

# UNITED STATES PATENT AND TRADEMARK OFFICE

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### The '652 Patent:

GlobalFoundries U.S. Inc., GlobalFoundries Dresden Module One LLC & Co. KG,  
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Advanced Micro Devices, Inc., Renesas Electronics Corporation, Renesas Electronics America, Inc.,  
Toshiba America Electronic Components, Inc., Toshiba America Inc.,  
Toshiba America Information Systems, Inc., and Toshiba Corporation

v.

Zond LLC

*IPR2014-00861*

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GlobalFoundries U.S. Inc., GlobalFoundries Dresden Module One LLC & Co. KG,  
GlobalFoundries Dresden Module Two LLC & Co. KG, and The Gillette Company

v.


Zond LLC

*IPR2014-01088 and IPR2014-01089*

## Overview

- Overview of the '652 Patent
- Grounds Instituted
- Overview of Prior Art
- Summary of Disputes with Respect to Independent Claims
- Summary of Disputes with Respect to Dependent Claims

# The '652 Patent



US00680652B1

(12) **United States Patent**  
Chistyakov

(10) **Patent No.:** US 6,806,652 B1  
(45) **Date of Patent:** \*Oct. 19, 2004

(54) **HIGH-DENSITY PLASMA SOURCE USING EXCITED ATOMS**

(75) **Inventor:** Roman Chistyakov, Andover, MA (US)

(73) **Assignee:** Zond, Inc., Mansfield, MA (US)

(\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) **Appl. No.:** 10/249,844  
(22) **Filed:** May 12, 2003

**Related U.S. Application Data**

(65) **Continuation-in-part of application No. 10/249,595, filed on Apr. 22, 2003.**

(51) **Int. Cl.:** H01J 7/24  
(52) **U.S. Cl.:** 315/111.21; 315/111.41; 156/345.44; 118/723 DC

(58) **Field of Search** 315/111.21, 315/111.41, 315/111.43, 111.71, 111.81, 111.91, 304/708.07, 298.08, 298.121, 298.161, 298.2, 298.21, 298.22, 156/345.33, 345.35, 345.38, 345.39, 345.4, 345.41, 345.42, 345.43, 345.44, 345.46; 118/723 ME, 723 DC, 723 I, 723 IR

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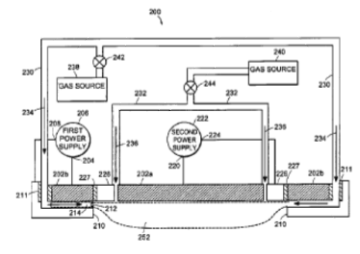
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**Primary Examiner**—Don Wong  
**Assistant Examiner**—Ephrem Alemu  
(74) **Attorney, Agent, or Firm**—Kart Rauschenbach; Rauschenbach Patent Law Group, LLC

(57) **ABSTRACT**

The plasma source includes a cathode assembly. An anode is positioned adjacent to the cathode assembly. An excited atom source generates an initial plasma and excited atoms from a volume of feed gas. The initial plasma and excited atoms are located proximate to the cathode assembly. A power supply generates an electric field between the cathode assembly and the anode. The electric field super-ionizes the initial plasma so as to generate a high-density plasma.

**35 Claims, 19 Drawing Sheets**



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(10) **Patent No.:** US 6,806,652 B1  
(45) **Date of Patent:** \*Oct. 19, 2004

(54) **HIGH-DENSITY PLASMA SOURCE USING EXCITED ATOMS**

US Patent 6,806,652 (Ex. 1101)

# Independent Claims

## Claim 1

### Claim 1

#### *“Excited Atom Source”*

1. A high-density plasma source comprising:
  - a) a cathode assembly;
  - b) an anode that is positioned adjacent to the cathode assembly;
  - c) an excited atom source that generates an initial plasma and excited atoms from a volume of feed gas, the initial plasma and excited atoms being proximate to the cathode assembly; and
  - d) a power supply that generates an electric field between the cathode assembly and the anode, the electric field super-ionizing the initial plasma so as to generate a high-density plasma.

*'652 Patent, Claim 1 (Ex. 1101)*

# Independent Claims

## Claims 18 and 35

### Claim 18

#### *“Transporting the Initial Plasma and Excited Atoms”*

**18.** A method of generating a high-density plasma, the method comprising:

- a) generating an initial plasma and excited atoms from a volume of feed gas;
- b) transporting the initial plasma and excited atoms proximate to a cathode assembly; and
- c) super-ionizing the initial plasma proximate to the cathode assembly, thereby generating a high-density plasma.

*'652 Patent, Claim 18 (Ex. 1101)*

### Claim 35

#### *“Transporting the Initial Plasma and Excited Atoms”*

**35.** A high-density plasma source comprising:

- a) means for generating an initial plasma and excited atoms from a volume of feed gas;
- b) means for transporting the initial plasma and excited atoms proximate to a cathode assembly;
- c) means for super-ionizing the initial plasma proximate to the cathode assembly, thereby generating a high-density plasma.

*'652 Patent, Claim 35 (Ex. 1101)*

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