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 No.: IPR2024-00911
U.S. Patent No. 10,937,806
Issue Date: March 2, 2021

Title: THROUGH ARRAY CONTACT (TAC) FOR THREE-DIMENSIONAL MEMORY DEVICES

PETITIONER'S PRELIMINARY REPLY

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LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,937,806 B2 to Tao et al.
1002	File History of U.S. Patent No. 10,937,806 B2 to Tao et al.
1003	Declaration of Jack C. Lee
1004	*Curriculum Vitae* of Dr. Jack C. Lee
1005	U.S. Patent Publ. No. 2017/0179026 A1 to Toyama et al. ("Toyama").
1006	Minute Order, Dkt. No. 42, dated February 22, 2024 in *Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC*, Case No. 3:23-cv-05792-RFL
1007	Combined Civil and Criminal Federal Court Management Statistics (December 31, 2023), available at https://www.uscourts.gov/sites/default/files/data_tables/fcms_na_distcomparison1231.2023.pdf
1008	Docket from *Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC*, Case No. 3:23-cv-05792-RFL
1009	CN109075169A Office Action, dated November 14, 2019
1010	Certified Translation of CN109075169A Office Action, dated November 14, 2019
1011	CN109075169A Reexamination Decision, dated November 25, 2021
1012	Certified Translation of CN109075169A Reexamination Decision, dated November 25, 2021
1013	Micheloni, "3D Flash Memories" (2016)
1014	Aritome, "NAND Flash Memory Technologies" (2016)

Exhibit	Description
1015	U.S. Patent Publ. No. 2018/0108671 A1 to Yu et al.
1016	U.S. Patent Publ. No. 2019/0229125 A1 to Zhou et al.
1017	U.S. Patent No. 10,354,980 B1 to Mushiga et al.
1018	U.S. Patent No. 9,293,348 B2 to Lai et al.
1019	U.S. Patent No. 8,598,643 B2 to Kawasaki et al.
1020	U.S. Patent No. 8,697,519 B2 to Jee et al.
1021	Excerpts from "Merriam-Webster's Collegiate Dictionary," Eleventh Edition (2014)
1022	Print out of https://www.studycountry.com/wiki/what-is-a-piece-of-land-surrounded-by-water-on-2-sides
1023	Micheloni et al., "Inside Solid State Drives (SSDs)" (1st Ed. 2013)
1024	U.S. Patent No. 10,043,558 to Shah et al.
1025	Micheloni et al., "Inside NAND Flash Memories" (2010)
1026	Lau, "Ball Grid Array Technology" (1995)
1027	U.S. Patent No. 10,103,169 to Ge et al.
1028	U.S. Patent No. 9,935,050 to Dunga et al.
1029	Chang, "ULSI Technology" (1996)
1030	Chen, "CMS Devices & Technology for VLSI" (1988)
1031	Jaeger, "Volume V: Introduction to Microelectronic Fabrication" (1988)
1032	U.S. Patent No. 5,776,808 to Muller et al.
1033	U.S. Patent No. 9,236,393 to Cernea

Exhibit	Description
1034	Capogreco et al., "Integration and electrical evaluation of epitaxially grown Si and SiGe channels for vertical NAND Memory applications," 2015 IEEE International Memory Workshop, 2015
1035	Kim et al., "Three-Dimensional NAND Flash Architecture Design Based on Single-Crystalline Stacked Array," IEEE Transactions on Electron Devices, Vol. 59, No. 1, Jan. 2012, pp. 35-45
1036	Wagner, "The Use of HBr in Polysilicon Etching," Gases & Instrumentation International, Vol. 7, Issue 4, July/August (2013) printed from https://www.pall.com/content/dam/pall/microelectronics/literature-library/non-gated/HBr_Polysilicon.pdf
1037	Baker, "CMOS Circuit Design, Layout, and Simulation," Third Ed. (2010)
1038	Complaint for Patent Infringement, Dkt. No. 1, filed Nov. 9, 2023, in *Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC*, Case No. 3:23-cv-05792-RFL
1039	First Amended Complaint for Patent Infringement, Dkt. No. 29, filed Feb. 2, 2024, in *Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC*, Case No. 3:23-cv-05792-RFL
1040	Plaintiff and Counterclaim Defendant Yangtze Memory Technologies Company, Ltd.'s Disclosure of Asserted Claims and Infringement Contentions, dated May 6, 2024, in *Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC*, Case No. 3:23-cv-05792-RFL
1041	Declaration of Jared Bobrow in Support of Petitioner's Motion for Admission *Pro Hac Vice*
1042	Email from Patent Trial and Appeal Board authorizing filing of a preliminary reply, dated October 24, 2024

I. INTRODUCTION

Petitioner Micron Technology, Inc. ("Micron") respectfully submits this Preliminary Reply. *See* Ex. 1042. At issue is whether dependent claim 10 refers to local contacts on the channel structures (Micron's position) or refers to local contacts on the channel structures ***and*** the slit structures (PO's position). Both the claim language and each embodiment in the specification support Micron's construction. PO's construction, which reads out every embodiment of the specification, cannot be correct.

II. PATENT OWNER'S IMPLICIT CONSTRUCTION READS OUT EVERY EMBODIMENT OF THE '806 PATENT AND IGNORES THE CLAIM LANGUAGE

Before demonstrating that PO's implicit construction fails as a matter of law, this Preliminary Reply places the relevant claim terms in context. As shown below, the '806 Patent discloses local contacts (236) for channel structures (216) and local contacts (238) for the slit structures (226). There are etch stops (224) only between the channel local contacts and the channel structures.

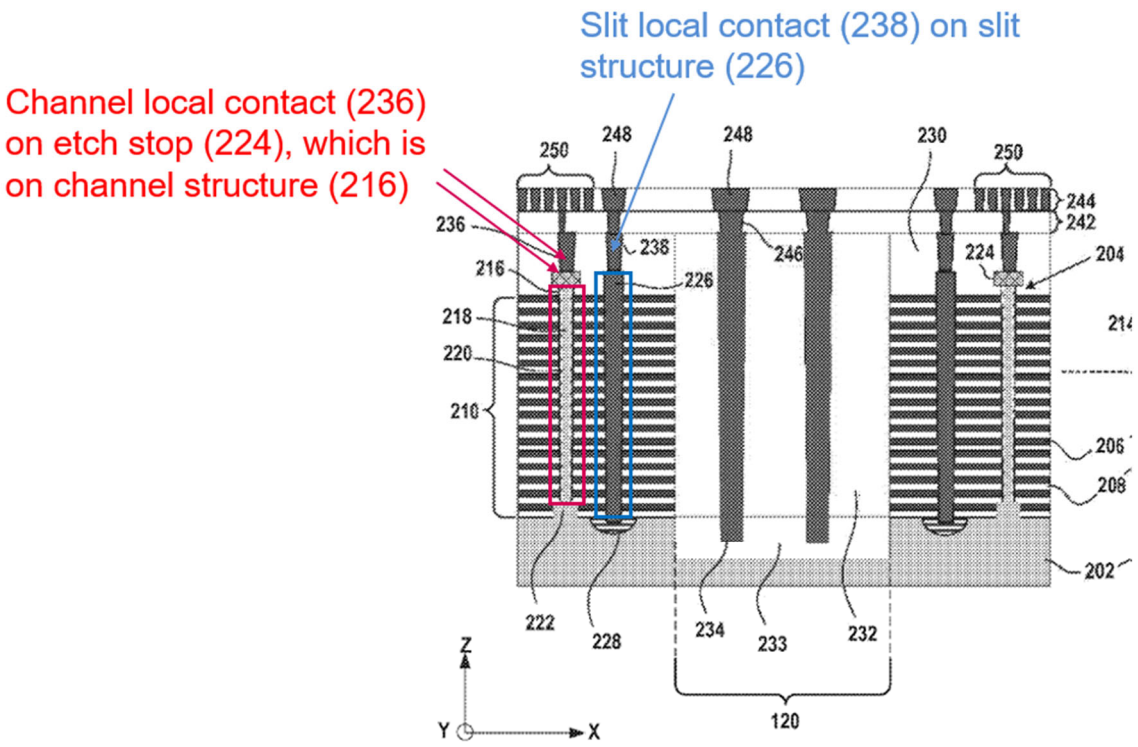

FIG. 2

Ex. 1001, Fig. 2 (partial), 11:27-30 ("As shown in FIG. 2, local contacts can include NAND string contacts 236, slit structure contacts 238, and WL contacts 240."), 9:36-39 ("In some embodiments, each NAND string 204 includes an epitaxial layer 222 and an etch stop plug 224 at the respective bottom and top of NAND string 204, as shown in FIG. 2.").

Notably, the '806 Patent never discloses an etch stop on the slit structures. In fact, the Patent distinguishes the channels ***that have*** etch stops and slit structures ***that do not***. Ex. 1001, 1:60-65 (local contacts connecting to channel etch stops and connecting directly to slits), 11:40-43 (same), 2:38-56 (only channels have etch stops), 9:36-53 (same), 15:61-16:15 (same), 17:53-62 (same), 20:53-59 (same). This

is unsurprising, because the '806 Patent defines the function of the "etch stop plug" as protecting the channel and serving as the channel's drain: "As the name suggests, etch stop plug 224 is an etch stop layer that prevents etching of dielectrics in channel structure 216, such as SiO2 and SiN, during subsequent etch operations. In some embodiments, etch stop plug 224 acts as the drain of NAND string 204." *Id.*, 9:40-53.

Independent claim 8 recites: "local contacts disposed on the first and second channel structures and the slit structures." Thus, claim 8 requires two subclasses of local contacts: (1) channel structure local contacts (236 in the above figure), and (2) slit structure local contacts (238 in the above figure). Next, dependent claim 10 recites: "[t]he 3D memory device of claim 8, further comprising . . . an ***etch stop plug*** interposed ***between each local contact*** of the local contacts and ***each channel structure of the first and second channel structures***." Given the above description of the specification and the natural reading of the claim language, "each local contact" in claim 10 refers to the channel structure local contacts, not the slit structure local contacts.

PO, however, advances an implicit construction that claim 10 requires etch stop plugs on the slit structures. Specifically, PO faults the Petition because Toyama's etch stop plugs (63) are not between the slit local structures (91) and slits (76). POPR (Paper 9), 37-40. In effect, this construes dependent claim 10 as: "an

etch stop plug interposed between each local contact of the local contacts and each channel structure of the first and second channel structures ***[and each of the slit structures]***." This argument fails on multiple counts.

First, not a single embodiment of the '806 Patent includes etch stops on the slit structures (*see* above). Thus, PO's construction, which *requires* etch stops on the slit structures, cannot be correct. *On–Line Techs., Inc. v. Bodenseewerk Perkin–Elmer GmbH*, 386 F.3d 1133, 1138 (Fed. Cir. 2004) ("a claim interpretation that excludes a preferred embodiment from the scope of the claim is rarely, if ever, correct").

Second, the plain claim language undermines PO's interpretation. Independent claim 8 requires two sets of local contacts: (1) local contacts ***on channel structures,*** and (2) local contacts ***on slit structures***. Dependent claim 10 then recites that there is "an etch stop plug interposed ***between*** each local contact of the local contacts and each channel structure." Plainly, dependent claim 10 refers to the local contacts on the channel structures, not those on the slit structures, because claim 10 is referring to an area for the etch stop that is above the channel structure and beneath the local contact (by its use of "between"). In other words, the etch stop plugs sit "between" (1) local contacts and (2) channel structures. Only the local contacts for the channel structures are above the channel structures. The specification supports this reading of the claims because the '806 Patent only describes etch stop plugs as

being "between" channel local contacts and channel structures. Ex. 1001, 1:60-65 (local contacts connecting to channel etch stops and connecting directly to slits), 11:40-43 (same), 2:38-56 (only channels have etch stops), 9:36-53 (same), 15:61-16:15 (same), 17:53-62 (same), 20:53-59 (same).

At bottom, PO is attempting to read portions of claims 8 and 10 in a vacuum, ignoring the specification and surrounding claim language. This approach, however, runs counter to most basic premise of claim construction: "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

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/Jeremy Jason Lang/

Jeremy Jason Lang
Lead Counsel for Petitioner
Reg. No. 73,064
1000 Marsh Road
Menlo Park, CA 94025-1015
T: (650) 614-7400
F: (650) 614-7401
Email: PTABDocketJJL2@orrick.com

Attorneys for Petitioner Micron Technology, Inc.

CERTIFICATE OF SERVICE

The undersigned hereby confirms that the foregoing paper was caused to be served on October 31, 2024 via electronic mail, upon the following attorneys of record for the Patent Owner:

James L. Davis (James.L.Davis@ropesgray.com)
Andrew T. Radsch (andrew.radsch@ropesgray.com)
Christopher M. Bonny (Christopher.Bonny@ropesgray.com)
Allen S. Cross (allen.cross@ropesgray.com)
YMTC-Micron-IPRs-Ropes-Service@ropesgray.com

/*Karen Johnson*/
Karen Johnson