

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., TSMC  
NORTH AMERICA CORPORATION, FUJITSU SEMICONDUCTOR  
LIMITED, FUJITSU SEMICONDUCTOR AMERICA, INC., THE GILLETTE  
COMPANY, 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,

Petitioner

v.

ZOND, LLC  
Patent Owner

U.S. Patent No. 7,808,184

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*Inter Partes* Review Case No. 2014-00799<sup>1</sup>

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**PATENT OWNER RESPONSE  
UNDER 37 CFR § 42.220**

**Claims 1 – 5; 11 - 15**

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

**TABLE OF CONTENTS**

I. INTRODUCTION..... 1

II. TECHNOLOGY BACKGROUND.....5

    A. The ‘184 patent: Dr. Chistyakov’s Pulse Control Technique. ....5

III. SUMMARY OF PETITIONER’S PROPOSED GROUNDS..... 15

IV. THE BOARD’S COMPARISON OF THE CLAIMS TO THE PRIOR ART  
EFFECTIVELY APPLIES AN ERRONEOUS SCOPE TO THE CLAIMS ..... 15

    A. Construction of “Voltage Pulse Having At Least One of a Controlled  
    Amplitude and a Controlled Rise Time.” ..... 15

V. PETITIONER HAS FAILED TO PROVE BY A PREPONDERANCE OF  
THE EVIDENCE THAT CLAIMS 1 – 20 ARE OBVIOUS. ....25

    A. The Challenge Directed to Claims 1 – 5; 11 - 15. ....25

        1. Neither Wang nor Kudryavtsev Teach the Claimed Control of Voltage  
        Amplitude or Rise Time to Avoid Arc When Rapidly Forming a  
        Strongly Ionized Plasma. ....25

        2. Scope of Cited Art.....26

            i. General Scope of Wang.....26

            ii. General Scope of Kudryavtsev.....33

        3. Differences Between Wang and the Claims .....40

        4. Differences Between Kudryavtsev and the Claims .....46

        5. Incompatibilities Between Kudryavtsev and Wang.....50

        6. Secondary Considerations.....53

        7. Conclusion: Petitioner Has Not Proven that Claims 1 – 16 are  
        Obvious.....54

    B. The Challenge Directed to Dependent Claims 5, 15.....54

VI. CONCLUSION.....60

## I. Introduction

Petitioner's arguments hinge on fanciful misreadings of the prior art by its proffered expert, Mr. Richard DeVito.<sup>2</sup> As will be shown below, neither Wang nor Kudryavtsev teach *controlling the amplitude or rise time of a voltage pulse* in order to increase the "ionization rate so that a rapid increase in electron density and a formation of a strongly-ionized plasma occurs without forming an arc," as required by the claims of the '184 patent. Once the Board recognizes that Mr. DeVito essentially invented some of the alleged "teachings" in Wang and Kudryavtsev to suit the Petitioner's objectives, the Board should agree to confirm the challenged claims.

Neither Wang nor Kudryavtsev teach the claimed voltage control. The '184 patent discloses carefully "controlling" the amplitude and rise time of a voltage pulse. The patent shows that, with proper control of voltage amplitude and rise time, the inventor, Dr. Chistyakov, was able to ignite a plasma *without arcing*, rapidly grow that plasma to a high density, and sustain that density for

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<sup>2</sup> In its Institution Decision, the Board erroneously referred to Mr. DeVito as "Dr. DeVito." IPR2014-00799, Decision to Institute, page 9. However, Mr. DeVito was never awarded a doctorate of any kind. *See* Ex. 1002, De Vito Declaration ¶¶2 - ¶4.

a relatively long duration, again all without arcing.<sup>3</sup> Mr. DeVito and Petitioners erroneously argue that incidental, *uncontrolled* variations in voltage that occur in Wang and Kudryavtsev meet this limitation.

Importantly, Wang's system controls the *power* of its pulses to a constant target level, as opposed to the claimed control of pulse *voltage* in order to avoid arcing during the *transition to a strongly ionized plasma*. Constant power pulses, such as used in Wang, have a voltage and current that will vary *uncontrollably* as the system attempts to control the power (*i.e.*, the product of voltage and current) to a desired level. Since such power supplies are designed to control the *product* of voltage and current to a target level—and not voltage, the power supplies will allow the voltage to reach extremely high values when the current is near zero (*e.g.*, before plasma ignition or at low plasma densities) in an attempt to achieve the target power level.<sup>4</sup> Moreover, despite Mr. DeVito's assertions, Wang's teachings of a "reduction" in arcing upon ignition are inapposite to the '184 patent's requirement of avoiding arcing during the rapid increase in electron density and a formation of the strongly-ionized plasma.

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<sup>3</sup> Ex. 2015, Declaration of Patent Owner's Expert.

<sup>4</sup> Ex. 1005, Wang, col. 5, lines 32 – 33; Ex. 2014, DeVito Deposition, page 212, line 23 – page 215, line 3.

In addition to his misreading of Wang, Mr. DeVito apparently does not fully understand and therefore misreads the very technical and difficult Kudryavtsev reference. In fact, during his deposition Mr. DeVito could not explain the equations discussed by Kudryavtsev and testified that he did not rely on those equations at all.<sup>5</sup> Instead, Mr. DeVito purports to have relied on the experimental results of Kudryavtsev. But as explained by Patent Owner's expert, Dr. Hartsough, the Kudryavtsev describes a flash tube that is designed to apply a high voltage across an inert gas, resulting in a brilliant flash of light for a short duration. Flash tubes apply a voltage greater than the breakdown voltage, which may initiate the flash by an arc. Mr. DeVito did not consider this aspect of Kudryavtsev's system at all (possibly because his background and education is not in the field of plasma physics, but solid state physics, which are fundamentally different).

Finally, Mr. DeVito testified that he understands the Board's construction of the term "strongly ionized plasma" to require a 3 to 4 order of

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<sup>5</sup> Ex. 2014, DeVito Deposition, page 237, line 19 – page 241, line 2; page 307, line 24 – page 309, line 18.

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