

PATENT ASSIGNMENT COVER SHEET

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SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
HARRY-HAK-LAY CHUANG	01/21/2013
CHENG-CHENG KUO	01/21/2013
MING ZHU	01/21/2013
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City:	HSIN-CHU
State/Country:	TAIWAN
Postal Code:	300-77
PROPERTY NUMBERS Total: 1	
Property Type	Number
Application Number:	15797674
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NAME OF SUBMITTER:	KYLE HOWARD
SIGNATURE:	/Kyle Howard/
DATE SIGNED:	10/30/2017
Total Attachments: 2	
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ASSIGNMENT

WHEREAS, we,

- | | | | |
|-----|----------------------|----|---|
| (1) | Harry-Hak-Lay Chuang | of | 51 Paya Lebar Crescent
Singapore 536176 |
| (2) | Cheng-Cheng Kuo | of | 7F., No. 127, Puding 3rd Road
East District
Hsinchu City 300, Taiwan R.O.C. |
| (3) | Ming Zhu | of | Block 688F, #13-74, Woodlands Drive 75
Singapore 736688 |

have invented certain improvements in

**A VERTICAL TUNNELING FIELD-EFFECT TRANSISTOR CELL AND
FABRICATING THE SAME**

for which we have executed an application for Letters Patent of the United States of America,

 of even date filed herewith; and
 X filed on 13/749,186 and assigned application number 01-24-2013; 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.

Docket No.: 2012-0977 / 24061.2331
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.

Inventor Name: Harry-Hak-Lay Chuang

Residence Address: 51 Paya Lebar Crescent, Singapore 536176

Dated: ✓ 1/21/2013

✓ [Signature]
Inventor Signature

Inventor Name: Cheng-Cheng Kuo

Residence Address: 7F., No. 127, Puding 3rd Road, East District
Hsinchu City 300, Taiwan R.O.C.

Dated: ✓ 1/21/2013

✓ Cheng-Cheng Kuo
Inventor Signature

Inventor Name: Ming Zhu

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Dated: ✓ 1/21/13

✓ [Signature]
Inventor Signature