

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT4995895

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| SUBMISSION TYPE: | NEW ASSIGNMENT |
| NATURE OF CONVEYANCE: | ASSIGNMENT |
| CONVEYING PARTY DATA | |
| Name | Execution Date |
| WEI-CHIH WEN | 04/02/2018 |
| HAN-TING TSAI | 04/02/2018 |
| CHUNG-TE LIN | 04/02/2018 |
| RECEIVING PARTY DATA | |
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| State/Country: | TAIWAN |
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| PROPERTY NUMBERS Total: 1 | |
| Property Type | Number |
| Application Number: | 15941716 |
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| SIGNATURE: | /Renell G. Feimster for Bernard P. Codd/ |
| DATE SIGNED: | 06/07/2018 |
| Total Attachments: 3 | |
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COMBINED DECLARATION AND ASSIGNMENT FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

I believe I am the original or an original joint inventor of a claimed invention in the application for which a patent is sought on the invention entitled:

A SEMICONDUCTOR DEVICE INCLUDING VERTICAL ROUTING STRUCTURE AND METHOD FOR MANUFACTURING THE SAME

which application is:

- attached, or
- United States application number or PCT international application number _____ filed on _____

The above-identified application was made or authorized to be made by me.

In the event that the filing date and/or application number are not entered above at the time I execute this document, and if such information is deemed necessary, I hereby authorize and request the registered practitioners of **McDermott Will & Emery LLP**, associated with the Customer Number **20277**, to insert above the filing date and/or application number of the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

ASSIGNMENT

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, I hereby assign to

TAIWAN SEMICONDUCTOR MANUFACTURING CO., LTD.
No. 8, Li-Hsin Rd. 6, Science Based Industrial Park, Hsinchu, Taiwan 300

(hereinafter designated as the Assignee), the entire (100%) right, title and interest for the United States as defined in 35 USC §100, in the invention described in the application identified in this document.

I hereby confirm any prior assignment to Assignee, and to the extent that I have not already done so, agree to assign, and hereby do, sell, assign and transfer unto Assignee and its successors in interest, the full and exclusive right, title and interest in the United States of America and throughout the world, including the right to claim priority under the laws of the United States, the Paris Convention, and any foreign countries, to the inventions as described in the aforesaid application, to the aforesaid application itself, and all divisions, continuations, continuations-in-part, or other applications claiming priority directly or indirectly from the aforesaid application, and any United States or foreign Letters Patent, utility model, or other similar rights which may be granted thereon, including reissues, reexaminations and extensions thereof, and all copyright rights throughout the world in the aforesaid application and the subject matter disclosed therein, these rights, title and interest to be held and enjoyed by Assignee to the full end of the term for which the Letters Patent, utility model, or other similar rights, are granted and any extensions thereof as fully and entirely as the same would have been held by the undersigned had this assignment and sale not been made, and the right to sue for, and recover for past infringements of, or liabilities for, any of the rights relating to any of the applications, patents, utility models, or other similar rights, resulting therefrom, and the copyright rights;

I hereby covenant and agree to execute all instruments or documents required or requested for the making and prosecution of any applications of any type for patent, utility model, or other similar rights, and for copyright, in the United States and in all foreign countries including, but not limited to, any provisional, continuation, continuation-in-part, divisional, renewal or substitute thereof, and as to letters patent any reissue, re-examination, or extension thereof, and for litigation regarding, or for the purpose of protecting title and to the said invention, the United States application for patent, or Letters Patent therefor, and to testify in support thereof, for the benefit of Assignee without further or other compensation than that above set forth;

I hereby covenant that no assignment, sale, license, agreement or encumbrance has been or will be entered into which would conflict with this Assignment.

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| Legal name of inventor Wei-Chih Wen | |
| Inventor's signature <i>Wei-Chih Wen</i> | Date <i>2018/4/2</i> |

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| Legal name of inventor Han-Ting Tsai | |
| Inventor's signature <i>Han-Ting Tsai</i> | Date <i>2018/4/2</i> |

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|---|-------------------------|
| Legal name of inventor Chung-Te Lin | |
| Inventor's signature <i>Chung-Te Lin</i> | Date <i>4/2/2018</i> |