

UNITED STATES PATENT AND TRADEMARK OFFICE

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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THE GILLETTE COMPANY, 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., and TOSHIBA  
CORPORATION

Petitioners,

v.

Zond, LLC.

Patent Owner of U.S. Patent No. 7,808,184  
Trial No. IPR2014-00799<sup>1</sup>

**PETITIONER'S DEMONSTRATIVE EXHIBITS FOR ORAL ARGUMENT**

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<sup>1</sup> Cases IPR2014-00855, IPR2014-00995 and IPR2014-01042 have been joined with the instant proceeding.

**UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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**'155 Patent:**

The Gillette Company

v. Zond, LLC

*IPR2014-477 and IPR2014-479*

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**'184 Patent:**

The Gillette Company, Fujitsu Semiconductor Limited, and Fujitsu Semiconductor America, Inc., Globalfoundries Dresden Module One LLC & Co. KG, Globalfoundries Dresden LLC & Co. KG, Toshiba America Electronic Components, Inc., Toshiba America Information Systems, Inc., and Toshiba Corporation

v. Zond, LLC.

*IPR2014-799<sup>1</sup> and IPR2014-803<sup>2</sup>*

<sup>1</sup> Cases IPR2014-855, IPR2014-995, and IPR2014-1042 are joined with the 799

<sup>2</sup> Cases IPR2014-858, IPR2014-996, and IPR2014-1061 are joined with the 803

## Overview

- Overview of '184 and '155 Patents
- Grounds Instituted
- Overview of Prior Art
- Summary of Disputes with Respect to Independent Claims
  - Claim Constructions
  - Response to Patent Owner's Arguments
- Summary of Disputes and Responses Related to Dependent

# The '184 and '155 Patents

(10) Patent No.: **US 7,808,184 B2**  
 (45) Date of Patent: **\*Oct. 5, 2010**

(10) Patent No.: **US 8,125,155**  
 (45) Date of Patent: **\*Feb. 28, 2010**

(12) United States Patent (10) Patent No.: **US 7,808,184 B2**

(54) **METHODS AND APPARATUS FOR GENERATING STRONGLY-IONIZED PLASMAS WITH IONIZATIONAL INSTABILITIES**

U.S.C. 154(b) by 882 days.  
 This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/465,574**

(22) Filed: **Aug. 18, 2006**

(65) **Prior Publication Data**  
 US 2006/0279223 A1 Dec. 14, 2006

**Related U.S. Application Data**  
 (63) Continuation of application No. 10/708,281, filed on Feb. 22, 2004, now Pat. No. 7,095,179.

(51) **Int. Cl.**  
**H05B 31/26** (2006.01)

(52) **U.S. Cl.** ..... **315/111.21; 315/111.41; 315/111.71**

(58) **Field of Classification Search** ..... **315/111.21; 111.91; 216.67; 71; 118/723 VE; 118/723 R; 156/345.33; 204/192.12; 192.1; 204/298.08**

See application file for complete search history.

(56) **References Cited**  
 U.S. PATENT DOCUMENTS  
 3,104,345 A 9/1963 Wilcox et al.

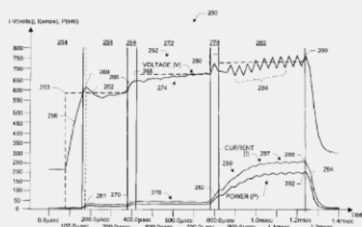
Kozminski, et al. A Novel Pulsed Magnetron Sputter Technique Utilizing Very High Target Power Densities, Surface and Coatings Technology, 1999, pp. 290-293, vol. 122, Elsevier.

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**Primary Examiner**—Douglas W Owens  
**Assistant Examiner**—Tung X Le  
 (74) *Attorney, Agent, or Firm*—Kurt Rauschenbach; Rauschenbach Patent Law Group, LLP

(57) **ABSTRACT**

Methods and apparatus for generating strongly-ionized plasmas are disclosed. A strongly-ionized plasma generator according to one embodiment includes a chamber for confining a feed gas. An anode and a cathode assembly are positioned inside the chamber. A pulsed power supply is electrically connected between the anode and the cathode assembly. The pulsed power supply generates a multi-stage voltage pulse that includes a low-power stage with a first peak voltage having a magnitude and a rise time that is sufficient to generate a weakly-ionized plasma from the feed gas. The multi-stage voltage pulse also includes a transient stage with a second peak voltage having a magnitude and a rise time that is sufficient to shift an electron energy distribution in the weakly-ionized plasma to higher energies that increase an ionization rate which results in a rapid increase in electron density and a formation of a strongly-ionized plasma.

**20 Claims, 16 Drawing Sheets**



(12) United States Patent (10) Patent No.: **US 8,125,155**

(54) **METHODS AND APPARATUS FOR GENERATING STRONGLY-IONIZED PLASMAS WITH IONIZATIONAL INSTABILITIES**

U.S.C. 154(b) by 0 days.  
 This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/070,388**

(22) Filed: **Aug. 27, 2010**

(65) **Prior Publication Data**  
 US 2011/0019332 A1 Jan. 27, 2011

**Related U.S. Application Data**  
 (60) Division of application No. 11/465,574, filed on Aug. 18, 2006, now Pat. No. 7,808,184, which is a continuation of application No. 10/708,281, filed on Feb. 22, 2004, now Pat. No. 7,095,179.

(51) **Int. Cl.**  
**H05B 31/26** (2006.01)

(52) **U.S. Cl.** ..... **315/111.21; 315/111.41; 315/111.71**

(58) **Field of Classification**

**OTHER PUBLICATIONS**

Bages, S. P., et al. Investigation of a High-Magnetron Discharge Initiated in the Low-Pressure Plasma. XVIIIth International Symposium on Discharge in Vacuum, 1996, pp. 1074-1076.

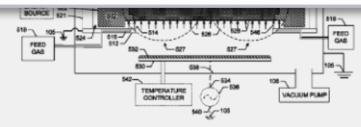
(Continued)  
**Primary Examiner**—Tung X Le  
 (74) *Attorney, Agent, or Firm*—Kurt Rauschenbach Patent Law Group, LLP

(57) **ABSTRACT**

Methods and apparatus for generating strongly-ionized plasmas are disclosed. A strongly-ionized plasma generator according to one embodiment includes a chamber for confining a feed gas. An anode and a cathode assembly are positioned inside the chamber. A pulsed power supply is electrically connected between the anode and the cathode assembly. The pulsed power supply generates a multi-stage voltage pulse that includes a low-power stage with a first

**Related U.S. Application Data**

(60) **Division of application No. 11/465,574, filed on Aug. 18, 2006, now Pat. No. 7,808,184, which is a continuation of application No. 10/708,281, filed on Feb. 22, 2004, now Pat. No. 7,095,179.**



# The '184 and '155 Patents

Anode (124)

Cathode Assembly (116)

Pulsed Power Supply (102)

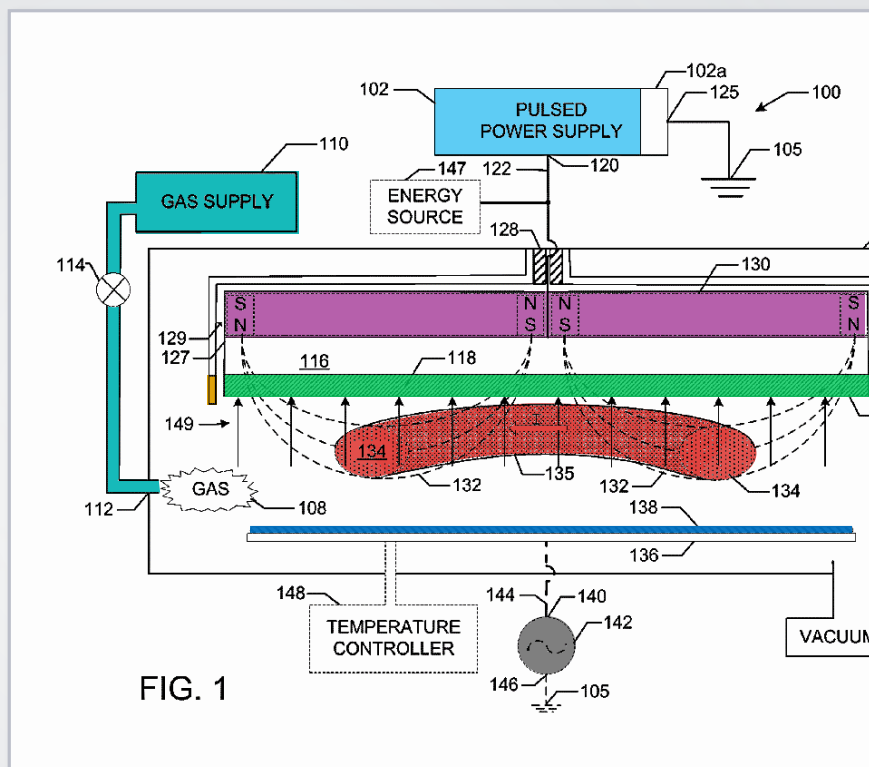
Magnets (130)

Plasma (134)

Feed Gas Source (110)

Substrate (138)

Bias Power Supply (142)



'155 Patent, Fig. 1;

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