

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT5118660

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
YI JEN TSAI	08/22/2018
SHIH-CHANG LIU	08/23/2018
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<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
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<b>ATTORNEY DOCKET NUMBER:</b>	TSMCP798US
<b>NAME OF SUBMITTER:</b>	JAMES R. POTASHNIK
<b>SIGNATURE:</b>	/James R. Potashnik/
<b>DATE SIGNED:</b>	08/30/2018
<b>Total Attachments: 4</b>	
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**PATENT ASSIGNMENT**

**PARTIES TO THE ASSIGNMENT**

Assignor(s):  
Yi Jen Tsai

Assignor(s):  
Shih-Chang Liu

Assignee:  
Taiwan Semiconductor Manufacturing Co., Ltd.  
No. 8, Li-Hsin Rd. 6, Hsin-Chu Science Park  
Hsin-Chu, Taiwan 300-77  
Republic of China

**AGREEMENT**

WHEREAS, ASSIGNOR(S) (listed above) are inventor(s) of an invention entitled  
**“METHOD FOR FORMING A PHASE CHANGE MEMORY (PCM) CELL WITH A LOW  
DEVIATION CONTACT AREA BETWEEN A HEATER AND A PHASE CHANGE  
ELEMENT”** for which:

a non-provisional application for United States Letters Patent:

was executed on even date preparatory to filing (each inventor should sign this  
Assignment on the same day as he/she signs the Declaration); or

was filed on \_\_\_\_\_ and accorded U.S. Serial No. \_\_\_\_\_; or

I hereby authorize and request my attorney associated with Customer No.  
107476, to insert on the designated lines below the filing date and application  
number of said application when known:

U.S. Serial No. \_\_\_\_\_

filed on \_\_\_\_\_

WHEREAS, ASSIGNEE (listed above), a corporation of the Republic of China is desirous of acquiring the entire right, title and interest in and to the invention and in and to any letters patent that may be granted therefore in the United States and in any and all foreign countries;

NOW, THEREFORE, in exchange for good and valuable consideration, the receipt of which is hereby acknowledged, ASSIGNOR(S) hereby sell, assign and transfer unto ASSIGNEE its successors and assigns, the entire right, title and interest in and to said invention and improvements, said application and any and all letters patent which may be granted for said invention in the United States of America and its territorial possessions and in any and all foreign countries, and in any and all divisions, reissues, re-examinations and continuations thereof, including the right to file foreign applications directly in the name of ASSIGNEE and to claim priority rights deriving from said United States application to which said foreign applications are entitled by virtue of international convention, treaty or otherwise, said invention, application and all letters patent on said invention to be held and enjoyed by ASSIGNEE and its successors and assigns for their use and benefit and of their successors and assigns as fully and entirely as the same would have been held and enjoyed by ASSIGNOR(S) had this assignment, transfer and sale not been made. ASSIGNOR(S) hereby authorize and request the Commissioner of Patents and Trademarks to issue all letters patent on said invention to ASSIGNEE. ASSIGNOR(S) agree to execute all instruments and documents required for the making and prosecution of applications for United States and foreign letters patent on said invention, for litigation regarding said letters patent, or for the purpose of protecting title to said invention or letters patent therefore.

TSMC Docket No. P20170897US00  
Docket No. TSMCP798US

2018.8.22  
Date

Yi Jen Tsai  
Name 1<sup>st</sup> Inventor Yi Jen Tsai

TSMC Docket No. P20170897US00  
Docket No. TSMCP798US

2018.08.23  
Date

Shih-chang Liu  
Name 2<sup>nd</sup> Inventor Shih-Chang Liu