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Filed By: David L. Cavanaugh, Reg. No. 36,476
Dominic E. Massa, Reg. No. 44,905
Michael H. Smith, Reg. No. 71,190
1875 Pennsylvania Ave. NW
Washington, DC 20006
Tel: (202) 663-6000
Email: David.Cavanaugh@wilmerhale.com
Dominic.Massa@wilmerhale.com
MichaelH.Smith@wilmerhale.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY LTD.
Petitioner

v.

GODO KAISHA IP BRIDGE 1
Patent Owner.

Case IPR2017-01841¹

**PETITIONER'S RESPONSE TO PATENT OWNER'S OBSERVATIONS
ON CROSS-EXAMINATION**

¹ Case IPR2017-01842 has been consolidated with this proceeding.

Petitioner submits this response to Patent Owner's Observations on Cross Examination. Patent Owner ("PO") presents seventeen observations on Dr. Shanfield's testimony. While Petitioner believes that the testimony will be appropriately viewed and weighed by the Board, the specific observations presented by Patent Owner misstate or omit the full testimony of Dr. Shanfield, and are often irrelevant, as specified below.

Response to Observation #1

PO contends Ex. 2026 at 88:10-89:7, 92:9-14, and 95:4-96:18 shows that the parties have the same construction for the claim term "an active region made of a semiconductor substrate." PO's observation ignores Dr. Shanfield emphasis that he *disagrees* with PO's *interpretation* because the term does *not* require a one-to-one correspondence between an active region and a transistor. Ex. 2026, 94:15-95:3 ("I don't agree with the patent owner's interpretation of that phrase... I don't agree with the patent owner's interpretation, which, as I explain in the following sentences, limits the active region to a single transistor, for example."). By contrast, after reviewing Dr. Shanfield's Reply Declaration, Dr. Glew testified he had no opinion on this claim term. Ex. 1029, 46:1-47:6 ("Q. Sitting here today, you don't have an opinion on whether the phrase 'an active region made of a semiconductor substrate['] requires a one-to-one correspondence with a MISFET,[] correct? A. I haven't been asked to analyze that with respect to that question. So I

haven't formed an opinion on that.”). Dr. Shanfield's undisputed testimony is that the active region does not require a one-to-one correspondence. Ex. 1027, ¶¶7-20; Ex. 1002, ¶¶66-67; *see also* DI, 8-9.

Response to Observation #2

PO contends Ex. 2026 at 84:18-86:12 and 95:4-96:18 shows that Dr. Glew's statement that semiconductor devices have been made without isolation regions is not misleading. As noted for Observation #1, PO ignores Dr. Shanfield emphasis that he *disagrees* with PO's *interpretation* of the term “an active region made of a semiconductor substrate.” *Id.*, 94:15-95:3. Dr. Shanfield also confirmed that “you can have an active region without an isolation region,” *id.*, 84:18-85:1, and explained that whether a transistor can theoretically exist without isolation is “not particularly relevant to the '501 patent because in 2003, all transistors -- virtually all transistors included isolation regions.” *Id.*, 87:12-87:18. Dr. Glew agrees that using spacing rather than isolation “would not be a typical solution.” Ex. 1024, 111:18-25. Moreover, as noted for Observation #1, Dr. Glew has testified he has no opinion on this claim term, and thus Dr. Shanfield's testimony is undisputed. Ex. 1029, 46:1-47:6; Ex. 1027, ¶¶7-20; Ex. 1002, ¶¶66-67.

Response to Observation #3

PO contends Ex. 2026 at 84:18-86:12 and 95:4-96:18 supports unspecified testimony from Dr. Glew that transistors without isolation do not have an active

region. To the contrary, Dr. Shanfield's testimony confirms that all functional transistors include an active region and that virtually all transistors at the time of the alleged invention used isolation. *Id.*, 84:18-85:1, 87:12-87:18; Ex. 1027, ¶16; Ex. 1002, ¶¶37-44. Dr. Shanfield's testimony also confirms Dr. Glew has not identified a single reference that describes a transistor as not having an active region or that says a lack isolation means there is no active region. Ex. 1027, ¶¶16-19; *see also* Sur-sur-reply, 3. Moreover, Dr. Glew has testified he had no opinion on this claim term. Ex. 1029, 46:1-47:6. Dr. Shanfield's consistent testimony confirms both that a POSITA would have understood the transistors in Igarashi's Fig. 12 embodiment include an active region because Igarashi expressly discloses performing "isolation" to form an "active element region," and that this limitation would have been obvious, because virtually all transistors at the time of the '501 patent included these features. Ex. 1027, ¶¶7-20; Ex. 1002, ¶¶61-81.

Response to Observation #4

PO contends that Ex. 2026 at 84:18-86:12 and 95:4-96:18 allegedly establishes that the absence of an isolation region signifies the absence of an active region. Patent Owner is incorrect. Dr. Shanfield confirms that all functional transistors, even rare examples without isolation, still include active regions. *Id.*, 84:18-85:1, Ex. 1027, ¶16. Dr. Shanfield adds that isolation regions are typically used to define an active region, but it is not a requirement. Ex. 2026, 88:2-9 ("Q.

So in your opinion, isolation regions are not required to define an active region in a transistor; is that right? A. It is not required. It's not a requirement. But as far as what's relevant, it's useful to understand how a transistor is really built, or groups or transistors are really build, and not some very exceptional situation.”). PO's observation is also irrelevant because virtually all transistors at time of invention used isolation. *Id.*, 87:12-87:18. Dr. Glew agrees using spacing rather than isolation “would not be a typical solution.” Ex. 1024, 111:18-25. Moreover, Dr. Glew has testified he had no opinion on the meaning of this claim term. Ex. 1029, 46:1-47:6. Thus, Dr. Shanfield's testimony is undisputed.

Response to Observation #5

PO contends Ex. 2026 at 97:10-99:15 and 105:14-106:18 shows that Dr. Shanfield admitted that the formation region Rn of the transistor does not include the isolation region and argues this is contrary to the patent. This observation mischaracterizes Dr. Shanfield's plain testimony in the cited section. *Id.*, 98:12-24 (“Q. So the formation region is a part of the substrate in which the transistor is formed; is that accurate? A. It looks like they're including some of the isolation region in region Rn. *That's not where the transistor is being formed.* Q. So the formation region includes portions of the -- at least portions of the isolation region? A. *It's hard to tell.* This is a schematic diagram, so I don't know whether -- how literally to take exactly where that bracket extends. Q. But as it's shown in Figure

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