506808357 08/09/2021

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2

EPAS ID: PAT6855176

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
JUNBEOM PARK	07/07/2021
SANGMO KOO	07/27/2021
MINYI KIM	07/18/2021
SEOKHYEON YOON	07/07/2021

RECEIVING PARTY DATA

Name:	SAMSUNG ELECTRONICS CO., LTD.
Street Address: 129, SAMSUNG-RO, YEONGTONG-GU	
City:	SUWON-SI, GYEONGGI-DO
State/Country:	KOREA, REPUBLIC OF
Postal Code:	16677

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	17396942

CORRESPONDENCE DATA

Fax Number: (703)668-8200

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

703-668-8000 Phone:

Email: dcmailroom@hdp.com

Correspondent Name: HARNESS, DICKEY & PIERCE, P.L.C.

Address Line 1: P.O. BOX 8910

Address Line 4: RESTON, VIRGINIA 20195

ATTORNEY DOCKET NUMBER:	8947-001634-US
NAME OF SUBMITTER:	GARY D. YACURA, REG. NO. 35,416
SIGNATURE:	/Gary D. Yacura/
DATE SIGNED:	08/09/2021

Total Attachments: 12

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> **REEL: 057123 FRAME: 0156** 506808357

PATENT



PATENT REEL: 057123 FRAME: 0157

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:	SEMI	ICONDUCTOR DEVICE		
for whice		ignor is about to make or has made United !	States or Inte	rnational application
WHERE	AS, as	a below named inventor(s), I/(we) hereby o	leclare that:	
Section	I. Dec	claration		
This ded	claratio	on is directed to:		
	\boxtimes	The attached U.S. non-provisional patent	application, o	r
		U.S. non-provisional patent application nu on, or	mber	, filed
		PCT international patent application numb	er	, filed on
The abo	ove-ide	entified application was made or authorized	l to be made l	oy me (us).
		that I am (we are) the original inventor (ori he above-identified application.	ginal joint inv	entors) of a claimed
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 fo	rm requ	uires the use of an Application Data Sheet.		
SEC Ref	No.	IE-202008-055-1-US0 Attorne	ey Ref No.	8947-001634-US

COMBINED DECLARATION (37 CFR 1.63) FOR UTILITY PATENT APPLICATION AND ASSIGNMENT FORM PATENT PAGE 1 of 4 REEL: 057123 FRAME: 0158

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 16677, 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-

SEC Ref No. IE-202008-055-1-US0 Attorney Ref No. 8947-001634-US

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;

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 Harness, Dickey & Pierce, P.L.C. 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	Family Name	First Given Name	Second Given Name
INVENTOR/ASSIGNOR	PARK	Junbeom	
SIGNATURE		DATE	

SEC Ref No.	IE-202008-055-1-US0	Attorney Ref No.	8947-001634-US

		•	
LEGAL NAME OF SECOND	Family Name	First Given Name	Second Given Name
INVENTOR/ASSIGNOR	коо	Sangmo	
	arrijs.		
SIGNATURE	Ann	DATE	2021. 7. 27
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LEGAL NAME OF THIRD	Family Name	First Given Name	Second Given Name
INVENTOR/ASSIGNOR	KIM	Minyi	
<u> </u>		5	<i>.</i>
CICALATION		DATE	
SIGNATURE		·····	
			·····
LEGAL NAME OF FOURTH	Family Name	First Given Name	Second Given Name
INVENTOR/ASSIGNOR	YOON	Seokhyeon	

		DATE	
SIGNATURE			

	***************************************	***************************************	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
SEC Ref No.	IE-202008-055-1-US0	Attorney Ref No.	8947-001634-US

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:	SEMI	CONDUCTOR DEVICE
for whic		gnor is about to make or has made United States or International application
WHEREA	∖S, as	a below named inventor(s), I/(we) hereby declare that:
Section	l. Ded	claration
This dec	laratio	on is directed to:
	\boxtimes	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 abo	ve-ide	entified application was made or authorized to be made by me (us).
		that I am (we are) the original inventor (original joint inventors) of a claimed ne above-identified application.
	•	acknowledge that any willful false statement made in this declaration is der 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or
¹ This for	m requ	uires the use of an Application Data Sheet.
SEC Ref I	No	IE-202008-055-1-US0 Attorney Ref No. 8947-001634-US

COMBINED DECLARATION (37 CFR 1.63) FOR UTILITY PATENT APPLICATION AND ASSIGNMENT FORM PATENT PAGE 1 of 4 REEL: 057123 FRAME: 0162

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 16677, 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-

SEC Ref No. IE-202008-055-1-US0 Attorney Ref No. 8947-001634-US

SAMSUNG ELECTRONICS CO., LTD.

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;

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 Harness, Dickey & Pierce, P.L.C. 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	Family Name	First Given Name	Second Given Name
FIRST INVENTOR/ASSIGNOR	PARK Loope (107) (147)	Junbeom	
			<u> </u>
SIGNATURE	194		2021.07.07

SEC Ref No. IE-202008-055-1-US0 Attorney Ref No. 8947-001634-US

COMBINED DECLARATION (37 CFR 1.63) FOR UTILITY PATENT APPLICATION AND ASSIGNMENT FORM
Page 3 of 4

LEGAL NAME OF	Family Name	First Given Name	Second Given Name
SECOND INVENTOR/ASSIGNOR	KOO	Sangmo	
SIGNATURE		DATE	
LEGAL NAME OF	Family Name	First Given Name	Second Given Name
THIRD INVENTOR/ASSIGNOR	KIM	Minyl	
SIGNATURE		DATE	
LEGAL NAME OF	Family Name	First Given Name	Second Given Name
FOURTH INVENTOR/ASSIGNOR	YOON-	Seokhyeon	
SIGNATURE	4	DATE	07/07

SEC Bot No.	IF-202008-055-1-1500		2011.01614.119
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COMBINED DECLARATION (37 CFR 1.63) FOR UTILITY PATENT APPLICATION AND ASSIGNMENT FORM
Page 4 of 4

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PATENT REEL: 057123 FRAME: 0165

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:	Title: SEMICONDUCTOR DEVICE				
	for which Assignor is about to make or has made United States or International application for patent.				
WHERE	AS, as	a below named inventor(s), I/(we) hereby declare that:			
Section	ıl. Dec	claration			
This de	claratio	on is directed to:			
	\boxtimes	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 abo	ove-ide	entified application was made or authorized to be made by me (us).			
		that I am (we are) the original inventor (original joint inventors) of a claimed he above-identified application.			
• •	•	acknowledge that any willful false statement made in this declaration is nder 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or			
¹ This fo		uires the use of an Application Data Sheet.			
SEC Ref	No.	IE-202008-055-1-US0 Attorney Ref No. 8947-001634-US			
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COMBINED DECLARATION (37 CFR 1.63) FOR UTILITY PATENT APPLICATION AND ASSIGNMENT FORM **PATENT**

REEL: 057123 FRAME: 0166

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 16677, 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.

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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-

SEC Ref No.	IE-202008-055-1-US0	Attorney Ref No.	8947-001634-US

COMBINED DECLARATION (37 CFR 1.63) FOR UTILITY PATENT APPLICATION AND ASSIGNMENT FORM
Page 2 of 4 PATENT

REEL: 057123 FRAME: 0167

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;

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.

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

LEGAL NAME OF	Family Name	First Given Name	Second Given Name
FIRST	PARK	moednut	
		DATE	
SIGNATURE		-	••••

SEC Ref No.	IE-202008-055-1-US0	Attorney Ref No.	8947-001634-US	
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LEGAL NAME OF	Family Name	First Given Name	Second Given Name
SECOND INVENTOR/ASSIGNOR	коо	Sangmo	
		DATE	***************************************
signature	·		
			T = 1 = 1
LEGAL NAME OF THIRD	Family Name	First Given Name	Second Given Name
INVENTOR/ASSIGNOR	KIM	Minyi	
SIGNATURE	26 mg	DATE	7/18/2021
LEGAL NAME OF	Family Name	First Given Name	Second Given Name
FOURTH INVENTOR/ASSIGNOR	YOON	Seokhyeon	
		<u></u>	<u> </u>
SIGNATURE		DATE .	***************************************

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RECORDED: 08/09/2021

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REEL: 057123 FRAME: 0169