

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.,  
and GLOBALFOUNDRIES U.S. INC.,  
Petitioners,

v.

GODO KAISHA IP BRIDGE 1,  
Patent Owner.

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Case IPR2016-01376<sup>1</sup>

Patent 6,197,696 B1

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Before JUSTIN T. ARBES, MICHAEL J. FITZPATRICK, and  
JENNIFER MEYER CHAGNON, *Administrative Patent Judges*.

**PETITIONER'S RESPONSES TO PATENT OWNER'S MOTION FOR  
OBSERVATIONS REGARDING THE CROSS-EXAMINATION OF  
BRUCE W. SMITH, PH.D.**

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<sup>1</sup> GlobalFoundries U.S. Inc.'s motion for joinder in IPR2017-00921 was granted.

Petitioner provides the following responses to Patent Owner's observations on the cross-examination testimony of Bruce W. Smith, Ph.D. (Paper 34).

**Response to Observation No. 1:**

Patent Owner's Observation No. 1 is improper as it contains arguments the Board's rules do not permit. *See* Office Trial Practice Guide, 77 Fed. Reg. 48,767-68 (Aug. 14, 2012). Under the guise of a statement of relevance, Patent Owner argues Petitioner and Dr. Smith are attempting "to rewrite the Japanese Application's express disclosures." Paper 34, at 1-2. That explanation has nothing to do with relevance. Dr. Smith's testimony referenced here and in Observation No. 1 is relevant, not for the reasons Patent Owner advances, but because that testimony is consistent with the statement in the Japanese '371 application that "the second silicon dioxide film 355 and the organic film 354 are sequentially dry-etched using the second resist pattern 359 as a mask." EX1014, at ¶0093; *see also* EX1049, at ¶¶29-36. Observation No. 1 also references incomplete testimony. Dr. Smith was asked, "So it's your testimony that the second resist pattern 359 is removed during etching of the organic film 354?" EX2040, at 15:4-6. Dr. Smith responded,

Well, it doesn't say it's fully removed. It's a statement that says that 359 is removed during that step. That layer 359 would need to remain at least partially, some of that material, until all of 354 is etched through, becomes

354A. And then as the Figure 16B shows, to remove resist pattern 359A [sic], one would continue the etch process through the organic film 354. Which would then completely remove 359.

*Id.* at 15:7–15.

**Response to Observation No. 2:**

As Observation No. 2 notes, Dr. Smith was asked, “Is film 354A being used as a mask in etching film 353?” Dr. Smith responded, “It says that in the specification, but 354A is not -- would not be part of the mask that would be etching 353.” EX2040, at 18:3–7. Dr. Smith was also asked, “Does layer 354 become a mask during this process, after layer 355 is completely removed?” Dr. Smith responded (after a form objection from Mr. Davis) that “354, once 355A is removed -- and 354 being the organic film, or an organic film -- would then be masking 353.” EX2040, at 59:20–60:3. This testimony is relevant because it supports Petitioner’s argument that layer 354A does not act as a mask until it is exposed (Paper 26, at 13–14), and supports the Board’s construction finding that “a layer positioned between an overlying layer and the layer being etched” can act as a mask “in an instance where the overlying layer is also removed during the etching, and thus, the between layer acts to shield the layer being etched during etching.” Paper 11, at 18, n.7. It does not contradict Petitioner’s arguments or the Board’s

construction, as Patent Owner incorrectly suggests. Dr. Smith's testimony also highlights the internally inconsistent usage of the term "mask" in the specification of the '696 patent, as Dr. Smith explained in his declaration. EX1049, at ¶¶20–28. Contrary to Patent Owner's assertion (Paper 34, at 2–3), Dr. Smith's testimony cited in Observation No. 2 (EX2040, at 16:1–17:20) is irrelevant to the process for transitioning between Figures 16(c) and 16(d). Dr. Smith's testimony relates to transitioning between Figures 16(b) and 16(c), not between Figures 16(c) and 16(d). EX2040, at 16:16–18:7.

**Response to Observation No. 3:**

Patent Owner's Observation No. 1 is improper as it contains arguments the Board's rules do not permit, and because it extends nearly two pages, not a short paragraph as permitted under the rules. *See* Office Trial Practice Guide, 77 Fed. Reg. 48,767-68 (Aug. 14, 2012). Patent Owner argues that Dr. Smith's testimony at EX2040, at 18:13–20:20, is relevant to "whether a buried layer that has a lateral edge 'in line and flush with [a lateral] edge of' an overlying layer can act as a mask." Paper 34, at 3. Dr. Smith's testimony is not relevant to this issue. Nowhere in this passage was Dr. Smith asked about, nor did he testify about buried layers, lateral edges, or in line and flush edges with an overlying layer. Dr. Smith's testimony in the cited passage relates to the internally inconsistent treatment of masks by the specification of the '696 patent, as Dr. Smith has extensively opined.

EX1049, at ¶¶20–28. Contrary to Patent Owner’s arguments, Dr. Smith’s testimony in this passage about layer 505A from Figs. 23(b) and 23(c) of the ’696 patent are irrelevant to layers 355 and 358 from the Japanese ’371 application. Patent Owner did not ask Dr. Smith about those layers in the cited excerpt. Figures 23(b) and 23(c) do not even appear in the Japanese ’371 application. Dr. Smith’s testimony in Observation No. 3 is consistent with, and supports, the Board’s construction finding that “a layer positioned between an overlying layer and the layer being etched” can act as a mask “where the overlying layer is also removed during the etching, and thus, the between layer acts to shield the layer being etched during etching” (Paper 11, at 18, n.7), because Dr. Smith explained layer 505A acts as a mask until layer 504A is exposed.

**Response to Observation No. 4:**

Patent Owner’s Observation No. 1 is improper as it contains arguments the Board’s rules do not permit. *See* Office Trial Practice Guide, 77 Fed. Reg. 48,767-68 (Aug. 14, 2012). Contrary to Patent Owner’s arguments, Dr. Smith’s testimony at EX2040, at 20:21–22:1, about layer 605A from Figs. 32(a) and 32(b) of the ’696 patent is not relevant to different layers 355 and 358 from the Japanese ’371 application, about which Dr. Smith was not asked in the cited passage. Patent Owner mischaracterizes and misquotes Dr. Smith’s testimony when it writes, “605A will act to mask etching until *the film [603]* is removed.” Paper 34, 5

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