

1           IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
2                           BEFORE THE PATENT TRIAL AND APPEAL BOARD

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4           TAIWAN SEMICONDUCTOR  
5           MANUFACTURING COMPANY, LTD.

6           AND TSMC NORTH AMERICA CORP.,

Case Nos.

IPR2014-00781

7                           Petitioners,

IPR2014-00782

IPR2014-01083

8           -vs-

IPR2014-01086

IPR2014-01087

9           ZOND, LLC,

10                           Patent Owner.

11                           \_\_\_\_\_  
12                           VIDEOTAPED DEPOSITION of DR. UWE KORTSHAGEN

13   VOLUME I

14   Minneapolis, Minnesota

15   December 3rd, 2014

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24           Reported by:

Amy L. Larson, RPR

25           Job No. 87857

1 APPEARANCES:  
 2 RADULESCU  
 3 350 Fifth Avenue  
 4 New York, New York 10118  
 5 By: Etai Lahav, Esq.  
 6 Maria Granovsky, Esq.  
 7 For: Zond, LLC  
 8  
 9 GONSALVES LAW FIRM  
 10 2216 Beacon Lane  
 11 Falls Church, Virginia 22043  
 12 By: Gregory Gonsalves, Esq.  
 13 For: Zond, LLC  
 14  
 15 DUANE MORRIS  
 16 100 High Street  
 17 Boston, Massachusetts 02110  
 18 By: Anthony Fitzpatrick, Esq.  
 19 For: Taiwan Semiconductor Manufacturing  
 20 Company Limited and  
 21 TSMC North America  
 22  
 23 HAYNES AND BOONE  
 24 2323 Victory Avenue  
 25 Dallas, Texas 75219  
 By: David McCombs, Esq.  
 By: Gregory Huh, Esq.  
 For: Taiwan Semiconductor Manufacturing  
 Company Limited and  
 TSMC North America  
 ///

1 APPEARANCES: (CONT'D.)  
 2 WHITE & CASE  
 3 701 Thirteenth Street, N.W.  
 4 Washington, D.C. 20005  
 5 By: David Tennant, Esq.  
 6 By: Brett Rismiller, Esq.  
 7 For: Global Foundries  
 8  
 9  
 10  
 11 O'MELVENY & MYERS  
 12 400 South Hope Street  
 13 Los Angeles, California 90071  
 14 By: Vincent Zhou, Esq. (By telephone)  
 15 For: Advanced Micro Devices  
 16  
 17  
 18  
 19 FOLEY & LARDNER  
 20 321 North Clark Street  
 21 Chicago, Illinois 60654  
 22 By: Michael Houston, Esq. (By telephone)  
 23 For: Renesas Electronics Corporation and  
 24 Renesas Electronics America, Inc.  
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 ALSO PRESENT: Dean Hibben, Videographer

1 INDEX:  
 2 EXAMINATION BY: PAGE  
 3 Mr. Lahav.....9  
 4 EXHIBITS MARKED FOR IDENTIFICATION:  
 5 Exhibit 2004.....95  
 6 U.S. Patent No. 6,398,929 B1  
 7 No Bates  
 8 PREVIOUSLY MARKED EXHIBITS:  
 9 Exhibit TSMC 1001  
 10 U.S. Patent No. 6,853,142 B2  
 11 No Bates  
 12 Exhibit INTEL 1002  
 13 Kortshagen Declaration - '759 Patent  
 14 No Bates  
 15 Exhibit TSMC 1003  
 16 High-Current Low-Pressure Quasi-Stationary  
 17 Discharge in a Magnetic Field  
 18 Experimental Research  
 19 No Bates  
 20 Exhibit TSMC 1004  
 21 U.S. Patent No. 6,190,512 B1  
 22 No Bates  
 23 Exhibit TSMC 1201  
 24 U.S. Patent No. 7,147,759 B2  
 25 No Bates  
 26 Exhibit TSMC 1202  
 27 Kortshagen Declaration - '142 Patent  
 28 No Bates  
 29 Exhibit TSMC 1204  
 30 Ionization Relaxation in a plasma produced  
 31 by a pulsed inert-gas discharge  
 32 No Bates  
 33  
 34 Exhibit TSMC 1205  
 35 U.S. Patent 6,413,382 B1  
 36 No Bates

1 INDEX: (CONT'D.)  
 2 PREVIOUSLY MARKED EXHIBITS:  
 3 Exhibit TSMC 1216  
 4 U.S. Patent 6,306,265 B1  
 5 No Bates  
 6 Exhibit TSMC 1221  
 7 U.S. Patent 5,247,531  
 8 No Bates  
 9 Exhibit TSMC 1222  
 10 European Patent Application  
 11 No Bates  
 12 Exhibit TSMC 1302  
 13 Kortshagen Declaration - '759 Patent  
 14 No Bates  
 15 Exhibit  
 16 Paper 13 - No Bates  
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1 THE VIDEOTAPED DEPOSITION OF DR. UWE KORTSHAGEN,  
2 VOLUME I, taken on this 3rd day of December, 2014,  
3 at The Commons Hotel, 615 Washington Avenue, S.E.,  
4 Minneapolis, Minnesota, commencing at  
5 approximately 7:37 a.m.

6  
7 PROCEEDINGS

8  
9 THE VIDEOGRAPHER: This is the  
10 start of tape number 1 in the videotaped  
11 deposition of Dr. Uwe Kortshagen in the  
12 matter of Taiwan Semiconductor Manufacturing  
13 Company, LL -- LTD, et al. Versus Zond, LLC,  
14 in the United States Patent and Trademark  
15 Office before the Patent Trial and Appeal  
16 Board, case numbers IPR 2014-00781,  
17 IPR 2014-00782, IPR 2014-01083,  
18 IPR 2014-01086, and IPR 2014-01087.

19 This deposition is being held at the  
20 Commons Hotel in Minneapolis, Minnesota, on  
21 December 3rd, 2014, at approximately  
22 7:41 a.m.

23 My name is Dean Hibben, I'm the legal  
24 video specialist from TSG Reporting,  
25 Incorporated, headquartered at 747 Third

1 DR. UWE KORTSHAGEN

2 MR. RISMILLER: Brett Rismiller  
3 with White & Case representing Global  
4 Foundries.

5 THE VIDEOGRAPHER: And those on  
6 the phone, please.

7 MR. ZHOU: Yes, this is Xin-Yi  
8 Zhou. It's spelled X-I-N dash Y-I, and the  
9 last name is Z-H-O-U, and I represent  
10 Advanced Micro Devices, Inc.

11 MR. HOUSTON: This is  
12 Michael Houston of Foley & Lardner  
13 representing Renesas Electronics Corporation  
14 and Renesas Electronics America, Inc.,  
15 Renesas being spelled R-E-N-E-S-A-S, for the  
16 court reporter.

17 MR. SILLIMAN: Michael Silliman  
18 here, last name is S-I-L-L-I-M-A-N, from  
19 Baker, Botts, LLP, representing Toshiba.

20 THE VIDEOGRAPHER: And would the  
21 court reporter please swear in the witness.

22 DR. UWE KORTSHAGEN,  
23 a witness in the above-entitled action,  
24 after having been first duly sworn, was  
25 deposed and says as follows:

1 DR. UWE KORTSHAGEN  
2 Avenue, New York, New York. The court  
3 reporter is Amy Larson in association  
4 with TSG Reporting.

5 Will counsel please introduce yourselves.

6 MR. LAHAV: Etai Lahav of  
7 Radulescu, LLP, representing the patent owner  
8 Zond.

9 MS. GRANOVSKY: Maria Granovsky,  
10 Radulescu, LLP, representing Zond.

11 MR. GONSALVES: Greg Gonsalves  
12 representing Zond.

13 MR. FITZPATRICK: Anthony  
14 Fitzpatrick from Duane Morris, LLP,  
15 representing Taiwan Semiconductor  
16 Manufacturing Company Limited and TSMC  
17 North America.

18 MR. TENNANT: David Tennant with  
19 White & Case representing Global Foundries.

20 MR. MCCOMBS: David McCombs with  
21 Haynes & Boone representing TSMC  
22 North America and Taiwan Semiconductor  
23 Limited and Fujitsu.

24 MR. HUH: Gregory Huh with  
25 Haynes & Boone representing TSMC and Fujitsu.

1 DR. UWE KORTSHAGEN

2 MR. FITZPATRICK: Before we begin  
3 the questioning this morning, I did want to  
4 state on the record that objections that I  
5 make or that Mr. Tennant makes will apply to  
6 all petitioners, to avoid having -- us  
7 having to make duplicate objections.

8 MR. LAHAV: And we agree with  
9 that. And if we could actually limit it to  
10 statements from Mr. Fitzpatrick that would be  
11 best, but --

12 MR. FITZPATRICK: Our intention is  
13 to try to do that to the extent possible.

14 MR. LAHAV: Okay. Thank you.

15 EXAMINATION

16 BY MR. LAHAV:

17 Q. Good morning.

18 A. Good morning.

19 Q. Can you please state your full name for the  
20 record.

21 A. My full name is Uwe Richard Kortshagen.

22 Q. And can you spell all of that.

23 A. The first name is spelled U-W-E. The middle  
24 name R-I-C-H-R -- A-R-D, and the last name  
25

1 DR. UWE KORTSHAGEN  
 2 is K-O-R-T-S-H-A-G-E-N.  
 3 Q. Have you ever given a deposition before?  
 4 A. No.  
 5 Q. Okay. So I'm going to go over some of the  
 6 rules of depositions, okay?  
 7 A. Thank you.  
 8 Q. Do you understand that you've just taken an  
 9 oath to testify truthfully?  
 10 A. Yes.  
 11 Q. And you will testify truthfully today?  
 12 A. Yes.  
 13 Q. You understand that I'm going to be asking  
 14 you questions?  
 15 A. Yes.  
 16 Q. And that you have an obligation to answer my  
 17 questions?  
 18 A. Yes.  
 19 Q. And that even if your counsel objects to my  
 20 questions, you still have to answer them; do  
 21 you understand that?  
 22 A. Yes.  
 23 Q. The one exception to that is if you get  
 24 instructed on attorney work product or  
 25 attorney/client privilege; do you understand?

1 DR. UWE KORTSHAGEN  
 2 A. Yes.  
 3 Q. Please allow me to finish my question before  
 4 you answer, okay?  
 5 A. Yes.  
 6 Q. Thank you. If you don't understand a  
 7 question or you would like me to rephrase,  
 8 please ask me to do so, okay?  
 9 A. Yes.  
 10 Q. If I ask a question and you answer it, I'm  
 11 going to assume you understood it. Is that  
 12 fair?  
 13 A. Yes.  
 14 Q. Okay. Please also be careful to give  
 15 audible, verbal answers to my questions, all  
 16 right?  
 17 A. Yes.  
 18 Q. So uh-huhs or nuh-uhs, the court reporter has  
 19 trouble taking those, so it's important to  
 20 give the verbal answers, all right?  
 21 A. Yes.  
 22 Q. Are you taking any medications that might  
 23 impair your ability to testify truthfully  
 24 today?  
 25 A. No.

1 DR. UWE KORTSHAGEN  
 2 Q. Is there any other reason why you can't  
 3 testify truthfully today?  
 4 A. No.  
 5 Q. Okay. Where are you currently employed?  
 6 A. At the University of Minnesota.  
 7 Q. And what is your title?  
 8 A. I'm a professor of mechanical engineering.  
 9 Q. In your CV you reference a diploma degree in  
 10 physics in June of 1988, and it's -- how do  
 11 you pronounce the name of the university?  
 12 A. The University of Bochum.  
 13 Q. Bochum?  
 14 A. Bochum.  
 15 Q. Bochum. And is a diploma degree like a  
 16 bachelor's degree in the United States?  
 17 A. It is probably between a bachelor's and a  
 18 master's degree. It is a five-year degree.  
 19 Q. Okay. Did you -- okay. And then you  
 20 obtained a Ph.D. in January of 1991 from the  
 21 same university?  
 22 A. That is correct, yes.  
 23 Q. Did you prepare a dissertation in connection  
 24 with your Ph.D.?  
 25 A. Yes, I did.

1 DR. UWE KORTSHAGEN  
 2 Q. What was the topic of that dissertation?  
 3 A. The topic was on electron energy distribution  
 4 functions in radio frequency produced  
 5 plasmas.  
 6 Q. Did you study any particular applications?  
 7 A. I studied a particular method of generating  
 8 plasmas based on so-called propagating  
 9 surface waves.  
 10 Q. And did you -- did you study any particular  
 11 commercial application or application of any  
 12 particular endeavor other than the  
 13 generalized -- generation of plasmas?  
 14 A. No.  
 15 Q. Okay. Did that dissertation entail research  
 16 relating to generation of plasmas inside a  
 17 magnetron?  
 18 A. No.  
 19 Q. Did you study in your dissertation generating  
 20 plasmas for purposes of sputtering?  
 21 A. No.  
 22 Q. After your Ph.D., under education your CV  
 23 lists a, quote, habilitation in experimental  
 24 physics?  
 25 A. That is correct.

DR. UWE KORTSHAGEN

- 1 Q. What is a habilitation in experimental  
2 physics?  
3  
4 A. Habilitation is a specific degree in the  
5 German academic system which at that time in  
6 the 1990s was required to become a  
7 university professor.  
8 Q. Does it correlate with post-doc research?  
9 A. Yeah, you may correlate it with -- with an  
10 advanced post doc. It also includes writing  
11 yet another thesis, habilitation, but one is  
12 already in the position to advise Ph.D.  
13 students at that point.  
14 Q. Was there any coursework required --  
15 A. No, there is no --  
16 Q. Go ahead.  
17 A. No, there is no coursework required.  
18 Q. What was the topic of your thesis for your  
19 habilitation?  
20 A. The topic of the thesis was on kinetic theory  
21 and experiments studying electron  
22 distribution functions in a wide range of  
23 plasmas.  
24 Q. In that, quote, "wide range of plasmas," end  
25 quote, did that include plasmas used for

DR. UWE KORTSHAGEN

- 1 When -- when people in the art talk about  
2 chemical vapor deposition, that's something  
3 different than sputtering, correct?  
4  
5 A. Generally, I would say this is correct, yes.  
6 Q. So you said you studied this capacitively?  
7 coupled plasmas that could be used for  
8 sputtering. Did you study them in connection  
9 with their use for sputtering?  
10 A. I studied them with respect to their -- how  
11 should I express it -- with respect to the  
12 properties of electrons within these plasmas,  
13 in particular, the energy distribution  
14 function of electrons.  
15 Q. But you didn't study how to make use of that  
16 energy distribution function with respect to  
17 sputtering, correct?  
18 MR. FITZPATRICK: Objection to the  
19 form of the question.  
20 THE WITNESS: I think the correct  
21 way to answer this is to say that the  
22 fundamental studies of electron distribution  
23 functions that I performed also applied to  
24 situations of sputtering.  
25 BY MR. LAHAV:

DR. UWE KORTSHAGEN

- 1 sputtering?  
2  
3 A. Yes.  
4 Q. Did it include plasmas used for magnetron  
5 sputtering?  
6 A. No.  
7 Q. Can you explain the work you did in  
8 connection with your habilitation related to  
9 plasmas used for sputtering?  
10 A. Among other -- among the different systems  
11 that I studied at that time was a particular  
12 plasma system called capacitively coupled  
13 plasma, and such kinds of plasmas can be used  
14 for the chemical vapor deposition of films,  
15 but they can also be used for sputtering.  
16 Q. And sputtering is not chemical vapor  
17 deposition, correct?  
18 A. I would call it more physical vapor  
19 deposition.  
20 Q. So sputtering is physical vapor deposition  
21 and chemical vapor deposition is some other  
22 process, right?  
23 A. Could you repeat that question, please?  
24 Q. Sure. I'm going to repeat it, I'm going  
25 to change it.

DR. UWE KORTSHAGEN

- 1 Q. Did you apply them?  
2 MR. FITZPATRICK: Objection to the  
3 form of the question.  
4 THE WITNESS: If you're asking me  
5 whether I applied what I learned at the time.  
6 to sputtering, the answer is no.  
7 BY MR. LAHAV:  
8 Q. Did you study how those plasmas might be used  
9 for sputtering?  
10 A. No.  
11 Q. Do you have any industry experience? Have  
12 you ever worked in industry?  
13 A. No.  
14 Q. Have you ever operated a PVD apparatus?  
15 A. No.  
16 Q. So you've never operated a magnetron  
17 sputtering chamber, for example, right?  
18 A. No.  
19 Q. Have you ever designed a magnetron sputtering  
20 chamber?  
21 A. No.  
22 Q. The focus of your research with respect to  
23 plasmas relates to nanoparticles and  
24 nanocrystals, correct?  
25

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