

PATENT ASSIGNMENT COVER SHEET

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SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
YOUNG-SOO KIM	10/03/2014
CHUL-WOO PARK	10/03/2014
SI-HONG KIM	12/03/2014
KWANG-IL PARK	10/03/2014
JAE-YOUN YOUN	10/03/2014
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PROPERTY NUMBERS Total: 1	
Property Type	Number
Application Number:	14514416
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DATE SIGNED:	08/07/2015
Total Attachments: 5	

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COMBINED DECLARATION (37 CFR §1.63) FOR UTILITY PATENT APPLICATION AND ASSIGNMENT FORM¹

The undersigned acknowledges that this document is being used both as an assignment of the invention and as the declaration (37 CFR 1.63) for a Utility or Design Application.

WHEREAS, the undersigned, hereinafter referred to collectively as Assignor, has invented:

Title: **MEMORY DEVICE AND MEMORY SYSTEM HAVING THE SAME**

for which Assignor is about to make or has made United States or International application for patent.

WHEREAS, as a below named inventor(s), I/(we) hereby declare that:

Section I. Declaration

This declaration is directed to:

- The attached U.S. non-provisional patent application, or
- U.S. non-provisional patent application number _____, filed on _____, or
- PCT international patent application number _____, filed on _____.

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

I (we) believe that I am (we are) the original inventor (original joint inventors) of a claimed invention in the above-identified application.

I (we) 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.

¹ This form requires the use of an Application Data Sheet.

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SAMSUNG ELECTRONICS CO., LTD.

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims.

I acknowledge that I am aware of the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

Section II. Assignment

In consideration of the sum of One Dollar (\$1.00) and other good and valuable consideration paid to each of the undersigned, the undersigned hereby sell(s) and assign(s) to

Samsung Electronics Co., Ltd.

having an address at 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 443-742, Republic of Korea (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 Section I of this document.

Assignor hereby confirms any prior assignment to Assignee, and to the extent that Assignor has not already done so, agrees to assign, and hereby does, 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 Assignor 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;

Assignor hereby covenants and agrees 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

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Patent therefor, and to testify in support thereof, for the benefit of Assignee without further or other compensation than that above set forth;

Assignor hereby covenants that no assignment, sale, license, agreement or encumbrance has been or will be entered into which would conflict with this Assignment; and

Assignor hereby requests the United States Patent and Trademark Office to issue the Letters Patent of the United States of America to Assignee, and requests that any official of any country or countries foreign to the United States, whose duty it is to issue or grant patents and applications as aforesaid, to issue the Letters Patent, Utility Model Registration or other similar right to Assignee.

The undersigned hereby grant(s) the law firm of Muir Patent Consulting, PLLC the power to insert on this Declaration and Assignment any further identification which may be necessary or desirable in order to comply with the rules of the U.S. Patent and Trademark Office for recordation of this document.

Section III. Inventor(s)/Assignor(s) Signature(s)

LEGAL NAME OF FIRST INVENTOR/ASSIGNOR	Family Name	First Given Name	Second Given Name
	SOHN	Young-Soo	

SIGNATURE Young-Soo Sohn DATE 2014. 10. 3

LEGAL NAME OF SECOND INVENTOR/ASSIGNOR	Family Name	First Given Name	Second Given Name
	PARK	Chul-Woo	

SIGNATURE 박철우 DATE 10. 3. 2014

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LEGAL NAME OF THIRD INVENTOR/ASSIGNOR	Family Name	First Given Name	Second Given Name
	KIM	Si-Hong	
<p>SIGNATURE <u>김시홍</u> DATE <u>Dec. 3. 2014</u></p>			

LEGAL NAME OF FOURTH INVENTOR/ASSIGNOR	Family Name	First Given Name	Second Given Name
	PARK	Kwang-IL	
<p>SIGNATURE <u>박광일</u> DATE <u>2014. 12. 3</u></p>			

LEGAL NAME OF FIFTH INVENTOR/ASSIGNOR	Family Name	First Given Name	Second Given Name
	YOUN	Jae-Youn	
<p>SIGNATURE <u>Jae-Youn Youn</u> DATE <u>2014. 10. 3</u></p>			

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MEMORY DEVICE AND MEMORY SYSTEM HAVING THE SAME

CROSS-REFERENCE TO RELATED APPLICATION(S)

5 [0001] This application claims priority under 35 USC § 119 to Korean Patent Application No. 10-2014-0020751, filed on February 21, 2014 in the Korean Intellectual Property Office (KIPO), the contents of which are herein incorporated by reference in their entirety.

BACKGROUND

1. Technical Field

10 [0002] Example embodiments relate to a semiconductor device, and more particularly to a memory device and a memory system having the memory device.

2. Description of the Related Art

15 [0003] Generally, a volatile memory device such as a dynamic random access memory (DRAM) stores data by charging a capacitor. Since the charge stored in the capacitor may leak with a passage of time, the volatile memory device is typically required to perform a refresh operation periodically.

[0004] As a fabrication process of the memory device is scaled down, space between word-lines becomes narrower. Therefore, disturbance phenomenon occurs more frequently than before, during which charge of a memory cell connected to one word-line is influenced
20 by voltage distribution of adjacent word-lines.

[0005] When one particular word-line is intensively accessed, the disturbance phenomenon increases in which the charge of the memory cell connected to neighboring word-lines adjacent to the particular word-line may be lost due to an activated voltage of the particular word-line.

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