

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT2893838

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
MING ZHU	03/05/2014
LEE-WEE TEO	03/04/2014
HARRY-HAK-LAY CHUANG	03/05/2014
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.
<b>Street Address:</b>	NO. 8, LI-HSIN RD. 6
<b>Internal Address:</b>	SCIENCE-BASED INDUSTRIAL PARK
<b>City:</b>	HSIN-CHU
<b>State/Country:</b>	TAIWAN
<b>Postal Code:</b>	300-77
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	14188181
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
<b>Phone:</b>	214-651-5000
<b>Email:</b>	ipdocketing@haynesboone.com
<b>Correspondent Name:</b>	HAYNES AND BOONE, LLP IP SECTION
<b>Address Line 1:</b>	2323 VICTORY AVENUE
<b>Address Line 2:</b>	SUITE 700
<b>Address Line 4:</b>	DALLAS, TEXAS 75219
<b>ATTORNEY DOCKET NUMBER:</b>	24061.2791
<b>NAME OF SUBMITTER:</b>	DAVID M. O'DELL
<b>SIGNATURE:</b>	/David M. O'Dell/
<b>DATE SIGNED:</b>	06/11/2014
<b>Total Attachments: 4</b>	
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**ASSIGNMENT**

WHEREAS, we,

- |     |                      |    |  |
|-----|----------------------|----|--|
| (1) | Ming Zhu             | of | Block 688F, #13-74<br>Woodlands Drive 75<br>Singapore 736688 |
| (2) | Lee-Wee Teo          | of | 607, Senja Road, #10-06<br>Singapore 670607                  |
| (3) | Harry-Hak-Lay Chuang | of | 51 Paya Lebar Crescent<br>Singapore 536191                   |

have invented certain improvements in

**METHOD OF FABRICATING HYBRID IMPACT-IONIZATION  
SEMICONDUCTOR DEVICE**

for which we have filed an application for Letters Patent of the United States of America on February 24, 2014, as U.S. Serial No. 14/188,181; and

WHEREAS, we authorize the attorney of record to update this document to include Patent Office information as deemed necessary (i.e., filing date, serial number, etc.);

WHEREAS, Taiwan Semiconductor Manufacturing Company, Ltd., (“TSMC”), No. 8, Li-Hsin Rd. 6, Science-Based Industrial Park Hsin-Chu, Taiwan 300-77, Republic of China. is desirous of obtaining the entire right, title, and interest in, to and under the said invention and the said application in the United States of America and in any and all countries foreign thereto;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and other good and valuable consideration, we have sold, assigned, transferred and set over, and by these presents do hereby sell, assign, transfer and set over, unto the said TSMC, its successors, legal representatives, and assigns, the entire right, title, and interest in, to and under the said invention, and the said application, and all divisional, renewal, substitutional, and continuing applications thereof, and all Letters Patent of the United States of America which may be granted thereon and all reissues and extensions thereof, and all applications for Letters Patent which may be filed for said invention in any country or countries foreign to the United States of America, and all extensions, renewals, and reissues thereof, and all prior patents and patent applications from which a filing priority of the above-described patent application may be obtained, including the right to collect past damages; and we hereby authorize and request the Commissioner of Patents of the United States of America, and any official of any country or countries foreign to the United States of America, whose duty it is to issue patents on applications as aforesaid, to issue all Letters Patent for said invention to the said TSMC, its successors, legal representatives and assigns, in accordance with the terms of this instrument.

AND WE HEREBY covenant that we have full right to convey the entire interest herein assigned, and that we have not executed, and will not execute, any agreement in conflict herewith.

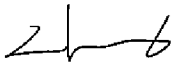
AND WE HEREBY further covenant and agree that we will communicate to said TSMC, its successors, legal representatives and assigns, any facts known to us respecting said invention, and testify in any legal proceedings, sign all lawful papers, execute all divisional, renewal, substitutional, continuing, and reissue applications, make all rightful declarations and/or oaths and generally do everything possible to aid the said TSMC, its successors, legal representatives and assigns, to obtain and enforce proper patent protection for said invention in all countries.

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Inventor Name: Ming Zhu

Residence Address: Block 688F, #13-74, Woodlands Drive 75, Singapore 736688

Dated: \_\_\_\_\_

  
\_\_\_\_\_  
Inventor Signature

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Inventor Name: Lee-Wee Teo

Residence Address: 607, Senja Road, #10-06, Singapore 670607

Dated: \_\_\_\_\_

\_\_\_\_\_  
Inventor Signature

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Inventor Name: Harry-Hak-Lay Chuang

Residence Address: 51 Paya Lebar Crescent, Singapore 536191

Dated: \_\_\_\_\_

\_\_\_\_\_  
Inventor Signature

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Docket No.: 2009-0791-D/24061.2791  
Customer No.: 000042717

AND WE HEREBY further covenant and agree that we will communicate to said TSMC, its successors, legal representatives and assigns, any facts known to us respecting said invention, and testify in any legal proceedings, sign all lawful papers, execute all divisional, renewal, substitutional, continuing, and reissue applications, make all rightful declarations and/or oaths and generally do everything possible to aid the said TSMC, its successors, legal representatives and assigns, to obtain and enforce proper patent protection for said invention in all countries.

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Inventor Name: Ming Zhu

Residence Address: Block 688F, #13-74, Woodlands Drive 75, Singapore 736688

Dated: \_\_\_\_\_

\_\_\_\_\_  
Inventor Signature

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Inventor Name: Lee-Wee Teo

Residence Address: 607, Senja Road, #10-06, Singapore 670607

Dated: 4 March 2014

  
\_\_\_\_\_  
Inventor Signature

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Inventor Name: Harry-Hak-Lay Chuang

Residence Address: 51 Paya Lebar Crescent, Singapore 536191

Dated: \_\_\_\_\_

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Inventor Signature

Docket No.: 2009-0791-D/24061.2791

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Residence Address: Block 688F, #13-74, Woodlands Drive 75, Singapore 736688

Dated: \_\_\_\_\_

\_\_\_\_\_  
Inventor Signature

Inventor Name: Lee-Wee Teo

Residence Address: 607, Senja Road, #10-06, Singapore 670607

Dated: \_\_\_\_\_

\_\_\_\_\_  
Inventor Signature

Inventor Name: Harry-Hak-Lay Chuang

Residence Address: 51 Paya Lebar Crescent, Singapore 536191

Dated: 3/5/2014

  
\_\_\_\_\_  
Inventor Signature