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Page 1
       IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
           BEFORE THE PATENT TRIAL AND APPEAL BOARD
2
     TAIWAN SEMICONDUCTOR
     MANUFACTURING COMPANY, LTD.
    AND TSMC NORTH AMERICA CORP., Case Nos.
                                      IPR2014-00781
5
                     Petitioners, IPR2014-00782
                                       IPR2014-01083
б
                                       IPR2014-01086
     -vs-
                                       IPR2014-01087
7
     ZOND, LLC,
8
                     Patent Owner.
9
10
11
           VIDEOTAPED DEPOSITION of DR. UWE KORTSHAGEN
12
                             VOLUME I
13
                      Minneapolis, Minnesota
14
                        December 3rd, 2014
15
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19
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22
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24
    Reported by:
    Amy L. Larson, RPR
25
     Job No. 87857
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		Dage (,		Daga 2
		Page 2	4		Page 3
1 2	APPEARANCES: RADULESCU		1 2	APPEARANCES: (CONT'D.) WHITE & CASE	
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l _	For: Zond, LLC			O'MELVENY & MYERS	
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20				For: Toshiba	
21 22			22		
23			24		
24				ALSO PRESENT: Dean Hibben, Videographer	
25	///		25		
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1	INDEX:		1	INDEX: (CONT'D.)	
2	EXAMINATION BY: PAGE		2	PREVIOUSLY MARKED EXHIBITS:	
3 4	Mr. Lahav9 EXHIBITS MARKED FOR IDENTIFICATION:		3	Exhibit TSMC 1216	
5	Exhibit 200495			U.S. Patent 6,306,265 B1	
	U.S. Patent No. 6,398,929 B1		4	No Bates	
6	No Bates		5	Exhibit TSMC 1221	
7 8	PREVIOUSLY MARKED EXHIBITS: Exhibit TSMC 1001			U.S. Patent 5,247,531	
	U.S. Patent No. 6,853,142 B2		6	No Bates	
9	No Bates		7	Exhibit TSMC 1222	
10	Exhibit INTEL 1002			European Patent Application	
11	Kortshagen Declaration - '759 Patent No Bates		8	No Bates	
12	Exhibit TSMC 1003		9	Exhibit TSMC 1302	
	High-Current Low-Pressure Quasi-Stationary			Kortshagen Declaration - '759 Patent	
13	Discharge in a Magnetic Field		10	No Bates	
14	Experimental Research No Bates		11	Exhibit	
15	Exhibit TSMC 1004			Paper 13 - No Bates	
	U.S. Patent No. 6,190,512 B1		12		
16	No Bates		13		
17	Exhibit TSMC 1201 U.S. Patent No. 7,147,759 B2		14		
18	No Bates		15		
19	Exhibit TSMC 1202		16		
20	Kortshagen Declaration - '142 Patent		17		
20	No Bates Exhibit TSMC 1204		18		
21	EMBUR 15MC 1404		19		
21					
21	Ionization Relaxation in a plasma produced by a pulsed inert-gas discharge		20		
22	Ionization Relaxation in a plasma produced		21		
	Ionization Relaxation in a plasma produced by a pulsed inert-gas discharge No Bates		21 22		
22	Ionization Relaxation in a plasma produced by a pulsed inert-gas discharge No Bates Exhibit TSMC 1205		21 22 23		
22	Ionization Relaxation in a plasma produced by a pulsed inert-gas discharge No Bates		21 22		

	Page 6		Page 7
1	THE VIDEOTAPED DEPOSITION OF DR. UWE KORTSHAGEN,	$\begin{vmatrix} 1 \end{vmatrix}$	DR. UWE KORTSHAGEN
2	VOLUME I, taken on this 3rd day of December, 2014,	2	Avenue, New York, New York. The court
3	at The Commons Hotel, 615 Washington Avenue, S.E.,	3	reporter is Amy Larson in association
4	Minneapolis, Minnesota, commencing at	4	with TSG Reporting.
5	approximately 7:37 a.m.	5	Will counsel please introduce yourselves.
6	TP	6	MR. LAHAV: Etai Lahav of
7	PROCEEDINGS	7	Radulescu, LLP, representing the patent owner
8	1110022211100	8	Zond.
9	THE VIDEOGRAPHER: This is the	9	
10	start of tape number 1 in the videotaped	10	MS. GRANOVSKY: Maria Granovsky, Radulescu, LLP, representing Zond.
11	deposition of Dr. Uwe Kortshagen in the	11	MR. GONSALVES: Greg Gonsalves
12	matter of Taiwan Semiconductor Manufacturing	12	
13	Company, LL LTD, et al. Versus Zond, LLC,	13	representing Zond.
14	in the United States Patent and Trademark		MR. FITZPATRICK: Anthony
15		14	Fitzpatrick from Duane Morris, LLP,
16	Office before the Patent Trial and Appeal	15	representing Taiwan Semiconductor
17	Board, case numbers IPR 2014-00781,	16	Manufacturing Company Limited and TSMC
	IPR 2014-01082, IPR 2014-01083,	17	North America.
18	IPR 2014-01086, and IPR 2014-01087.	18	MR. TENNANT: David Tennant with
19	This deposition is being held at the	19	White & Case representing Global Foundries.
20	Commons Hotel in Minneapolis, Minnesota, on	20	MR. MCCOMBS: David McCombs with
21	December 3rd, 2014, at approximately	21	Haynes & Boone representing TSMC
22	7:41 a.m.	22	North America and Taiwan Semiconductor
23	My name is Dean Hibben, I'm the legal	23	Limited and Fujitsu.
24	video specialist from TSG Reporting,	24	MR. HUH: Gregory Huh with
25	Incorporated, headquartered at 747 Third	25	Haynes & Boone representing TSMC and Fujitsu.
	Page 8		Page 9
1	DR. UWE KORTSHAGEN	1	DR. UWE KORTSHAGEN
2	MR. RISMILLER: Brett Rismiller	2	MR. FITZPATRICK: Before we begin
3	with White & Case representing Global	3	the questioning this morning, I did want to
4	Foundries.	4	state on the record that objections that I
5	THE VIDEOGRAPHER: And those on	5	make or that Mr. Tennant makes will apply to
6	the phone, please.	6	all petitioners, to avoid having us
7	MR. ZHOU: Yes, this is Xin-Yi	7	having to make duplicate objections.
8	Zhou. It's spelled X-I-N dash Y-I, and the	8	MR. LAHAV: And we agree with
9	last name is Z-H-O-U, and I represent	9	that. And if we could actually limit it to
10	Advanced Micro Devices, Inc.	10	statements from Mr. Fitzpatrick that would be
11	MR. HOUSTON: This is	11	best, but
12	Michael Houston of Foley & Lardner	12	MR. FITZPATRICK: Our intention is
13	representing Renesas Electronics Corporation	13	to try to do that to the extent possible.
14	and Renesas Electronics America, Inc.,	14	MR. LAHAV: Okay. Thank you.
15	Renesas being spelled R-E-N-E-S-A-S, for the	15	, ,
16	court reporter.	16	EXAMINATION
17	MR. SILLIMAN: Michael Silliman	17	BY MR. LAHAV:
18	here, last name is S-I-L-L-I-M-A-N, from	18	Q. Good morning.
19	Baker, Botts, LLP, representing Toshiba.	19	A. Good morning.
20	THE VIDEOGRAPHER: And would the	20	Q. Can you please state your full name for the
20 21 22	court reporter please swear in the witness.	21	record.
22	DR. UWE KORTSHAGEN,	22	A. My full name is Uwe Richard Kortshagen.
23	a witness in the above-entitled action,	23	Q. And can you spell all of that.
24	after having been first duly sworn, was	24	A. The first name is spelled U-W-E. The middle
25	denosed and says as follows:	25	name R-I-C-H-R A-R-D, and the last name

	Page 10		Page 11
1	DR. UWE KORTSHAGEN	1	DR. UWE KORTSHAGEN
2	is K-O-R-T-S-H-A-G-E-N.	2	A. Yes.
3	Q. Have you ever given a deposition before?	3	Q. Please allow me to finish my question before
4	A. No.	4	you answer, okay?
5	Q. Okay. So I'm going to go over some of the	5	A. Yes.
6	rules of depositions, okay?	6	Q. Thank you. If you don't understand a
7	A. Thank you.	7	question or you would like me to rephrase,
8	Q. Do you understand that you've just taken an	8	please ask me to do so, okay?
9	oath to testify truthfully?	9	A. Yes.
10	A. Yes.	10	Q. If I ask a question and you answer it, I'm
11	Q. And you will testify truthfully today?	11	going to assume you understood it. Is that
12	A. Yes.	12	fair?
13	Q. You understand that I'm going to be asking	13	A. Yes.
14	you questions?	14	Q. Okay. Please also be careful to give
15	A. Yes.	15	audible, verbal answers to my questions, all
16	Q. And that you have an obligation to answer my	16	right?
17	questions?	17	A. Yes.
18	A. Yes.	18	Q. So uh-huhs or nuh-uhs, the court reporter has
19	Q. And that even if your counsel objects to my	19	trouble taking those, so it's important to
20	questions, you still have to answer them; do	20	give the verbal answers, all right?
21	you understand that?	21	A. Yes.
22	A. Yes.	22	Q. Are you taking any medications that might
23	Q. The one exception to that is if you get	23	impair your ability to testify truthfully
24	instructed on attorney work product or	24	today?
25	attorney/client privilege; do you understand?	25	A. No.
	Page 12		Page 13
1	DR. UWE KORTSHAGEN	1	DR. UWE KORTSHAGEN
2			
	O. Is there any other reason why you can t	2	
3	Q. Is there any other reason why you can't testify truthfully today?		Q. What was the topic of that dissertation?
3 4	testify truthfully today? A. No.	2 3 4	Q. What was the topic of that dissertation?A. The topic was on electron energy distribution
_	testify truthfully today? A. No.	3	Q. What was the topic of that dissertation?A. The topic was on electron energy distribution functions in radio frequency produced
4	testify truthfully today? A. No. Q. Okay. Where are you currently employed?	3 4	Q. What was the topic of that dissertation?A. The topic was on electron energy distribution functions in radio frequency produced plasmas.
4 5	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota.	3 4 5	Q. What was the topic of that dissertation?A. The topic was on electron energy distribution functions in radio frequency produced plasmas.Q. Did you study any particular applications?
4 5 6	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title?	3 4 5 6	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating
4 5 6 7	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota.	3 4 5 6 7	Q. What was the topic of that dissertation?A. The topic was on electron energy distribution functions in radio frequency produced plasmas.Q. Did you study any particular applications?
4 5 6 7 8	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering.	3 4 5 6 7 8	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating
4 5 6 7 8 9	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in	3 4 5 6 7 8 9	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves.
4 5 6 7 8 9	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do	3 4 5 6 7 8 9	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular
4 5 6 7 8 9 10	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university?	3 4 5 6 7 8 9 10	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any
4 5 6 7 8 9 10 11	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university? A. The University of Bochum.	3 4 5 6 7 8 9 10 11	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any particular endeavor other than the
4 5 6 7 8 9 10 11 12	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university? A. The University of Bochum. Q. Bochum?	3 4 5 6 7 8 9 10 11 12	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any particular endeavor other than the generalized generation of plasmas?
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4 5 6 7 8 9 10 11 12 13 14 15 16 17	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university? A. The University of Bochum. Q. Bochum? A. Bochum. Q. Bochum. And is a diploma degree like a	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any particular endeavor other than the generalized generation of plasmas? A. No. Q. Okay. Did that dissertation entail research relating to generation of plasmas inside a magnetron?
4 5 6 7 8 9 10 11 12 13 14 15 16 17	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university? A. The University of Bochum. Q. Bochum? A. Bochum. Q. Bochum. And is a diploma degree like a bachelor's degree in the United States? A. It is probably between a bachelor's and a master's degree. It is a five-year degree.	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any particular endeavor other than the generalized generation of plasmas? A. No. Q. Okay. Did that dissertation entail research relating to generation of plasmas inside a
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4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university? A. The University of Bochum. Q. Bochum? A. Bochum. Q. Bochum. And is a diploma degree like a bachelor's degree in the United States? A. It is probably between a bachelor's and a master's degree. It is a five-year degree. Q. Okay. Did you okay. And then you obtained a Ph.D. in January of 1991 from the same university?	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any particular endeavor other than the generalized generation of plasmas? A. No. Q. Okay. Did that dissertation entail research relating to generation of plasmas inside a magnetron? A. No. Q. Did you study in your dissertation generating plasmas for purposes of sputtering? A. No.
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university? A. The University of Bochum. Q. Bochum? A. Bochum. Q. Bochum. And is a diploma degree like a bachelor's degree in the United States? A. It is probably between a bachelor's and a master's degree. It is a five-year degree. Q. Okay. Did you okay. And then you obtained a Ph.D. in January of 1991 from the same university? A. That is correct, yes.	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any particular endeavor other than the generalized generation of plasmas? A. No. Q. Okay. Did that dissertation entail research relating to generation of plasmas inside a magnetron? A. No. Q. Did you study in your dissertation generating plasmas for purposes of sputtering? A. No. Q. After your Ph.D., under education your CV
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	 testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university? A. The University of Bochum. Q. Bochum? A. Bochum. Q. Bochum. And is a diploma degree like a bachelor's degree in the United States? A. It is probably between a bachelor's and a master's degree. It is a five-year degree. Q. Okay. Did you okay. And then you obtained a Ph.D. in January of 1991 from the same university? A. That is correct, yes. Q. Did you prepare a dissertation in connection 	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any particular endeavor other than the generalized generation of plasmas? A. No. Q. Okay. Did that dissertation entail research relating to generation of plasmas inside a magnetron? A. No. Q. Did you study in your dissertation generating plasmas for purposes of sputtering? A. No. Q. After your Ph.D., under education your CV lists a, quote, habilitation in experimental
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	testify truthfully today? A. No. Q. Okay. Where are you currently employed? A. At the University of Minnesota. Q. And what is your title? A. I'm a professor of mechanical engineering. Q. In your CV you reference a diploma degree in physics in June of 1988, and it's how do you pronounce the name of the university? A. The University of Bochum. Q. Bochum? A. Bochum. Q. Bochum. And is a diploma degree like a bachelor's degree in the United States? A. It is probably between a bachelor's and a master's degree. It is a five-year degree. Q. Okay. Did you okay. And then you obtained a Ph.D. in January of 1991 from the same university? A. That is correct, yes.	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	 Q. What was the topic of that dissertation? A. The topic was on electron energy distribution functions in radio frequency produced plasmas. Q. Did you study any particular applications? A. I studied a particular method of generating plasmas based on so-called propagating surface waves. Q. And did you did you study any particular commercial application or application of any particular endeavor other than the generalized generation of plasmas? A. No. Q. Okay. Did that dissertation entail research relating to generation of plasmas inside a magnetron? A. No. Q. Did you study in your dissertation generating plasmas for purposes of sputtering? A. No. Q. After your Ph.D., under education your CV

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1	DR. UWE KORTSHAGEN	1	DR. UWE KORTSHAGEN
2	Q. What is a habilitation in experimental	2	sputtering?
3	physics?	3	A. Yes.
4	A. Habilitation is a specific degree in the	4	Q. Did it include plasmas used for magnetron
5	German academic system which at that time in	5	sputtering?
6	the 1990s was required to become a.	6	A. No.
7	university professor.	7	Q. Can you explain the work you did in
8	Q. Does it correlate with post-doc research?	8	connection with your habilitation related to
9	A. Yeah, you may correlate it with with an	9	plasmas used for sputtering?
10	advanced post doc. It also includes writing	10	A. Among other among the different systems
11	yet another thesis, habilitation, but one is	11	that I studied at that time was a particular
12	already in the position to advise Ph.D.	12	plasma system called capacitively coupled
13	students at that point.	13	plasma, and such kinds of plasmas can be used
14	Q. Was there any coursework required	14	for the chemical vapor deposition of films,
15	A. No, there is no	15	but they can also be used for sputtering.
16	Q. Go ahead.	16	Q. And sputtering is not chemical vapor
17	A. No, there is no coursework required.	17	deposition, correct?
18	Q. What was the topic of your thesis for your	18	A. I would call it more physical vapor
19	habilitation?	19	deposition.
20	A. The topic of the thesis was on kinetic theory	20	Q. So sputtering is physical vapor deposition
21	and experiments studying electron	21	and chemical vapor deposition is some other
22	distribution functions in a wide range of	22	process, right?
23	plasmas.	23	A. Could you repeat that question, please?
24	Q. In that, quote, "wide range of plasmas," end	24	Q. Sure. I'm not going to repeat it, I'm going
25	quote, did that include plasmas used for	25	to change it.
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	Page 16		Page 17
1	DR. UWE KORTSHAGEN	1	DR. UWE KORTSHAGEN
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