12/17/2018 505239862

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT5286632

| SUBMISSION TYPE: | NEW ASSIGNMENT | | | |
|-----------------------|----------------|--|--|--|
| NATURE OF CONVEYANCE: | ASSIGNMENT | | | |

CONVEYING PARTY DATA

| Name | Execution Date |
|----------------------|----------------|
| HARRY-HAK-LAY CHUANG | 01/24/2017 |
| HUNG CHO WANG | 01/24/2017 |
| TONG-CHERN ONG | 01/24/2017 |
| WEN-TING CHU | 01/24/2017 |
| YU-WEN LIAO | 01/24/2017 |
| KUEI-HUNG SHEN | 01/24/2017 |
| KUO-YUAN TU | 01/24/2017 |
| SHENG-HUANG HUANG | 01/24/2017 |

RECEIVING PARTY DATA

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| City: | HSIN-CHU | | | |
| State/Country: | TAIWAN | | | |
| Postal Code: | 300-77 | | | |

PROPERTY NUMBERS Total: 1

| Property Type | Number | | | | |
|---------------------|----------|--|--|--|--|
| Application Number: | 16222031 | | | | |

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| NAME OF SUBMITTER: | JAMES R. POTASHNIK | | | |

PAIENI **REEL: 047795 FRAME: 0055** 505239862

| SIGNATURE: | /James R. Potashnik/ |
|------------------------------|----------------------|
| DATE SIGNED: | 12/17/2018 |
| Total Attachments: 10 | |
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| source=Assignment#page10.tif | |

PATENT REEL: 047795 FRAME: 0056

PATENT ASSIGNMENT

PARTIES TO THE ASSIGNMENT

| Assignor(s): Harry-Hak-Lay Chuang |
|--|
| Assignor(s): Hung Cho Wang |
| Assignor(s): Tong-Chern Ong |
| Assignor(s): Wen-Ting Chu |
| Assignor(s): Yu-Wen Liao |
| Assignor(s): Kuei-Hung Shen |
| Assignor(s): Kuo-Yuan Tu |
| Assignor(s): -Sheng-Haung-Huang- |
| Sheng-Huang Huang Assignee: Taiwan Semiconductor Manufacturing Co., Ltd. No. 8, Li-Hsin Rd. 6, Hsin-Chu Science Park Hsin-Chu, Taiwan 300-77 Republic of China |
| GREEMENT |
| WHEREAS, ASSIGNOR(S) (listed above) are invento |

A

or(s) of an invention entitled

"MEMORY DEVICE HAVING A SINGLE BOTTOM ELECTRODE LAYER" for which:

a non-provisional application for United States Letters Patent:

| \boxtimes | 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 | | | | | | | |

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Jan 2008

PASPENT 15a **REEL: 047795 FRAME: 0057**

| | I hereby author | orize and | request | my a | attorney | associat | ed with | Custome | · No. |
|---|--|--|---------|---------|-----------|------------|---------|------------|-------|
| | <u>107476</u> , to inse | ert on the | designa | ted iin | ies beloi | w the fill | ng date | and applic | ation |
| | number of said application when known: | | | | | | | | |
| , | U.S. Serial No. | Yandanahadadkan pa | | **** | | | | | |
| | filed on | \$==passassassassassassassassassassassassass | ~~~~~ | | * | | | | |

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

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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.

1st Inventor Harry-Hak-Lay Chuang

70(7/1/14 Date

Haney Cho Wang_ 2nd Inventor Hung Cho Wang

2017

Wen-Try Chr 4th Inventor Wen-Ting Chu Name

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Date

Yu-Wen Cias

Name 5th Inventor Yu-Wen Liao

e/-24-26/) Date

Kuei'-Hury Shen
Name 6th Inventor Kuei-Hung Shen

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2017 / 1 / 24 Date

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*>*01'//1/*>/*⊈ Date

Name

Shong-Huang Huang

8th Inventor Sheng-Huang Huang

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