

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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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,  
Petitioners,

v.

ZOND, LLC,  
Patent Owner

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IPR2014-00861<sup>1</sup>  
Patent 6,806,652 B2

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**PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE**

**Claims 18-34**

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<sup>1</sup> Cases IPR2014-00864, IPR2014-01003, and IPR2014-01066 have been joined with the instant proceeding.

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II. ZOND’S FLAWED INTERPRETATIONS OF THE PRIOR ART FAIL.....2

    A. Mozgrin explicitly teaches that the ionization fraction of its high-density plasma exceeds the 75% required by the ’652 Patent..... 2

    B. Mozgrin discloses process parameters that “super-ionize” the initial plasma in the same manner as taught by the ’652 Patent..... 3

    C. Patent Owner’s criticism of Dr. Kortshagen’s calculation has no effect on Mozgrin’s disclosure of “super-ionizing” the initial plasma ..... 9

    D. Patent Owner is incorrect in concluding that Mozgrin does not control its sputtering chamber pressure ..... 11

    E. Even if Mozgrin does not control its sputtering chamber pressure, Dr. Kortshagen’s analysis remains correct and demonstrates Mozgrin’s disclosure of “super-ionizing” its initial plasma. .... 13

III. CLAIMS 18-34 ARE UNPATENTABLE OVER THE CITED PRIOR ART .....16

    A. Mozgrin teaches super-ionizing an initial plasma to generate a high-density plasma as claimed by claim 18. .... 16

    B. Iwamura further suggests the combination of Mozgrin and Kudryavtsev with Fahey in order to (1) create an initial plasma, then (2) super-ionize the initial plasma to create a high-density plasma, as claimed by claim 18. .... 18

C. Claims 31-34 are unpatentable over the prior art cited in the instituted grounds. .... 21

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**PETITIONER'S EXHIBIT LIST**

June 26, 2015

<b>Exhibit</b>	<b>Description</b>
1101	U.S. Patent No. 6,806,652 ("652 Patent")
1102	Kortshagen Declaration ("Kortshagen Decl.")
1103	D.V. Mozgrin, <i>et al</i> , <u>High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research</u> , Plasma Physics Reports, Vol. 21, No. 5, 1995
1104	Wang, U.S. Pat. No. 6,413,382 ("Wang")
1105	D. W. Fahey, <i>et al.</i> , <u>High flux beam source of thermal rare-gas metastable atoms</u> , J. Phys. E; Sci. Instrum., Vol. 13, 1980 ("Fahey")
1106	A. A. Kudryavtsev, <i>et al</i> , <u>Ionization relaxation in a plasma produced by a pulsed inert-gas discharge</u> , Sov. Phys. Tech. Phys. 28(1), January 1983
1107	Chistyakov, U.S. Patent No. 7,147,759
1108	Iwamura, U.S. Patent No. 5,753,886
1109	Röepcke et al, <u>Comparison of Optical Emission Spectrometric Measurements of the Concentration and Energy of Species in Low-pressure Microwave and Radiofrequency Plasma Sources</u> , J. Analytical Atomic Spectrometry, September 1993, Vol. 8, pp. 803-808
1110	J. Hopwood and J. Asmussen, <u>Neutral gas temperatures in a multipolar electron cyclotron resonance plasma</u> , Appl. Phys. Let. 58 (22), 2473-2475 (1991)
1111	G. A. Hebner, <u>Spatially resolved, excited state densities and</u>

	<u>neutral and ion temperatures in inductively coupled argon plasmas</u> , J. Appl. Physics, 80 (5), 2624- 2636 (1996)
1112	Clarenbach, <u>Time-dependent gas density and temperature measurements in pulsed helicon discharges in argon</u> , Plasma Sources Sci. Technol. 12 (2003) 345–357
1113	Plasma Etching: An Introduction, by Manos and Flamm, pp. 185-258, Academic Press (1989) (“Manos”)
1114	Campbell, U.S. Pat. No. 5,429,070 (“Campbell” )
1115	Affidavit of Mr. Fitzpatrick in Support of Motion for <i>Pro Hac Vice</i> Admission
1116	Stipulation of Dismissals
1117	CONFIDENTIAL BOARD ONLY – Zond TSMC Settlement Agreement
1118	Affidavit of Brett C Rismiller in Support of Petitioner's Motion for <i>Pro Hac Vice</i> Admission
1119	Supplemental Kortshagen Declaration (“Supp. Kortshagen Decl.”)
1120	Deposition Transcript of Larry D. Hartsough Ph.D. for U.S. Patent No. 6,806,652 dated May 15, 2015 (“652 Hartsough Depo. Tr.”)

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