

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FUJITSU SEMICONDUCTOR LIMITED, FUJITSU SEMICONDUCTOR AMERICA, INC., ADVANCED MICRO DEVICES, INC., RENESAS ELECTRONICS CORPORATION, RENESAS ELECTRONICS AMERICA, INC., GLOBALFOUNDRIES U.S., INC., GLOBALFOUNDRIES DRESDEN MODULE ONE LLC & CO. KG, GLOBALFOUNDRIES DRESDEN MODULE TWO LLC & CO. KG, TOSHIBA AMERICA ELECTRONIC COMPONENTS, INC., TOSHIBA AMERICA INC., TOSHIBA AMERICA INFORMATION SYSTEMS, INC., TOSHIBA CORPORATION, and THE GILLETTE COMPANY
Petitioner,

v.

ZOND, LLC,
Patent Owner.

Case IPR2014-00821¹
Patent 6,853,142 B2

Before KEVIN F. TURNER, DEBRA K. STEPHENS, JONI Y. CHANG, SUSAN L.C. MITCHELL, and JENNIFER MEYER CHAGNON,
Administrative Patent Judges.

Opinion for the Board filed by *Administrative Patent Judge Turner.*

Opinion Dissenting-in-Part filed by *Administrative Patent Judge Stephens.*

TURNER, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

¹ Cases IPR2014-00863, IPR2014-01013, and IPR2014-01057 have been joined with the instant *inter partes* review.

I. INTRODUCTION

Taiwan Semiconductor Manufacturing Company, Ltd. and TSMC North America Corporation (collectively, “TSMC”) filed a Petition requesting an *inter partes* review of claims 2, 11, 13, 14, and 16 of U.S. Patent No. 6,853,142 B2 (Ex. 1101, “the ’142 Patent”). Paper 2 (“Pet.”). Patent Owner Zond, LLC (“Zond”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). We instituted the instant trial on October 20, 2014, pursuant to 35 U.S.C. § 314. Paper 9 (“Dec.”).

Subsequent to institution, we granted the revised Motions for Joinder filed by other Petitioners (collectively, “GlobalFoundries”) listed in the Caption above, joining Cases IPR2014-00863, IPR2014-01013, and IPR2014-01057 with the instant trial (Papers 12–14), and also granted a Joint Motion to Terminate with respect to TSMC (Paper 32). Zond filed a Response (Paper 26 (“PO Resp.”)), and GlobalFoundries filed a Reply (Paper 39 (“Reply”)). Oral hearing² was held on June 12, 2015, and a transcript of the hearing was entered into the record. Paper 46 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). This final written decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth below, we determine that GlobalFoundries has shown, by a preponderance of the evidence, that claims 2, 11, 13, 14, and 16 of the ’142 Patent are unpatentable under 35 U.S.C. § 103(a).

² The hearings for this review and the following *inter partes* reviews were consolidated: IPR2014-00807, IPR2014-00808, IPR2014-00818, IPR2014-00819, IPR2014-00827, IPR2014-01098, IPR2014-01099, and IPR2014-01100.

A. Related District Court Proceedings

The parties indicate that the '142 Patent was asserted in numerous proceedings in Massachusetts: 1:13-cv-11570-RGS (*Zond v. Intel*); 1:13-cv-11577-DPW (*Zond v. AMD, Inc.*); 1:13-cv-11581-DJC (*Zond v. Toshiba Am. Elec. Comp. Inc.*); 1:13-cv-11591-RGS (*Zond v. SK Hynix, Inc.*); 1:13-cv-11625-NMG (*Zond v. Renesas Elec. Corp.*); 1:13-cv-11634-WGY (*Zond v. Fujitsu*); and 1:13-cv-11567-DJC (*Zond v. The Gillette Co.*). Pet. 1; Paper 4.

B. The '142 Patent

The '142 Patent relates to methods and apparatus for generating high-density plasma. Ex. 1101, Abs. At the time of the invention, sputtering was a well-known technique for depositing films on semiconductor substrates. *Id.* at 1:16–24. The '142 Patent indicates that prior art magnetron sputtering systems deposit films having low uniformity and poor target utilization (the target material erodes in a non-uniform manner). *Id.* at 3:32–36. To address these problems, the '142 Patent discloses that increasing the power applied between the target and anode can increase the uniformity and density in the plasma. *Id.* at 3:37–44. However, increasing the power also “can increase the probability of generating an electrical breakdown condition leading to an undesirable electrical discharge (an electrical arc) in the chamber 104.” *Id.*

According to the '142 Patent, forming a weakly-ionized plasma substantially eliminates the probability of establishing a breakdown condition in the chamber when high-power pulses are applied between the cathode and anode. *Id.* at 6:21–30. Once the weakly-ionized plasma is formed, high-power pulses are applied between the cathode and anode to

generate a strongly-ionized plasma from the weakly-ionized plasma. *Id.* at 7:23–36. The '142 Patent also discloses that the provision of the feed gas to the plasma allows for homogeneous diffusion of the feed gas in the weakly-ionized plasma and allows for the creation of a highly uniform strongly-ionized plasma. *Id.* at 6:31–35.

C. Illustrative Claims

Of the challenged claims, all are dependent and all depend from one of claim 1 or 10. Claims 10 and 11, reproduced below, are illustrative:

10. A method for generating a strongly-ionized plasma in a chamber, the method comprising:

ionizing a feed gas to form a weakly-ionized plasma that reduces the probability of developing an electrical breakdown condition in the chamber;

supplying power to the weakly-ionized plasma by applying an electrical pulse across the weakly-ionized plasma, *the electrical pulse having a magnitude and a rise-time that is sufficient to increase the density of the weakly-ionized plasma to generate a strongly-ionized plasma*; and

diffusing the strongly-ionized plasma with additional feed gas thereby allowing the strongly-ionized plasma to absorb additional energy from the power supply.

11. The method of claim 10 wherein the applying the electrical pulse across the weakly-ionized plasma excites atoms in the weakly-ionized plasma and *generates secondary electrons*, the secondary electrons ionizing the excited atoms, thereby creating a strongly-ionized plasma.

Ex. 1101, 21:13–31 (emphases added).

D. Prior Art Relied Upon

Based on the instituted grounds, GlobalFoundries relies upon the following prior art references:

Lantsman	US 6,190,512 B1	Feb. 20, 2001	(Ex. 1104)
Wang	US 6,413,382 B1	July 2, 2002	(Ex. 1105)

A. A. Kudryavtsev and V.N. Skrebov, *Ionization Relaxation in a Plasma Produced by a Pulsed Inert-Gas Discharge*, 28(1) SOV. PHYS. TECH. PHYS. 30–35 (Jan. 1983) (Ex. 1106) (hereinafter, “Kudryavtsev”).

D.V. Mozgrin, *High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research*, Thesis at Moscow Engineering Physics Institute (1994) (Ex. 1119) (hereinafter “Mozgrin Thesis”).³

E. Grounds of Unpatentability

We instituted the instant trial based on the following grounds of unpatentability (Dec. 32):

Claims	Basis	References
13 and 14	§ 103(a)	Wang and Lantsman
2 and 11	§ 103(a)	Wang, Lantsman, and Kudryavtsev
16	§ 103(a)	Wang, Lantsman, and Mozgrin Thesis

³ The Mozgrin Thesis is a Russian-language reference. The citations to the Mozgrin Thesis are to the certified English-language translation submitted by GlobalFoundries (Ex. 1118).

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.