alleged TAC region is not defined by the alleged dielectric structure as required by claim 7, and instead includes portions of the alternating conductor/dielectric stack. Petitioner’s assertion that Toyama’s alleged TAC region is defined by the dielectric structure (Reply, 26-30) is based on an incorrect claim construction, and fails for multiple independent reasons.

1. Claim 7 Expressly Requires that the Dielectric Structure “Defines” the TAC Region

Petitioner’s arguments that the TAC region may extend to include portions of the alternating conductor/dielectric layer stack (Reply 28-30) are contrary to the express language of the claim and all disclosed embodiments.

The express language of claim 7 requires that the dielectric structure “defines” the TAC region. In addition, as PO has explained, because independent claim 1 requires that the “dielectric structure ... extend[s] vertically through the alternating layer stack,” the TAC region defined by the dielectric structure does not include the alternating conductor/dielectric layer stack. POR, 69-71.

In addition to the express language of claim 7, in ***all*** the disclosed embodiments that have a TAC region, the TAC region defined by the dielectric structure (’378, 6:11-16, 10:21-24, 5:60-7:4, Figs. 1A-1C, 2; POR, 69-71), and does not include a portion of the alternating stack, for example as shown in Figure 2.



Petitioner fails to support a broader interpretation of claim 7. Petitioner's dictionary definition, "to fix or mark the limits of" (Ex. 1038, 3), actually supports the plain meaning of claim 7 that the TAC region is coextensive with the dielectric structure.

Petitioner's argument that the TAC region can include other elements (Reply, 28-29 (citing Ex. 1044)) misunderstands the claim term and the parties' dispute. Claim 7 does not preclude other components within the dielectric structure, so long as the TAC region is defined by the dielectric structure.

Petitioner next argues that Fig. 1A shows “TAC region 102” that includes “TAC region 120” and other components (Reply, 29-30), but the claims are not directed to TAC region 102.

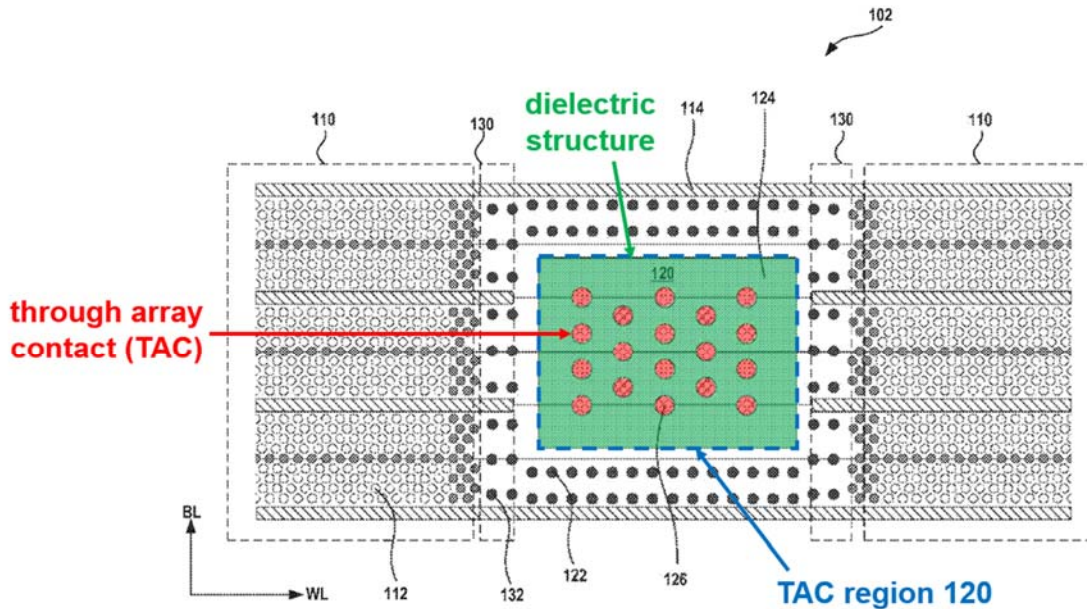


FIG. 1A

'378, Fig. 1A (annotated). The larger region 102 (and 104 and 106 in Figures 1B-1C, respectively) illustrate the placement of the claimed TAC region 120 in the context of other components. These placements are called “WL TAC region 102” (6:23-25), “BL TAC region 104” (6:41-43), and “staircase TAC region 106” (6:62-64) to illustrate the relative location.⁴ But the actual TAC region structure at each location is TAC region 120. Thus, as Dr. Yang explained, “a [POSITA] would understand that a TAC region, which is...a claimed element..., is actually 120.” Ex. 1040, 71:4-72:1. Petitioner does not dispute that TAC region 120 is shown as defined by the dielectric structure and does not include the stack.

⁴ “WL” is “word line” and “BL” is “bit line.” '378, 5:60-63.

2. Toyama’s Alleged TAC Region Is Not Defined by the Dielectric Structure and Instead Extends Beyond to Include the Alternating Stack

Petitioner’s assertion that the alleged TAC region of Toyama’s Second Modification (1B) is defined by the dielectric structure (Reply, 26-28) is incorrect for two independent reasons.

First, Petitioner ignores that Toyama’s alleged TAC region extends far beyond “the dielectric structure” to encompass three separate insulating liners, and is therefore not defined by “the dielectric structure.” In other words, there is no single dielectric structure that “defines” the TAC region as required by claim 7, rather Petitioner points to a region that comprises dielectric structures. Petitioner’s attempt to treat multiple insulating liners as a single “structure” fails. *See* §III.A.3.

Second, Petitioner ignores that Toyama’s alleged TAC region includes portions of the alternating stack, which claim 7 precludes. Specifically, because the dielectric structure must extend through the alternating stack (independent claim 1), and the TAC region must be defined by the dielectric structure (dependent claim 7), the TAC region does not include the stack. *See* §III.B.1; POR, 69-71.

C. Claim 18: Toyama’s First Exemplary Structure (1A) and Second Modification (1B) Do Not Disclose or Render Obvious “an Etch Stop Plug Interposed Between Each Local Contact of the Local Contacts and Each Channel Structure of the Channel Structures”

Petitioner does not dispute that its Petition mappings fail to meet the requirement in dependent claim 18 of an etch stop between *each* local contact and each channel structure (*see* §II.C).

Instead, Petitioner introduces improper new claim mappings relying on a bit line as the purported local contact (Reply, 31-34), which also fail to meet the claim. Petitioner argues that its new mappings should be permitted (Reply, 31 n.12 (citing *Apple*, 2024 WL 3084509, at *5)), but the cited case is inapposite because PO has not proposed a new claim construction—PO is relying on the plain language of the claim. Instead, Petitioner is belatedly and improperly trying to correct its failure of proof.

Regardless, in relying on bit lines to address dependent claim 18, Petitioner fails to show that the bit line is “disposed on ... the slit structures” as required by independent claim 15. For both the First Exemplary Structure (1A) and Second Modification (1B), Toyama makes clear that there are no **bit lines 103** on the purported **slit structures 76**:

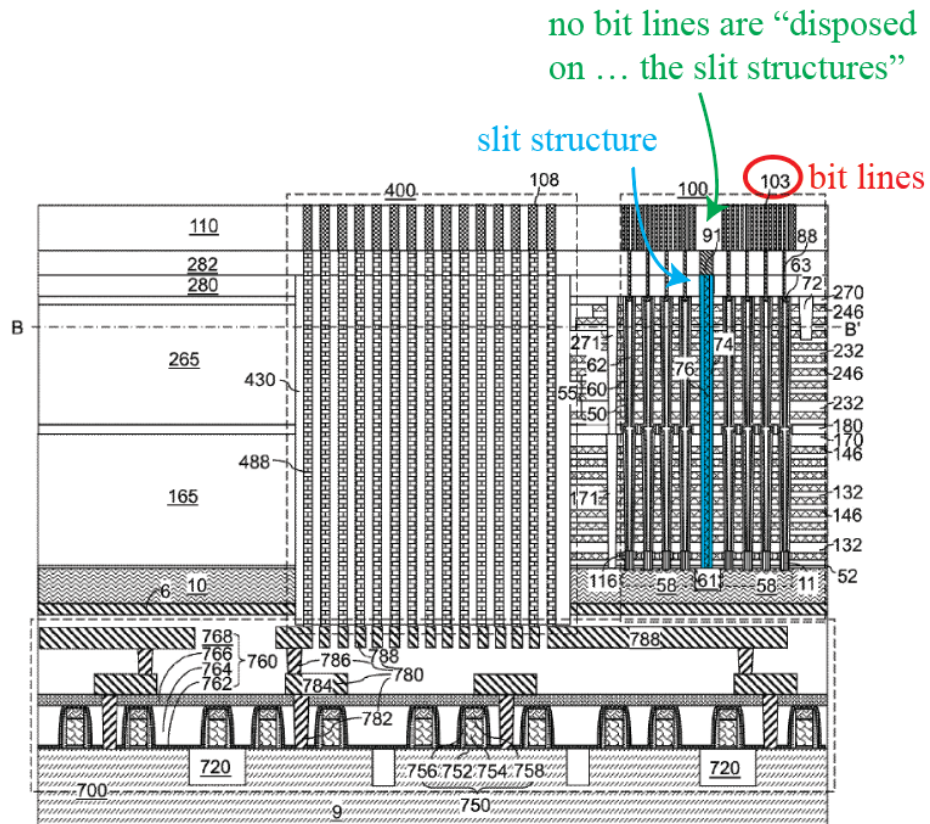
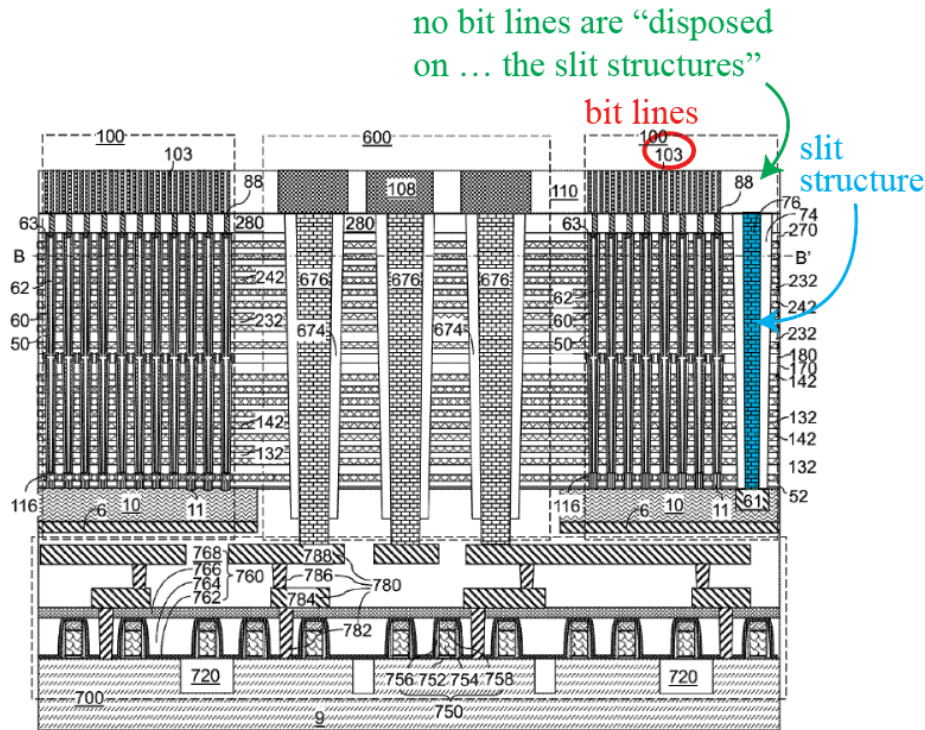


FIG. 17A

Toyama, Fig. 17A (first exemplary structure); *see also* Pet. 82-83.



Toyama, Fig. 49 (second modification); *see also* Pet. 84-85. Petitioner’s conjecture about the path of the bit lines in Fig. 17B and Fig. 48B (Reply 33-34) contradicts Fig. 17A and Fig. 49, which as depicted above, confirm that there are no bit lines on the purported slit structures. For the same reason, that bit lines 103 “extend along...direction hd2” (perpendicular to the figures above) (Reply 33-34) does not mean they extend in that direction so far as to cross over the slit structures. To the extent Petitioner is suggesting that Figs. 17A and 49 are inaccurate, it has provided no evidence of the purported inaccuracy and thus has failed to meet its burden of proof.

Petitioner's attempt to compare Toyama to the '378's bit lines is unavailing— in contrast to Toyama, the '378 expressly states that the “interconnect contacts 248 can include bit lines 250,” and the interconnect contact is disposed on the slit structure as depicted in Figure 2:

bit line “disposed on ...
the slit structures”

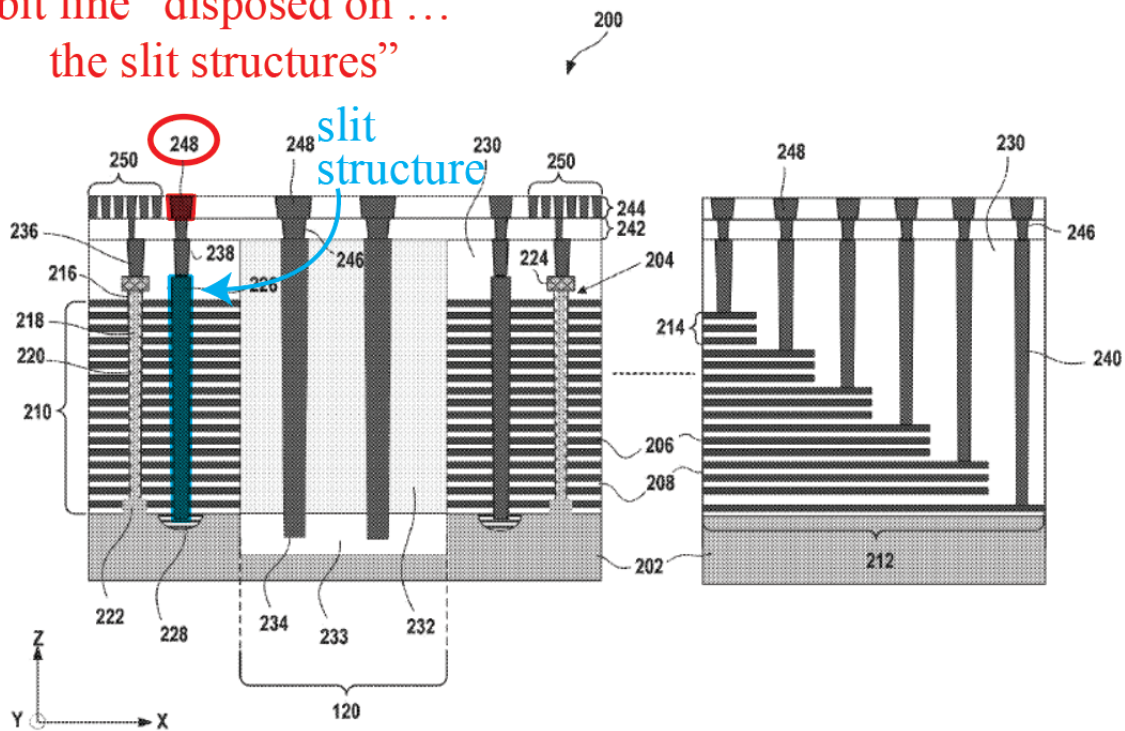


FIG. 2

'378, 12:4-5, Fig. 2. *See also* POR 30-34; Yang ¶¶73-77.

Finally, to the extent Petitioner relies on obviousness, no motivation has been provided to run bit lines over slit structures. *See* Reply 31-34; Lee ¶¶67-73.

IV. CONCLUSION

Petitioner has still failed to demonstrate by a preponderance of the evidence that any of the Challenged Claims of the '378 are anticipated or obvious. Accordingly, the Board should uphold the validity of all Challenged Claims.

Dated: August 6, 2025

Respectfully submitted,

ROPES & GRAY LLP

By: /James L. Davis, Jr./

James L. Davis, Jr.

Reg. No. 57,325

ROPES & GRAY LLP

525 University Avenue, 8th Floor

Palo Alto, CA 94301

Telephone: +1-650-617-4794

James.L.Davis@ropesgray.com

Andrew T. Radsch

(*pro hac vice*)

ROPES & GRAY LLP

525 University Avenue, 8th Floor

Palo Alto, CA 94301

Telephone: +1-650-617-4011

Andrew.Radsch@ropesgray.com

Christopher M. Bonny

Reg. No. 63,307

ROPES & GRAY LLP

525 University Avenue, 8th Floor

Palo Alto, CA 94301

Telephone: +1-650-617-4011

Christopher.Bonny@ropesgray.com

Allen S. Cross
Reg. No. 74,729
ROPES & GRAY LLP
2099 Pennsylvania Avenue, NW
Washington, D.C. 20006-6807
Phone: 202-508-4708
Allen.Cross@ropesgray.com

*Attorneys for Patent Owner, Yangtze
Memory Technologies Co. Ltd.*

CERTIFICATE OF WORD COUNT

The undersigned certifies that the foregoing PATENT OWNER'S SUR-
REPLY complies with the type-volume limitation in 37 C.F.R. § 42.24(c).
According to the word-processing system's word count, the brief contains 5,596
words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(c).

Dated: August 6, 2025

Respectfully submitted,

By: /James L Davis, Jr./
James L. Davis, Jr.
Reg. No. 57,325
ROPES & GRAY LLP

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing PATENT OWNER'S SUR-REPLY was served in its entirety by filing through the Patent Trial and Appeal Case Tracking System (P-TACTS), as well as providing a courtesy copy via e-mail to the following attorneys of record for Petitioner listed below:

Lead Counsel	Back-up Counsel
Jeremy Jason Lang Registration No. 73,604 (jlang@orrick.com) Postal & Hand-Delivery Address: Orrick, Herrington & Sutcliffe LLP 51 West 52nd Street New York, NY 10019 T: 212-506-5000; F: 212-506-5151 P52PTABDocket@orrick.com PTABDocketJL2@orrick.com PTABDocketJ3B3@orrick.com T61PTABDocket@orrick.com PTABDocketP2S7@orrick.com micron-ymtc_ohs@orrick.com	K. Patrick Herman Registration No. 75,018 (pherman@orrick.com) Jared Bobrow <i>Pro Hac Vice</i> (jbobrow@orrick.com) Travis Jensen Registration No. 60,087 (tjensen@orrick.com) Parth Sagdeo Registration No. 71,275 (psagdeo@orrick.com)
<i>Counsel for Petitioner Micron Technology, Inc.</i>	

Dated: August 6, 2025

By: /Jonathan Bradford/
Name: Jonathan Bradford

ROPES & GRAY LLP