

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	10018-01-0242-US-CON1
	First Named Inventor	Jianquan JIA
	Title	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD
	Priority Mail Express® Label No.	

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
1. ☒ Fee Transmittal Form (PTO/SB/17 or equivalent)	ACCOMPANYING APPLICATION PAPERS
2. ☐ Applicant asserts small entity status. See 37 CFR 1.27	10. ☒ Assignment Papers (cover sheet & document(s)) Name of Assignee <u>Yangtze Memory Technologies Co., Ltd.</u>
3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.	11. ☐ 37 CFR 3.73(c) Statement ☒ Power of Attorney (when there is an assignee)
4. ☒ Specification [Total Pages <u>11</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement)	12. ☐ English Translation Document (if applicable)
5. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>4</u>]	13. ☒ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☐ Copies of citations attached
6. ☐ Inventor's Oath or Declaration [Total Pages <u>3</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))	14. ☐ Preliminary Amendment
a. ☐ Newly executed (original or copy) b. ☒ A copy from a prior application (37 CFR 1.63(d))	15. ☐ Return Receipt Postcard (MPEP § 503) (Should be specifically itemized)
7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent)	16. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
8. ☐ CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix) ☐ Landscape Table on CD	17. ☐ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
9. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required)	18. ☐ Other: _____ _____ _____ _____
a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies	

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
 (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS					
☒ The address associated with Customer Number: <u>153988</u> OR ☐ Correspondence address below					
Name					
Address					
City		State		Zip Code	
Country		Telephone	7039959887	Email	
Signature	/Zhiwei Zou/			Date	6/21/2021
Name (Print/Type)	Zhiwei Zou			Registration No. (Attorney/Agent)	66,041

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

FEE TRANSMITTAL		Complete if known	
		Application Number	
		Filing Date	Herewith
☐ Applicant asserts small entity status. See 37 CFR 1.27.		First Named Inventor	Jianquan JIA
☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.		Examiner Name	To Be Determined
		Art Unit	To Be Determined
TOTAL AMOUNT OF PAYMENT	(\$)	Practitioner Docket No.	10018-01-0242-US-CON1

METHOD OF PAYMENT (check all that apply)
☐ Check ☒ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 60-2227 Deposit Account Name: BAYES DEPOSIT ACCOUNT

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**
☒ Charge any additional fee(s) or underpayment of fee(s) ☐ Credit any overpayment of fee(s)
under 37 CFR 1.16 and 1.17

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION**1. BASIC FILING, SEARCH, AND EXAMINATION FEES** (U = undiscounted fee; S = small entity fee; M = micro entity fee)

Application Type	FILING FEES			SEARCH FEES			EXAMINATION FEES			Fees Paid (\$)
	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	
Utility	320	160*	80	700	350	175	800	400	200	1820
Design	220	110	55	160	80	40	640	320	160	
Plant	220	110	55	440	220	110	660	330	165	
Reissue	320	160	80	700	350	175	2,320	1,160	580	
Provisional	300	150	75	0	0	0		0	0	

* The \$150 small entity status filing fee for a utility application is further reduced to \$75 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	Undiscounted Fee (\$)	Small Entity Fee (\$)	Micro Entity Fee (\$)
Each claim over 20 (including Reissues)	100	50	25
Each independent claim over 3 (including Reissues)	480	240	120
Multiple dependent claims	860	430	215

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
1	0	0.00	

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
1	0	0.00	

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$420 (\$210 for small entity) (\$105 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
4				

4. OTHER FEE(S)

Non-English specification, \$140 fee (\$70 for small entity) (\$35 for micro entity)

Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, \$400 fee (\$200 small or micro entity)

Other (e.g., late filing surcharge): _____

SUBMITTED BY

Signature	/Zhiwei Zou/	Registration No. (Attorney/Agent)	66,041	Telephone	7039959887
Name (Print/Type)	Zhiwei Zou	Date	6/21/2021		

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	10018-01-0242-US-CON1
		Application Number	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1		Remove	
Legal Name			
Prefix	Given Name	Middle Name	Family Name
	Jianquan		Jia
Residence Information (Select One) US Residency • Non US Residency Active US Military Service			
City	Wuhan	Country of Residence ⁱ	CN
Mailing Address of Inventor:			
Address 1	18 Gaoxin 4th Road		
Address 2	East Lake High-Tech Development Zone		
City	Wuhan	State/Province	
Postal Code	430074	Country ⁱ	CN
Inventor 2		Remove	
Legal Name			
Prefix	Given Name	Middle Name	Family Name
	Ying		Cui
Residence Information (Select One) US Residency • Non US Residency Active US Military Service			
City	Wuhan	Country of Residence ⁱ	CN
Mailing Address of Inventor:			
Address 1	18 Gaoxin 4th Road		
Address 2	East Lake High-Tech Development Zone		
City	Wuhan	State/Province	
Postal Code	430074	Country ⁱ	CN
Inventor 3		Remove	
Legal Name			

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	10018-01-0242-US-CON1
		Application Number	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		

Prefix	Given Name	Middle Name	Family Name	Suffix
	Kaikai		You	
Residence Information (Select One) US Residency ☒ Non US Residency Active US Military Service				
City	Wuhan	Country of Residence ⁱ	CN	
Mailing Address of Inventor:				
Address 1	18 Gaoxin 4th Road			
Address 2	East Lake High-Tech Development Zone			
City	Wuhan	State/Province		
Postal Code	430074	Country ⁱ	CN	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add				

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	153988		
Email Address	uspto@bayes.law	Add Email	Remove Email

Application Information:

Title of the Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		
Attorney Docket Number	10018-01-0242-US-CON1	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	4	Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	10018-01-0242-US-CON1
		Application Number	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		

Publication Information:
☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	153988		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16709944	2019-12-11
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
16709944	Continuation of	PCT/CN2019/112409	2019-10-22
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Foreign Priority Information:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	10018-01-0242-US-CON1
		Application Number	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ^j	Filing Date (YYYY-MM-DD)	Access Code ^k (if applicable)	Remove

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	10018-01-0242-US-CON1
		Application Number	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	10018-01-0242-US-CON1
		Application Number	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.				
Applicant	1	Remove		
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.				
Clear				
☒ Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor		
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:				
Name of the Deceased or Legally Incapacitated Inventor:				
If the Applicant is an Organization check here. ☒				
Organization Name	YANGTZE MEMORY TECHNOLOGIES CO., LTD.			
Mailing Address Information For Applicant:				
Address 1	18 Gaoxin 4th Road			
Address 2	East Lake High-Tech Development Zone			
City	Wuhan	State/Province		
Country	CN	Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Applicant Data may be generated within this form by selecting the Add button.				
Add				

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	10018-01-0242-US-CON1
		Application Number	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		

Assignee	1			
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
				Remove
If the Assignee or Non-Applicant Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.				Add

Signature:				Remove
NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).				
This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.				
See 37 CFR 1.4(d) for the manner of making signatures and certifications.				
Signature	/Zhiwei Zou/		Date (YYYY-MM-DD)	2021-06-21
First Name	Zhiwei	Last Name	Zou	Registration Number 66,041
Additional Signature may be generated within this form by selecting the Add button.				Add

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	10018-01-0242-US-CON1
		Application Number	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

- 1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
- 3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Application No. 16/709,944, filed on December 11, 2019, which is a continuation of International Application No. PCT/CN2019/112409, filed on October 22, 2019, both of which are incorporated herein by reference in their entireties.

BACKGROUND

[0002] The present disclosure is related to a non-volatile memory device and a control method, and more particularly to a non-volatile memory device and a control method capable of applying word line pre-pulse signals with different voltage levels and reducing programming disturb.

[0003] Non-volatile memory devices, such as flash memory, have become the storage of choice in various electrical products, such as personal computers, flash drives, digital cameras, and mobile phones. Flash memory devices have undergone rapid development. The flash memory can store data for a considerably long time without powering, and have advantages such as high integration level, fast access, easy erasing, and rewriting. To further improve the bit density and reduce cost of the flash memory device, a three-dimensional (3D) NAND flash memory has been developed. A 3D NAND memory architecture stacks memory cells vertically in multiple layers, achieving a higher density than traditional NAND memory. As more layers are added, the bit density increases, thus increasing more storage capacity. With the layer increases, the program disturb becomes worse. A pre-pulse signal may be applied to an unselected bit line connect to an unselected memory string so as to remove boosting charges (electrons) of the unselected memory string. However, as the layer increases, the channel length increases accordingly. The effect of bit line pre-charge for electrons remained in the bottom channel will be reduced because of the increased channel length. A traditional method for improving the bit line pre-charge effect is to extend the bit line pre-pulse time, but this would sacrifice and influence the data programming time. Another traditional method for improving the bit line pre-charge effect is to increase the voltage level of the bit line pre-pulse, but this would increase the risk of the breakdown phenomenon of the bit line transistor. Thus, there is a need for improvement.

SUMMARY

[0004] It is therefore an objective of the present disclosure to provide a non-volatile memory device and a control method capable of applying word line pre-pulse signals with different voltage levels and reducing programming disturb.

[0005] An embodiment provides a non-volatile memory device. The non-volatile memory device includes a memory array including a plurality of memory strings, each memory string including a select gate transistor and a plurality of memory cells connected in series with the select gate transistor; a bit line connected to a first memory string of the plurality of memory strings; a select gate line connected to the select gate transistor of the first memory string of the plurality of memory strings; a plurality of word lines connected to the plurality of memory cells of the first memory string of the plurality of memory strings, each word line connected to a respective memory cell of the first memory string; a first control circuit configured to apply a bit line pre-pulse signal to the bit line during a pre-charge period; and a second control circuit configured to apply a word line signal to a selected word line of the plurality of word lines and apply a plurality of word line pre-pulse signals to word lines disposed between the select gate line and the selected word line during the pre-charge period, wherein voltage levels of the plurality of word line pre-pulse signals are incremental.

[0006] Another embodiment provides a control method of non-volatile memory device. The non-volatile memory device includes a memory array including a plurality of memory strings and each memory string includes a select gate transistor and a plurality of memory cells connected in series with the select gate transistor. The control method includes applying a bit line pre-pulse signal to a bit line connected to a first memory string of the plurality of memory strings during a pre-charge period; applying a word line signal to a selected word line connected to a selected memory cell of the plurality of memory cells of the first memory string during the pre-charge period; and applying a plurality of word line pre-pulse signals to a plurality of word lines connected to the plurality of memory cells of the first memory string and disposed between the select gate line and the selected word line during the pre-charge period, wherein voltage levels of the plurality of word line pre-pulse signals are different.

[0007] These and other objectives of the present disclosure will no doubt become obvious to those of ordinary skill in the art after reading the following detailed description of the embodiments that is illustrated in the various figures and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a schematic diagram of a non-volatile memory device according to an

embodiment of the present disclosure.

[0009] FIG. 2 is a schematic diagram illustrating a memory string and related connection lines of the non-volatile memory device shown in FIG. 1 according to an embodiment of the present disclosure.

[0010] FIG. 3 is a schematic diagram illustrating an unselected memory string and related connection lines of the non-volatile memory device shown in FIG. 1 according to an embodiment of the present disclosure.

[0011] FIG. 4 and FIG. 5 are signal timing diagrams of the memory string shown in FIG. 3 according to embodiments of the present disclosure.

DETAILED DESCRIPTION

[0012] Please refer to FIG. 1, which is a schematic diagram of a non-volatile memory device 1 according to an embodiment of the present disclosure. The non-volatile memory device 1 may be a NAND flash memory. For example, the non-volatile memory device 1 may be a three-dimensional (3D) NAND flash memory. The non-volatile memory device 1 includes a memory array 10 and control circuits 20 and 30. The memory array 10 includes a plurality of memory strings. Each memory string includes a plurality of memory cells. The memory cells of each string are connected together in series. The intersection of a word line and a semiconductor channel forms a memory cell. Top select gate lines TSGs, word lines WLs, top dummy word lines TDMYs, bottom dummy word lines BDMYs and bottom gate lines BSGs are connected between the memory array 10 and the control circuit 20. Bit lines BLs are connected between the memory array 10 and the control circuit 30.

[0013] FIG. 2 is a schematic diagram illustrating a memory string and related connection lines of the non-volatile memory device 1 shown in FIG. 1 according to an embodiment of the present disclosure. The memory string of the memory array 10 includes, but not limited thereto, a top select gate transistor, at least one top dummy memory cell, a plurality of memory cells, at least one bottom dummy memory cell and a bottom select gate transistor. A bit line BL is coupled to the memory string. A top select gate line TSG is connected to the top select gate transistor of the memory string. The at least one top dummy memory cell is connected in series with the top select gate transistor. At least one top dummy word line TDMY is connected to the at least one top dummy memory cell of the memory string. Each top dummy word line is separately connected to a top dummy memory cell. The plurality of memory cells can be configured to store data. The plurality of memory cells can be connected in series with the at least one top dummy memory cell. Word lines WL are connected to the

memory cells of the memory string. Each word line WL is separately connected to a memory cell. Further, the memory cells of the memory string of the memory array 10 are disposed sequentially along a first direction between the top dummy memory cell and the bottom dummy memory cell and accordingly the word lines WL are disposed sequentially along the first direction between the top dummy word line TDMY and the bottom dummy word line BDMY.

[0014] Moreover, the at least one bottom dummy memory cell is connected in series with the plurality of memory cells. At least one bottom dummy word line BDMY is connected to the at least one bottom dummy memory cell of the memory string. Each bottom dummy word line BDMY is separately connected to a bottom dummy memory cell. The bottom select gate transistor is connected in series with the at least one bottom dummy memory cell. A bottom select gate line BSG is connected to the bottom select gate transistor of the memory string. Writing and erasing data in the memory cells can be controlled from the control circuits and external circuits through the connection lines of the non-volatile memory device 1.

[0015] During a pre-charge period (before programming), the control circuit 30 is configured to apply a bit line pre-pulse signal to unselected bit lines BL of unselected memory strings of the memory array 10. For example, for each unselected memory string, the control circuit 30 is configured to apply a bit line pre-pulse signal to an unselected bit line BL of each unselected memory string during the pre-charge period. The control circuit 20 is configured to apply a top select gate pre-pulse signal to the top select gate line TSG and apply a bottom select gate pre-pulse signal to the bottom select gate line BSG. Moreover, the control circuit 20 is configured to apply a word line signal to a selected word line of the unselected memory string. The control circuit 20 is configured to apply a plurality of word line pre-pulse signals to word lines which are disposed between the selected word line and the top dummy word line TDMY (or the top select gate TSG). The control circuit 20 is also configured to apply a top dummy word line pre-pulse signal to the top dummy word lines TDMY disposed between the word lines and the top select gate TSG and apply a bottom dummy word line pre-pulse signal to the bottom dummy word lines BDMY disposed between the word lines and the bottom select gate BSG.

[0016] Moreover, voltage levels of the plurality of word line pre-pulse signals applied to the word lines disposed between the selected word line and the top dummy word line TDMY may be different. For example, the voltage levels of the plurality of word line pre-pulse signals applied to the word lines disposed between the selected word line and the top dummy word line TDMY may be incremental. For example, the voltage levels of the plurality of

word line pre-pulse signals applied to the word lines disposed between the selected word line and the top dummy word line TDMY are incremental sequentially from a word line disposed adjacent to the selected word line. For example, a first word line pre-pulse signal of the plurality of word line pre-pulse signals can be applied to a first word line of the plurality of word lines, and the first word line is disposed adjacent to the selected word line and between the selected word line and the top dummy word line TDMY. A second word line pre-pulse signal of the plurality of word line pre-pulse signals can be applied to a second word line of the plurality of word lines, and the second word line is disposed adjacent to the first word line and between the first word line and the top dummy word line TDMY. In an embodiment, the voltage level of the second word line pre-pulse signal is greater than the voltage level of the first word line pre-pulse signal.

[0017] A third word line pre-pulse signal of the plurality of word line pre-pulse signals can be applied to a third word line of the plurality of word lines, and the third word line is disposed adjacent to the second word line and between the second word line and the top dummy word line TDMY. In an embodiment, the voltage level of the third word line pre-pulse signal is greater than the voltage level of the second word line pre-pulse signal. A fourth word line pre-pulse signal of the plurality of word line pre-pulse signals can be applied to a fourth word line, and the fourth word line is disposed adjacent to the third word line and between the third word line and the top dummy word line TDMY, and so on. In an embodiment, the voltage level of the fourth word line pre-pulse signal is greater than the voltage level of the third word line pre-pulse signal, and so on.

[0018] In other words, the farther away from the selected word line, the larger voltage level of the word line pre-pulse signal can be applied since the word line pre-pulse signals are applied to word lines disposed between the top select gate TSG and the selected word line. The voltage level of the word line pre-pulse signal applied to the word line located farthest from the selected word line may be the largest among the voltage levels of the plurality of word line pre-pulse signals applied to the word lines disposed between the selected word line and the top dummy word line TDMY. The voltage level of the word line pre-pulse signal applied to the word line located closest from the selected word line may be the smallest among the voltage levels of the plurality of word line pre-pulse signals applied to the word lines disposed between the selected word line and the top dummy word line TDMY. Since the word line pre-pulse signals with different voltage levels are applied to the word lines between the top select gate line and selected word line, the channel potential gradient is therefore enhanced, and thus enhancing the pre-charge effect of the unselected bit line and reducing

programming disturb.

[0019] In addition, a voltage level of the top dummy word line pre-pulse signal applied to the top dummy word lines TDMY is greater than the voltage levels of the plurality of word line pre-pulse signals applied to the word lines disposed between the selected word line and the top dummy word line TDMY.

[0020] Moreover, the word lines disposed between the selected word line and the top select gate TSG can be divided into multiple groups of the word lines. Each divided group of word lines may include at least one word line. Note that, the amount of the word lines of each group of the word lines is not limited and may be varied and designed in accordance with practical system demands and requirements. Each group of the word lines may include at least one word line. For example, please refer to FIG. 3. FIG. 3 is a schematic diagram illustrating an unselected memory string and related connection lines of the non-volatile memory device 1 shown in FIG. 1 according to an embodiment of the present disclosure. A top select gate transistor TT, top dummy memory cells TDMY, memory cells MC0 to MCn, bottom dummy memory cells BDMC and a bottom select gate transistor BT are connected in series. FIG. 3 shows the unselected bit line BL, the top select gate line TSG, the top dummy word lines TDMY, the word lines WL0 to WLn, the bottom dummy word lines BDMY and the bottom select gate line BSG. As shown in FIG. 3, suppose the word line WL0 is the selected word line, the word lines WL1 to WLn are divided into a first group of word lines (Bottom WL), a second group of word lines (Middle WL) and a third group of word lines (Top WL). From the bottom to top, the first group of word lines (Bottom WL) includes the word lines WL1 to WLp. The first group of word lines (Bottom WL) is between the selected word line (word line WL0) and the second group of word lines (Middle WL). The second group of word lines (Middle WL) includes the word lines WL(p+1) to WLq. The second group of word lines (Middle WL) is between the first group of word lines (Bottom WL) and the third group of word lines (Top WL). The third group of word lines (Top WL) includes the word lines WL(q+1) to WLn. The third group of word lines (Top WL) is between the second group of word lines (Middle WL) and the top dummy word lines TDMY.

[0021] Please further refer to FIG. 3 and FIG. 4. FIG. 4 is a signal timing diagram of the memory string shown in FIG. 3 according to an embodiment of the present disclosure. Sequentially from the top of FIG. 4, the signal waveforms in a pre-charge period are: a bit line pre-pulse signal VP_BL, a top select gate pre-pulse signal VP_TSG, a top dummy word line pre-pulse signal VP_TDMY, word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL and a word line signal V_SELWL. During a pre-charge period, the bit

line pre-pulse signal VP_BL is applied to the unselected bit line BL of the unselected memory string of the memory array 10. The top select gate pre-pulse signal VP_TSG is applied to the top select gate line TSG. The top dummy word line pre-pulse signal VP_TDMY is applied to the top dummy word lines TDMY. The word line pre-pulse signals VP_TOPWL is applied to the third group of word lines (Top WL). The word line pre-pulse signals VP_MIDDLEWL is applied to the second group of word lines (Middle WL). The word line pre-pulse signals VP_BOTTOMWL is applied to the first group of word lines (Bottom WL). The bit line pre-pulse signal VP_BL applied to the unselected bit line BL may be a first power supply voltage Vdd. The top select gate pre-pulse signal VP_TSG applied to the top select gate line TSG may be a second power supply voltage Vcc. The top dummy word line pre-pulse signal VP_TDMY applied to the top dummy word lines TDMY may also be the first power supply voltage Vdd. The word line signal V_SELWL applied to the selected word line (WL0) can be a programming voltage.

[0022] In an embodiment, as shown in FIG. 4, the voltage level (1.2 volts) of the word line pre-pulse signal VP_MIDDLEWL is greater than the voltage level (0.6 volts) of the word line pre-pulse signal VP_BOTTOMWL. The voltage level (1.8 volts) of the word line pre-pulse signal VP_TOPWL is greater than the voltage level (1.2 volts) of the word line pre-pulse signal VP_MIDDLEWL. The voltage level (Vdd) of top dummy word line pre-pulse signal VP_TDMY is greater than the voltage levels of the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL. In another embodiment, please further refer to FIG. 5. FIG. 5 is a signal timing diagram of the memory string shown in FIG. 3 according to an alternative embodiment of the present disclosure. Sequentially from the top of FIG. 5, the signal waveforms in a pre-charge period are: a bit line pre-pulse signal VP_BL, a top select gate pre-pulse signal VP_TSG, a top dummy word line pre-pulse signal VP_TDMY, word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL and a word line signal V_SELWL. The word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL and the word line signal V_SELWL are negative pulse signals. As shown in FIG. 5, the voltage level (-1.2 volts) of the word line pre-pulse signal VP_MIDDLEWL is greater than the voltage level (-1.8 volts) of the word line pre-pulse signal VP_BOTTOMWL. The voltage level (-0.6 volts) of the word line pre-pulse signal VP_TOPWL is greater than the voltage level (-1.2 volts) of the word line pre-pulse signal VP_MIDDLEWL. The voltage level (Vdd) of top dummy word line pre-pulse signal VP_TDMY is greater than the voltage levels of the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL.

[0023] In an embodiment, please further refer to FIGs. 3-5. During the pre-charge period, the ending of the word line pre-pulse signal VP_MIDDLEWL applied to the second group of word lines (Middle WL) occurs after the ending of the word line pre-pulse signal VP_BOTTOMWL applied to the first group of word lines (Bottom WL). The ending of the word line pre-pulse signal VP_TOPWL applied to the third group of word lines (Top WL) occurs after the ending of the word line pre-pulse signal VP_MIDDLEWL applied to the second group of word lines (Middle WL). The ending of the top dummy word line pre-pulse signal VP_TDMY applied to the top dummy word lines TDMY occurs after the endings of the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL. As shown in FIG. 4 and FIG. 5, the end point of the word line pre-pulse signal VP_MIDDLEWL applied to the second group of word lines (Middle WL) is after the end point of the word line pre-pulse signal VP_BOTTOMWL applied to the first group of word lines (Bottom WL) during the pre-charge period. The end point of the word line pre-pulse signal VP_TOPWL applied to the third group of word lines (Top WL) is after the end point of the word line pre-pulse signal VP_MIDDLEWL applied to the second group of word lines (Middle WL) during the pre-charge period. The end point of the top dummy word line pre-pulse signal VP_TDMY applied to the top dummy word lines TDMY is after the end points of the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL. Since the word line pre-pulse signals with different ending timing are applied to the word lines between the top select gate line and selected word line, the whole programming speed can be improved effectively.

[0024] Moreover, as shown in FIG. 4, since the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL are positive pulse signals, the falling edge of the word line pre-pulse signal VP_MIDDLEWL is after the falling edge of the word line pre-pulse signal VP_BOTTOMWL during the pre-charge period. The falling edge of the word line pre-pulse signal VP_TOPWL is after the falling edge of the word line pre-pulse signal VP_MIDDLEWL during the pre-charge period. The falling edge of the top dummy word line pre-pulse signal VP_TDMY applied to the top dummy word lines TDMY is after the falling edges of the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL. As shown in FIG. 5, since the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL are negative pulse signals, the rising edge of the word line pre-pulse signal VP_MIDDLEWL is after the rising edge of the word line pre-pulse signal VP_BOTTOMWL during the pre-charge period. The rising edge of the word line pre-pulse signal VP_TOPWL is after the rising edge of the word line pre-pulse signal

VP_MIDDLEWL during the pre-charge period. The rising edge of the top dummy word line pre-pulse signal VP_TDMY is after the rising edges of the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL.

[0025] In an embodiment, please further refer to FIGs. 4-5. During the pre-charge period, the pulse durations (signal lengths) of the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL are incremental. The pulse duration of the word line pre-pulse signal VP_MIDDLEWL applied to the second group of word lines (Middle WL) is greater than the pulse duration of the word line pre-pulse signal VP_BOTTOMWL applied to the first group of word lines (Bottom WL). The pulse duration of the word line pre-pulse signal VP_TOPWL applied to the third group of word lines (Top WL) is greater than the ending of the word line pre-pulse signal VP_MIDDLEWL applied to the second group of word lines (Middle WL). The pulse duration of the top dummy word line pre-pulse signal VP_TDMY applied to the top dummy word lines TDMY is greater than the pulse durations of the word line pre-pulse signals VP_TOPWL, VP_MIDDLEWL and VP_BOTTOMWL.

[0026] In summary, the embodiments of the present disclosure provide word line pre-pulse signals with different to drive the word lines between the top select gate line and selected word line so as to enhance channel potential gradient, and thus enhancing the pre-charge effect of the unselected bit line and reducing programming disturb. Moreover, the embodiments of the present disclosure provide word line pre-pulse signals with different ending timing to the word lines between the top select gate line and selected word line, and thus improving the whole programming speed effectively.

[0027] Those skilled in the art will readily observe that numerous modifications and alterations of the device and method may be made while retaining the teachings of the present disclosure. Accordingly, the above disclosure should be construed as limited only by the metes and bounds of the appended claims.

WHAT IS CLAIMED IS:

1. A non-volatile memory device, comprising:

a memory array comprising a plurality of memory strings, each memory string comprising a select gate transistor and a plurality of memory cells connected in series with the select gate transistor;

a bit line connected to a first memory string of the plurality of memory strings;

a select gate line connected to the select gate transistor of the first memory string of the plurality of memory strings;

a plurality of word lines connected to the plurality of memory cells of the first memory string of the plurality of memory strings, each word line connected to a respective memory cell of the first memory string;

a first control circuit configured to apply a bit line pre-pulse signal to the bit line during a pre-charge period; and

a second control circuit configured to apply a word line signal to a selected word line of the plurality of word lines and apply a plurality of word line pre-pulse signals to word lines disposed between the select gate line and the selected word line during the pre-charge period, wherein voltage levels of the plurality of word line pre-pulse signals are incremental.

ABSTRACT

A non-volatile memory device and a control method are provided e disclosed. The non-volatile memory device includes a memory array, a bit line, a plurality of word lines, a first control circuit, and second control circuit. The bit line is connected to a first memory string of the memory array. The plurality of word lines are connected to memory cells of the first memory string and each word line is connected to a respective memory cell. The first control circuit is configured to apply a bit line pre-pulse signal to the bit line during a pre-charge period. The second control circuit is configured to apply a word line signal to a selected word line and apply a plurality of word line pre-pulse signals to word lines disposed between a select gate line and the selected word line. Voltage levels of the plurality of word line pre-pulse signals are incremental.

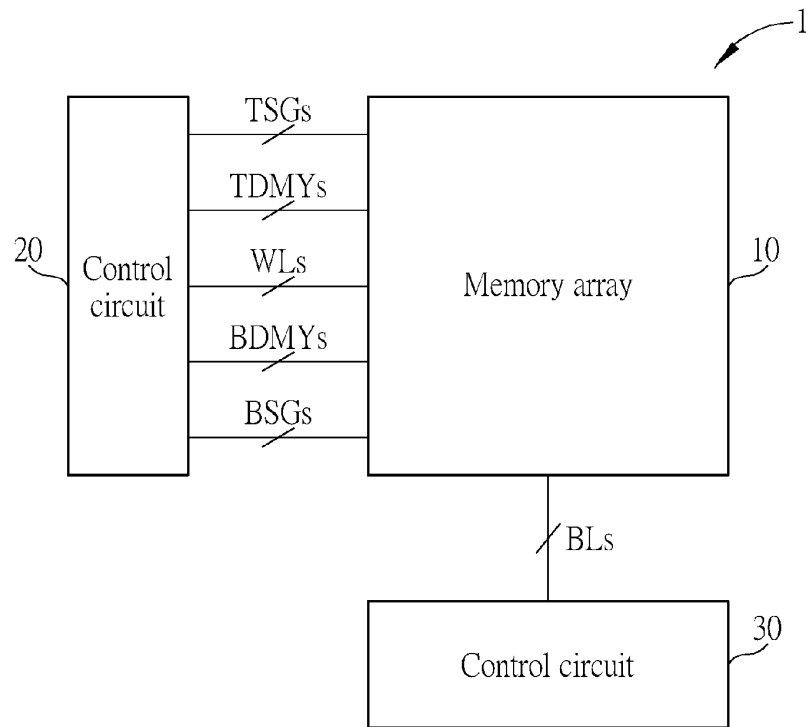


FIG. 1

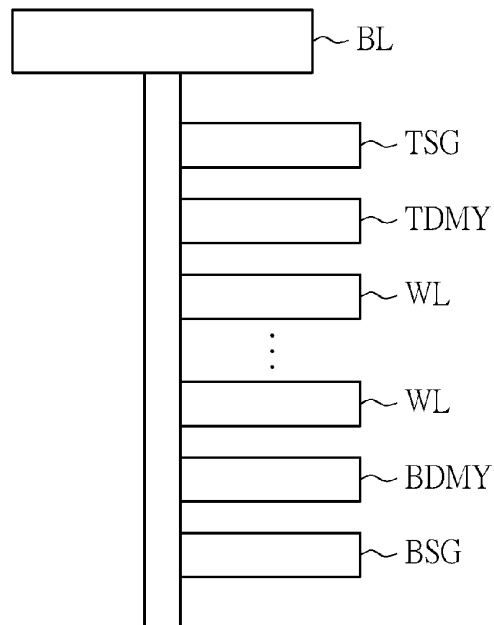


FIG. 2

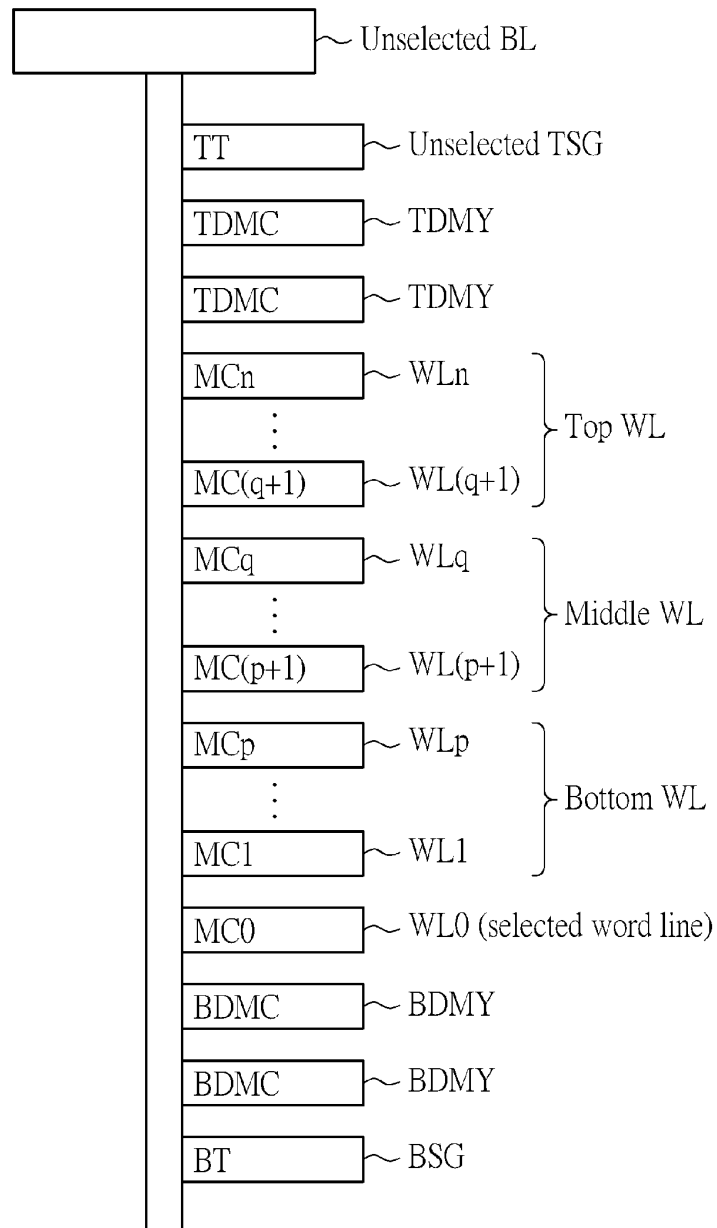


FIG. 3

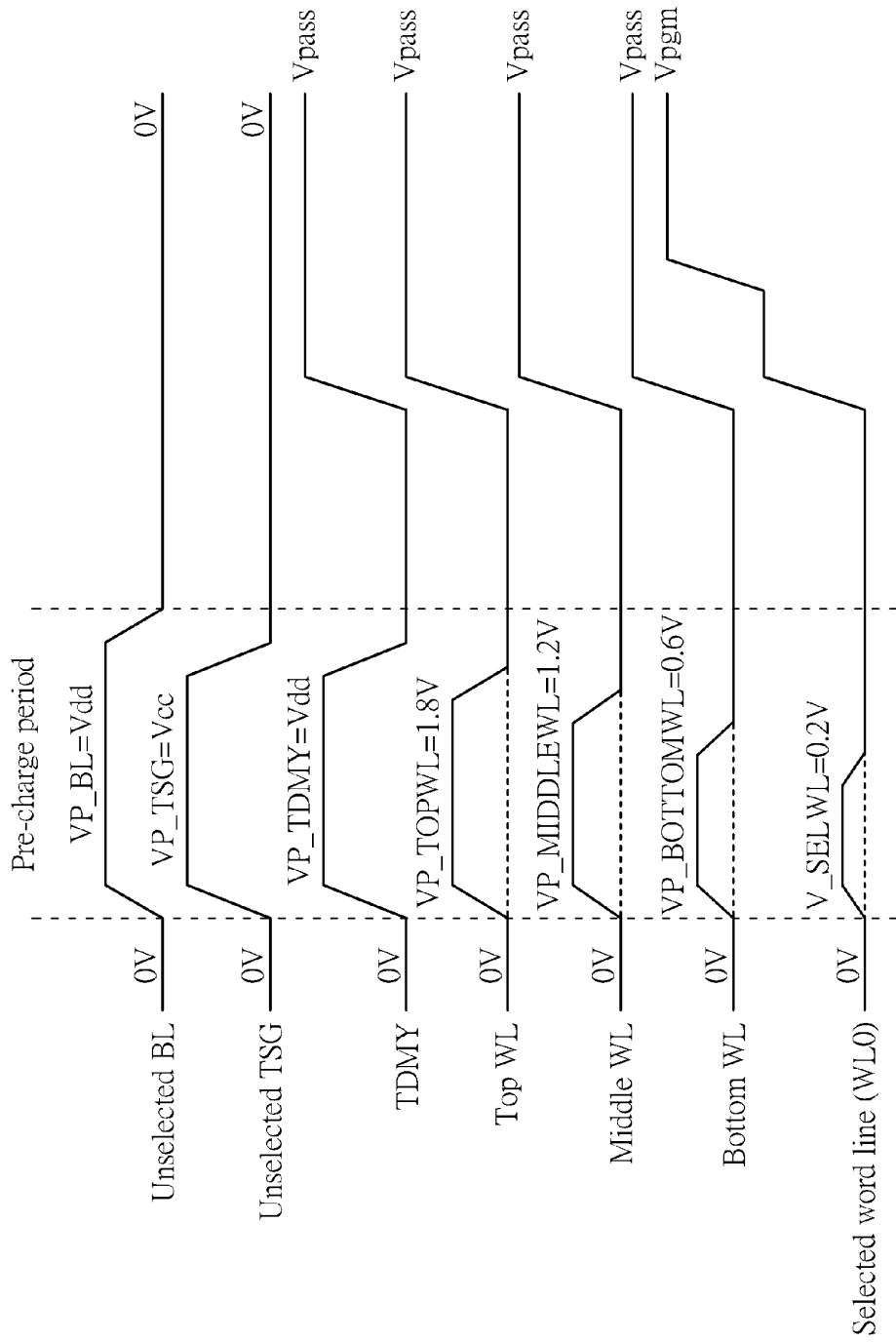
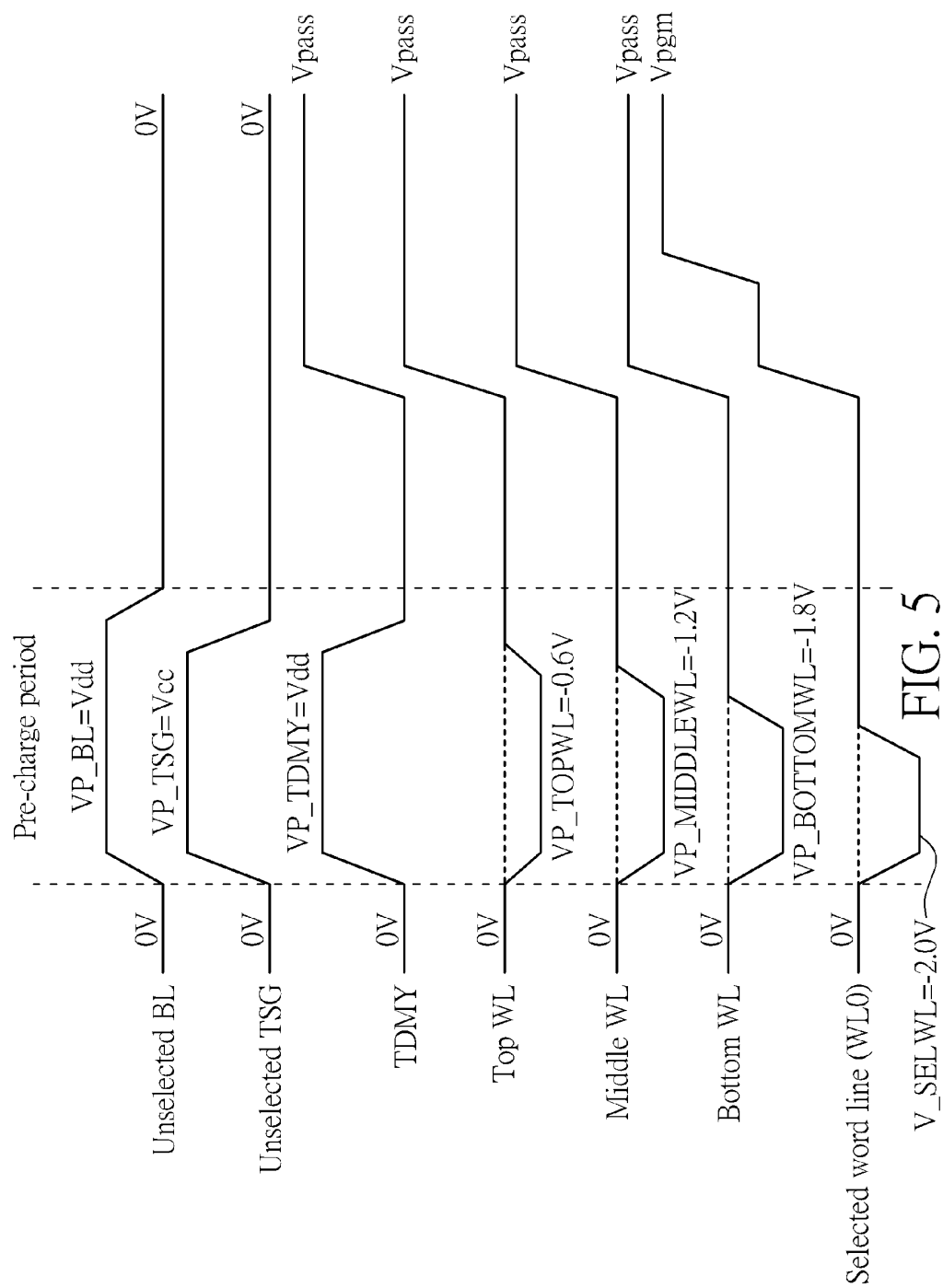


FIG. 4



Atty. Docket No. YMTP0261USA3

COMBINED DECLARATION AND ASSIGNMENT

DECLARATION

As the below named inventors, I hereby declare that:

This declaration is directed to:

- ☒ The attached application, or
☐ United States application or PCT International application number
_____ filed on _____

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

I believe that I am the original inventor or an original joint inventor of a claimed invention in 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

In consideration of the sum of One Dollar (\$1.00) or equivalent and other good and valuable consideration paid to each of the below named inventors, each of the below named inventors, hereby sell and assign to **Yangtze Memory Technologies Co., Ltd.**, a corporation formed under the laws of China, whose mailing address is Room 7018, No.18, Huaguang Boulevard, Guandong Tech. Industrial Park, Donghu Development Area, Hongshan District, Wuhan City, Hubei Province 430074, P.R.C. (hereafter referred to as the Assignee), his/her entire right, title and interest, including the right to sue for past infringement and to collect for all past, present and future damages, for the United States of America (as defined in 35 U.S.C. § 100) and throughout the world,

(a) in the invention(s) known as **NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD** for which application(s) for patent in the United States of America is identified above, in any and all applications thereon, in any and all Letters Patent(s) therefor, and

(b) in any and all applications that claim the benefit of the patent application identified above in part (a), including non-provisional applications, continuing (continuation, divisional, or continuation-in-part) applications, reissues, extensions, renewals and reexaminations of the patent application or Letters Patent therefor listed above in part (a), to the full extent of the term or terms for which Letters Patents issue, and

(c) in any and all inventions described in the patent application identified above in part (a), and in any and all forms of intellectual and industrial property protection derivable from such patent application, and that are derivable from any and all continuing applications, reissues, extensions,

renewals and reexaminations of such patent application, including, without limitation, patents, applications, utility models, inventor's certificates, and designs together with the right to file applications therefor; and including the right to claim the same priority rights from any previously filed applications under the International Agreement for the Protection of Industrial Property, or any other international agreement, or the domestic laws of the country in which any such application is filed, as may be applicable;

all such rights, title and interest to be held and enjoyed by the above-named Assignee, its successors, legal representatives and assigns to the same extent as all such rights, title and interest would have been held and enjoyed by the Assignor had this assignment and sale not been made.

The below named inventors agree to execute all papers necessary in connection with the application(s) and any non-provisional, continuing (continuation, divisional, or continuation-in-part), reissue, reexamination or corresponding application(s) thereof and also to execute separate assignments in connection with such application(s) as the Assignee may deem necessary or expedient.

The below named inventors agree to execute all papers necessary in connection with any patent enforcement action (judicial or otherwise) related to the application(s) or any non-provisional, continuing (continuation, divisional, or continuation-in-part), reissue or reexamination application(s) thereof and to cooperate with the Assignee in every way possible in obtaining evidence and going forward with such patent enforcement action.

The below named inventors hereby represent that he/she has full right to convey the entire interest herein assigned, and that he/she has not executed, and will not execute, any agreement in conflict therewith.

The below named inventors hereby represent that he/she understands that the patent practitioners associated with **CUSTOMER NUMBER 27765** are the legal representatives of, and attorneys for, the assignee, and are NOT the legal representatives of, and attorneys for, the inventors.

IN WITNESS WHEREOF, executed by the below named inventors on the date opposite his/her name.

LEGAL NAME OF INVENTOR

Inventor: Jianquan Jia Date: 2019.11.07

Signature of Inventor: Jianquan Jia

LEGAL NAME OF INVENTOR

Inventor: Ying Cui Date: 2019.11.07

Signature of Inventor: Ying Cui

LEGAL NAME OF INVENTOR

Inventor: Kaikai You Date: 2019.11.07

Signature of Inventor: Kai kai You

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	
Filing Date	Herewith
First Named Inventor	Jianquan JIA
Title	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD
Art Unit	To Be Determined
Examiner Name	To Be Determined
Attorney Docket Number	10018-01-0242-US-CON1

SIGNATURE of Applicant or Patent Practitioner

Signature	/Zhiwei Zou/	Date (Optional)	6/21/2021
Name	Zhiwei Zou	Registration Number	66,041
Title (if Applicant is a juristic entity)	Attorney for Applicant		
Applicant Name (if Applicant is a juristic entity)	Yangtze Memory Technologies Co., Ltd.		

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.



*Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number

Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

153988

OR



I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:



The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number:

OR



Firm or
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Yangtze Memory Technologies Co., Ltd.



Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

Name

SIMON SHI-NING YANG

Title

CEO

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.



Total of One forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual task. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1480, Alexandria, VA 22313-1480. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1480, Alexandria, VA 22313-1480.

If you need assistance in completing this form, call 1-800-PTO-4175 and select option 2.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	
	Filing Date	
	First Named Inventor	Jianquan JIA
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	10018-01-0242-US-CON1

U.S.PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1	9460805	B1	2016-10-04	Pang et al.		
	2	10283202	B1	2019-05-07	Chen et al.		
	3	10770157	B1	2020-09-08	Chen et al.		
If you wish to add additional U.S. Patent citation information please click the Add button.							Add
U.S.PATENT APPLICATION PUBLICATIONS							Remove
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1	20200353312	A1	2020-11-12	Smith		
	2	20110194351	A1	2011-08-11	KIM et al.		
	3	20190147955	A1	2019-05-16	Chen		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	Jianquan JIA	
	Art Unit	TBD	
	Examiner Name	TBD	
	Attorney Docket Number	10018-01-0242-US-CON1	

	4	20190108883	A1	2019-04-11	Yu	
	5	20190156901	A1	2019-05-23	Chen	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS								Remove
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	110289034	CN	A	2019-09-27		Abstract	

If you wish to add additional Foreign Patent Document citation information please click the Add button.

NON-PATENT LITERATURE DOCUMENTS								Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵
	1							

If you wish to add additional non-patent literature document citation information please click the Add button.

EXAMINER SIGNATURE			
Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	Jianquan JIA	
	Art Unit	TBD	
	Examiner Name	TBD	
	Attorney Docket Number	10018-01-0242-US-CON1	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Zhiwei Zou/	Date (YYYY-MM-DD)	2021-06-21
Name/Print	Zhiwei Zou	Registration Number	66,041

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		
First Named Inventor/Applicant Name:		Jianquan Jia		
Filer:		Zhiwei Zou/Anna O'Connor		
Attorney Docket Number:		10018-01-0242-US-CON1		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1820

Electronic Acknowledgement Receipt	
EFS ID:	43046981
Application Number:	17353727
International Application Number:	
Confirmation Number:	5573
Title of Invention:	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD
First Named Inventor/Applicant Name:	Jianquan Jia
Customer Number:	153988
Filer:	Zhiwei Zou/Anna O'Connor
Filer Authorized By:	Zhiwei Zou
Attorney Docket Number:	10018-01-0242-US-CON1
Receipt Date:	21-JUN-2021
Filing Date:	
Time Stamp:	22:00:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1820
RAM confirmation Number	E20216KM00521858
Deposit Account	602227
Authorized User	Anna O'Connor
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	10018-01-0242-US-CON1_UtilityPatentApp-FEETransmittal.pdf	1158037	no	2
			6f8118913c75101deee22ec6444dd8857e8b9215		
Warnings:					
Information:					
2	Application Data Sheet	10018-01-0242-US-CON1_ADS.pdf	1829435	no	9
			b3e2810528126e4a75f6082acabf8bf5743db93a		
Warnings:					
Information:					
3		2019-00232-YMTC-PCT-US-CON1_FINALApplication.pdf	174199	yes	11
			00b95fe75e985470278169d2de4effe34a498aff		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	9	
	Claims		10	10	
	Abstract		11	11	
Warnings:					
Information:					
4	Drawings-only black and white line drawings	2019-00232-YMTC-PCT-US-CON1_FINALFigures.pdf	715019	no	4
			07f45301bba12232c4f049642f5c560c170489c5		
Warnings:					
Information:					
5	Oath or Declaration filed	10018-01-0242-US-CON1_CombinedDEC-ASSIGN_signed.pdf	376631	no	3
			f47c5cb684aa48a72f1f7065f3c16da6252d5dbe		

Warnings:					
Information:					
6	Power of Attorney	10018-01-0242-US-CON1_GeneralPOA.pdf	923460	no	2
			78d6aa4f7fe2589bcb740b340ffdc88a7c7831ff		
Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	10018-01-0242-US-CON1_IDS-SB08.pdf	612222	no	4
			98f720b133655eb69c3009fb883fe419ece53ed7		
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	34982	no	2
			d3a88ad603dcf123bfc6a9e4ae6d55a5c2c22b48		
Warnings:					
Information:					
Total Files Size (in bytes):			5823985		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT6773370

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
JIANQUAN JIA	11/07/2019
YING CUI	11/07/2019
KAIKAI YOU	11/07/2019
RECEIVING PARTY DATA	
Name:	YANGTZE MEMORY TECHNOLOGIES CO., LTD.
Street Address:	ROOM 7018, NO 18, HUAGUANG BOULEVARD, GUANGDONG TECH. INDUSTRIAL PARK, DONGHUA DEVELOPMENT AREA,
Internal Address:	HONGSHAN DISTRICT, HUBEI PROVINCE
City:	WUHAN
State/Country:	CHINA
Postal Code:	430074
PROPERTY NUMBERS Total: 1	
Property Type	Number
Application Number:	17353727
CORRESPONDENCE DATA	
Fax Number:	(703)821-8128
<i>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.</i>	
Phone:	7039959887
Email:	uspto@bayes.law
Correspondent Name:	BAYES PLLC
Address Line 1:	1765 GREENSBORO STATION PLACE
Address Line 2:	SUITE 900
Address Line 4:	MCLEAN, UNITED STATES 22102
ATTORNEY DOCKET NUMBER:	10018-01-0242-US-CON1
NAME OF SUBMITTER:	ZHIWEI ZOU
SIGNATURE:	/Zhiwei Zou/
DATE SIGNED:	06/21/2021
This document serves as an Oath/Declaration (37 CFR 1.63).	
Total Attachments: 3	

source=10018-01-0242-US-CON1_CombinedDEC-ASSIGN_signed#page1.tif

source=10018-01-0242-US-CON1_CombinedDEC-ASSIGN_signed#page2.tif

source=10018-01-0242-US-CON1_CombinedDEC-ASSIGN_signed#page3.tif

Atty. Docket No. YMTP0261USA3

COMBINED DECLARATION AND ASSIGNMENT

DECLARATION

As the below named inventors, I hereby declare that:

This declaration is directed to:

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

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

I believe that I am the original inventor or an original joint inventor of a claimed invention in 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

In consideration of the sum of One Dollar (\$1.00) or equivalent and other good and valuable consideration paid to each of the below named inventors, each of the below named inventors, hereby sell and assign to **Yangtze Memory Technologies Co., Ltd.**, a corporation formed under the laws of China, whose mailing address is Room 7018, No.18, Huaguang Boulevard, Guandong Tech. Industrial Park, Donghu Development Area, Hongshan District, Wuhan City, Hubei Province 430074, P.R.C. (hereafter referred to as the Assignee), his/her entire right, title and interest, including the right to sue for past infringement and to collect for all past, present and future damages, for the United States of America (as defined in 35 U.S.C. § 100) and throughout the world,

(a) in the invention(s) known as **NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD** for which application(s) for patent in the United States of America is identified above, in any and all applications thereon, in any and all Letters Patent(s) therefor, and

(b) in any and all applications that claim the benefit of the patent application identified above in part (a), including non-provisional applications, continuing (continuation, divisional, or continuation-in-part) applications, reissues, extensions, renewals and reexaminations of the patent application or Letters Patent therefor listed above in part (a), to the full extent of the term or terms for which Letters Patents issue, and

(c) in any and all inventions described in the patent application identified above in part (a), and in any and all forms of intellectual and industrial property protection derivable from such patent application, and that are derivable from any and all continuing applications, reissues, extensions,

renewals and reexaminations of such patent application, including, without limitation, patents, applications, utility models, inventor's certificates, and designs together with the right to file applications therefor; and including the right to claim the same priority rights from any previously filed applications under the International Agreement for the Protection of Industrial Property, or any other international agreement, or the domestic laws of the country in which any such application is filed, as may be applicable;

all such rights, title and interest to be held and enjoyed by the above-named Assignee, its successors, legal representatives and assigns to the same extent as all such rights, title and interest would have been held and enjoyed by the Assignor had this assignment and sale not been made.

The below named inventors agree to execute all papers necessary in connection with the application(s) and any non-provisional, continuing (continuation, divisional, or continuation-in-part), reissue, reexamination or corresponding application(s) thereof and also to execute separate assignments in connection with such application(s) as the Assignee may deem necessary or expedient.

The below named inventors agree to execute all papers necessary in connection with any patent enforcement action (judicial or otherwise) related to the application(s) or any non-provisional, continuing (continuation, divisional, or continuation-in-part), reissue or reexamination application(s) thereof and to cooperate with the Assignee in every way possible in obtaining evidence and going forward with such patent enforcement action.

The below named inventors hereby represent that he/she has full right to convey the entire interest herein assigned, and that he/she has not executed, and will not execute, any agreement in conflict therewith.

The below named inventors hereby represent that he/she understands that the patent practitioners associated with **CUSTOMER NUMBER 27765** are the legal representatives of, and attorneys for, the assignee, and are NOT the legal representatives of, and attorneys for, the inventors.

IN WITNESS WHEREOF, executed by the below named inventors on the date opposite his/her name.

LEGAL NAME OF INVENTOR

Inventor: Jianquan Jia Date: 2019.11.07

Signature of Inventor: Jianquan Jia

LEGAL NAME OF INVENTOR

Inventor: Ying Cui Date: 2019.11.07

Signature of Inventor: Ying Cui

LEGAL NAME OF INVENTOR

Inventor: Kaikai You Date: 2019.11.07

Signature of Inventor: Kai kai You



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/353,727	06/21/2021	2827	1820	10018-01-0242-US-CON1	1	1

CONFIRMATION NO. 5573

FILING RECEIPT



CC000000126707651

153988
Bayes PLLC
1765 Greensboro Station Place
Suite 900
McLean, VA 22102

Date Mailed: 07/02/2021

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Jianquan Jia, Wuhan, CHINA;
Ying Cui, Wuhan, CHINA;
Kaikai You, Wuhan, CHINA;

Applicant(s)

YANGTZE MEMORY TECHNOLOGIES CO., LTD., Wuhan, CHINA;

Assignment For Published Patent Application

Yangtze Memory Technologies Co., Ltd.

Power of Attorney: The patent practitioners associated with Customer Number 153988

Domestic Priority data as claimed by applicant

This application is a CON of 16/709,944 12/11/2019
which is a CON of PCT/CN2019/112409 10/22/2019

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 07/01/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/353,727**

Projected Publication Date: 10/07/2021

Non-Publication Request: No

Early Publication Request: No

Title

NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD

Preliminary Class

365

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

page 2 of 4

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 17/353,727	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	1	minus 20 = *				x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1	minus 3 = *				x 480 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1820
APPLICATION AS AMENDED - PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =
	Application Size Fee (37 CFR 1.16(s))						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
			TOTAL ADD'L FEE			TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =
	Application Size Fee (37 CFR 1.16(s))						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
			TOTAL ADD'L FEE			TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.							



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1

CONFIRMATION NO. 5573

153988
Bayes PLLC
8260 Greensboro Drive
Suite 625
McLean, VA 22102

PUBLICATION NOTICE



OC000000128963881

Title:NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD

Publication No.US-2021-0312973-A1

Publication Date:10/07/2021

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <https://portal.uspto.gov/pair/PublicPair>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 17/353,727		Filing Date 06/21/2021		☐ To be Mailed			
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO											
APPLICATION AS FILED - PART I											
		(Column 1)		(Column 2)							
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A		N/A		N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A					
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =		*		x \$100 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =		*		x \$480 =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))											
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL					
APPLICATION AS AMENDED - PART II											
		(Column 1)		(Column 2)		(Column 3)					
AMENDMENT	10/29/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0			x \$100 =		0	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0			x \$480 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
								TOTAL ADD'L FEE		0	
		(Column 1)		(Column 2)		(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=			x \$0 =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=			x \$0 =			
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
								TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.								LDRC			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".								/EVA V GILLIS/			
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".											
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Jianquan Jia

Confirmation No.: 5573

Applicant: YANGTZE MEMORY
TECHNOLOGIES CO. LTD.

Art Unit: To Be Assigned

Application No.: 17/353,727

Examiner: To Be Assigned

Filing Date: June 21, 2021

Atty. Docket: 10018-01-0242-US-CON1

Title: **NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD**

PRELIMINARY AMENDMENT

Commissioner for Patents

PO Box 1450

Alexandria, VA 22313-1450

Commissioner:

Prior to examining the above-identified application, please enter and consider the following amendments:

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 6 of this paper.

No fee shall be required to submit this paper. However, if any extension of fee is required to continue prosecution of this application, please grant any extensions of time required to enter this Preliminary Amendment and charge any required fees to our Deposit Account No. 60-2227.

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Canceled)
2. (New) A memory device, comprising:
 - a plurality of memory strings;
 - a bit line connected to a first memory string of the plurality of memory strings;
 - a select gate line connected to the first memory string of the plurality of memory strings;
 - a selected word line of a plurality of word lines, wherein the plurality of word lines is connected to the first memory string; and
 - a control circuit configured to:
 - apply a first word line pre-pulse signal of a plurality of word line pre-pulse signals to a first group of the plurality of word lines during a pre-charge period;
 - apply a second word line pre-pulse signal of the plurality of word line pre-pulse signals to a second group of the plurality of word lines during the pre-charge period; and
 - apply a third word line pre-pulse signal of the plurality of word lines pre-pulse signals to a third group of the plurality of word lines during the pre-charge period,
 - wherein a voltage level of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a voltage level of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.
3. (New) The memory device of claim 2, wherein the first group of the plurality of word lines, the second group of the plurality of word lines, and the third group of the plurality of word lines are disposed in an order of distance from the selected word line of the plurality of word lines.
4. (New) The memory device of claim 2, wherein the first group of the plurality of word lines are disposed adjacent to the selected word line, the second group of the plurality of

word lines are disposed between the first group of the plurality of word lines and the select gate line, and the third group of the plurality of word lines are disposed between the second group of the plurality of word lines and the select gate line.

5. (New) The memory device of claim 2, wherein the control circuit is configured to apply a bit line pre-pulse signal to the bit line during the pre-charge period.

6. (New) The memory device of claim 5, wherein the first memory string is an unselected memory string, and the bit line is an unselected bit line.

7. (New) The memory device of claim 2, wherein the control circuit is configured to apply a word line signal to the selected word line of the plurality of word lines.

8. (New) The memory device of claim 2, wherein the control circuit is configured to apply a top dummy word line pre-pulse signal to a top dummy word line of the plurality of word lines during the pre-charge period.

9. (New) The memory device of claim 8, wherein a voltage level of the top dummy word line pre-pulse signal is greater than that of the third word line pre-pulse signal.

10. (New) The memory device of claim 2, wherein the voltage levels of the first word line pre-pulse signal, the second word line pre-pulse signal, and the third word line pre-pulse signal are positive.

11. (New) The memory device of claim 2, wherein a pulse duration of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a pulse duration of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.

12. (New) A method of controlling a memory device, the memory device comprising a plurality of memory strings, a bit line connected to a first memory string of the plurality of

memory strings, a select gate line connected the first memory string of the plurality of memory strings, a selected word line of a plurality of word lines, wherein the plurality of word lines is connected to the first memory string, the method comprising:

applying a word line signal to the selected word line of the plurality word lines connected to the first memory string of the plurality of memory strings during a pre-charge period;

applying a first word line pre-pulse signal of a plurality of word line pre-pulse signals to a first group of the plurality of word lines during the pre-charge period;

applying a second word line pre-pulse signal of the plurality of word line pre-pulse signals to a second group of the plurality of word lines during the pre-charge period; and

applying a third word line pre-pulse signal of the plurality of word line pre-pulse signals to a third group of the plurality of word lines during the pre-charge period;

wherein a voltage level of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a voltage level of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.

13. (New) The method of claim 12, wherein the first group of the plurality of word lines, the second group of the plurality of word lines, and the third group of the plurality of word lines are disposed in an order of distance from the selected word line of the plurality of word lines.

14. (New) The method of claim 12, wherein the first group of the plurality of word lines are disposed adjacent to the selected word line, the second group of the plurality of word lines are disposed between the first group of the plurality of word lines and the select gate line, and the third group of the plurality of word lines are disposed between the second group of the plurality of word lines and the select gate line.

15. (New) The method of claim 12, further comprising applying a bit line pre-pulse signal to the bit line during the pre-charge period.

16. (New) The method of claim 15, wherein the first memory string is an unselected memory string, and the bit line is an unselected bit line.

17. (New) The method of claim 12, further comprising apply a top dummy word line pre-pulse signal to a top dummy word line of the plurality of word lines during the pre-charge period.

18. (New) The method of claim 17, wherein a voltage level of the top dummy word line pre-pulse signal is greater than that of the third word line pre-pulse signal.

19. (New) The method of claim 17, wherein the top dummy word line is disposed between the third group of the plurality of word lines and the select gate line.

20. (New) The method of claim 12, wherein the voltage levels of the first word line pre-pulse signal, the second word line pre-pulse signal, and the third word line pre-pulse signal are positive.

21. (New) The method of claim 12, wherein a pulse duration of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a pulse duration of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.

REMARKS

In this Preliminary Amendment, Applicant has canceled claim 1 without prejudice to or disclaimer of their subject matter and added new claims 2-21. In particular, claims 3 and 13 are at least supported by FIG. 4. No new matter has been introduced.

Applicant respectfully requests entry of this Preliminary Amendment.

No fee shall be required to submit this paper. However, if any extension of fee is required to continue prosecution of this application, please grant any extensions of time required to enter this Preliminary Amendment and charge any required fees to our Deposit Account No. 60-2227.

Respectfully submitted,

BAYES PLLC

/Zhiwei Zou/

Zhiwei Zou
Attorney for Applicant
Registration No. 66,041

Date: October 29, 2021

8260 Greensboro Drive, Suite 625
McLean, VA 22102
(703) 995-9887

Electronic Acknowledgement Receipt	
EFS ID:	44158629
Application Number:	17353727
International Application Number:	
Confirmation Number:	5573
Title of Invention:	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD
First Named Inventor/Applicant Name:	Jianquan Jia
Customer Number:	153988
Filer:	Zhiwei Zou/Anna O'Connor
Filer Authorized By:	Zhiwei Zou
Attorney Docket Number:	10018-01-0242-US-CON1
Receipt Date:	29-OCT-2021
Filing Date:	21-JUN-2021
Time Stamp:	15:20:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2019-00232-YMTC-PCT-US-CON1_10018-01-0242-US-CON1_PreliminaryAmendment.pdf	128365	yes	6
			6c461c9afb2fb673b7e245a71462b96ad8d0d9f		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Preliminary Amendment	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	6
Warnings:			
Information:			
Total Files Size (in bytes):		128365	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1	5573
153988	7590	12/30/2021	EXAMINER	
Bayes PLLC			NGUYEN, VIET Q	
8260 Greensboro Drive				
Suite 625				
McLean, VA 22102				
			ART UNIT	PAPER NUMBER
			2827	
			NOTIFICATION DATE	DELIVERY MODE
			12/30/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
eofficeaction@appcoll.com
uspto@bayes.law

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

1. Claims **2-21** are present for examination.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be

commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. **A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.**

2. Claims **2 & 12** are rejected on the ground of nonstatutory double patenting as being unpatentable over claims **1 & 9, respectively**, of U.S. Patent No. **11,081,164 (same assignee/inventor)**. Although the claims at issue are not identical, they are not patentably distinct from each other because the following comparisons:

Claim 2 (of application) is broader and obviously read over claim 1 (of patent) because the control circuit of claim 1 (application) is configured to perform the three identical steps of the second control circuit (patent) such as, for example, applying a first word line pre-pulse signal to a first group of word lines during precharge period,

applying a second word line pre-pulse signal to a second group of word lines during precharge period, and applying a third word line pre-pulse signal to a third group of word lines during precharge period, and wherein a voltage level of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a voltage level of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.

Similarly, method claim 12 (application) is broader and obviously read over method claim 9 (of patent) because the method of claim 12 (application) is configured to perform the three identical steps of the method claim 9 (patent) such as, for example, applying a word line signal to the selected word line, then followed by applying a first word line pre-pulse signal to a first group of word lines during precharge period, applying a second word line pre-pulse signal to a second group of word lines during precharge period, and applying a third word line pre-pulse signal to a third group of word lines during precharge period, and wherein a voltage level of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a voltage level of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.

3. Claims 3-11 & 13-21 are objected as being dependent upon rejected claims 2 & 12 above, but they tentatively contain allowable subject matter over the prior arts of record for other detail features not being clearly suggested nor seen elsewhere at this time.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to VIET Q NGUYEN whose telephone number is (571)272-1788. The examiner can normally be reached M-F 7:30-3PM EST.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VIET Q NGUYEN/
Primary Examiner, Art Unit 2827

Notice of References Cited	Application/Control No. 17/353,727		Applicant(s)/Patent Under Reexamination Jia et al.	
	Examiner VIET Q NGUYEN		Art Unit 2827	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-11081164-B2	08-2021	Jia; Jianquan	G11C16/3427	1/1
*	B	US-11205471-B2	12-2021	Choi; Yonghyuk	G11C11/409	1/1
*	C	US-10998049-B1	05-2021	Wei; Wenzhe	G11C16/3418	1/1
*	D	US-11024371-B2	06-2021	Cui; Ying	H01L27/11556	1/1
*	E	US-10957408-B1	03-2021	Jia; Jianquan	G11C16/10	1/1
*	F	US-11017838-B2	05-2021	Kang; Hee-Woong	G11C16/16	1/1
*	G	US-10153029-B2	12-2018	Kwak; Dong-Hun	G11C16/06	1/1
*	H	US-10777254-B2	09-2020	Kwak; Dong-Hun	G11C16/10	1/1
*	I	US-9620232-B2	04-2017	Nam; Sang-Wan	G11C16/3418	1/1
*	J	US-9142313-B2	09-2015	Shim; Sang-Won	G11C16/10	1/1
*	K	US-10157674-B2	12-2018	Kim; Doo-hyun	G11C16/0483	1/1
*	L	US-9349471-B2	05-2016	Yun; Sung-Won	G11C16/3418	1/1
*	M	US-9837164-B2	12-2017	Yun; Sung-Won	G11C16/3431	1/1

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Notice of References Cited</i>	Application/Control No. 17/353,727		Applicant(s)/Patent Under Reexamination Jia et al.	
	Examiner VIET Q NGUYEN		Art Unit 2827	Page 2 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-9396800-B2	07-2016	Shim; Sang-Won	G11C16/0483	1/1
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
*	N	CN-113053431-A	06-2021	CN	HA KYUNG-SOO	G11C7/1093
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Search Notes</i> 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

CPC - Searched*		
Symbol	Date	Examiner
G11C 11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
365	230.06	12/26/2021	vn

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
365/230.06	12/26/2021	vn
G11C 11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn
PE2E Search -12.26.21	12/26/2021	vn

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
G11C	11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn

/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	
--	--

<i>Index of Claims</i> 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	12/27/2021								
	1	-								
	2	✓								
	3	○								
	4	○								
	5	○								
	6	○								
	7	○								
	8	○								
	9	○								
	10	○								
	11	○								
	12	✓								
	13	○								
	14	○								
	15	○								
	16	○								
	17	○								
	18	○								
	19	○								
	20	○								
	21	○								

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	150364	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 01:41 PM
L2	12886	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 01:47 PM
L3	159	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 02:59 PM
L4	211	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2021/12/26 02:59 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L5	180	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:00 PM
L6	109	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:04 PM
L7	46	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,	OR	ON	ON	2021/12/26 03:05 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L8	9	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:10 PM
L9	25	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L10	12	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L11	21	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2021/12/26 03:11 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L12	11	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L13	19	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L14	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2021/12/26 03:11 PM

			JPO; DERWENT; IBM_TDB)				
L15	12	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L16	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:12 PM
L17	57	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:12 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	41398	(G11C11/4085 OR	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26

		G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.					01:41 PM
N2	7560614	YANGTZE MEMORY TECHNOLOGIES CO., LTD.	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:43 PM
N3	530242	Jia, Jianquan; Cui, Ying; You, Kaikai	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:43 PM
N4	6894	365/230.06.ccls.	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:47 PM
N5	50	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:54 PM
N6	75	(wordline OR word-line OR (word adj1 line)) near9 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:54 PM
N7	77	(wordline OR word-line OR (word adj1 line)) near12 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:55 PM
N8	78	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:55 PM
N9	68	(N1 OR N4) AND (N2 OR N3) AND N8	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:56 PM
N10	52	N9 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:57 PM
N11	6	"11056196"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:58 PM
N12	3	"11205471"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:59 PM
N13	3	"11043279"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 02:01 PM

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	17/353727
	Filing Date	6/21/2021
	First Named Inventor	Jianquan JIA
	Art Unit	TBD 2827
	Examiner Name	TBD V. Nguyen
	Attorney Docket Number	10018-01-0242-US-CON1

U.S.PATENTS Remove						
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9460805	B1	2016-10-04	Pang et al.	
	2	10283202	B1	2019-05-07	Chen et al.	
	3	10770157	B1	2020-09-08	Chen et al.	
If you wish to add additional U.S. Patent citation information please click the Add button.						Add
U.S.PATENT APPLICATION PUBLICATIONS Remove						
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20200353312	A1	2020-11-12	Smith	
	2	20110194351	A1	2011-08-11	KIM et al.	
	3	20190147955	A1	2019-05-16	Chen	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		
Filing Date		
First Named Inventor	Jianquan JIA	
Art Unit	TBD	
Examiner Name	TBD	
Attorney Docket Number	10018-01-0242-US-CON1	

4	20190108883	A1	2019-04-11	Yu	
5	20190156901	A1	2019-05-23	Chen	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	110289034	CN	A	2019-09-27		Abstract	

If you wish to add additional Foreign Patent Document citation information please click the Add button.

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1		

If you wish to add additional non-patent literature document citation information please click the Add button.

EXAMINER SIGNATURE

Examiner Signature	/VIET Q. NGUYEN/	Date Considered	12/27/2021
--------------------	------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Jianquan JIA
Art Unit	TBD
Examiner Name	TBD
Attorney Docket Number	10018-01-0242-US-CON1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Zhiwei Zou/	Date (YYYY-MM-DD)	2021-06-21
Name/Print	Zhiwei Zou	Registration Number	66,041

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 17/353,727		Filing Date 06/21/2021		☐ To be Mailed			
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO											
APPLICATION AS FILED - PART I											
		(Column 1)		(Column 2)							
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A		N/A		N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A					
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =		*		x \$100 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =		*		x \$480 =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))											
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL					
APPLICATION AS AMENDED - PART II											
		(Column 1)		(Column 2)		(Column 3)					
AMENDMENT	04/10/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0			x \$100 =		0	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0			x \$480 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
								TOTAL ADD'L FEE		0	
		(Column 1)		(Column 2)		(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=			x \$0 =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=			x \$0 =			
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
								TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.								LIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".								/JACKIE A WHITE/			
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".											
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed		PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce
Electronic Petition Request	TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	
Application Number	17353727	
Filing Date	21-Jun-2021	
First Named Inventor	Jianquan Jia	
Attorney Docket Number	10018-01-0242-US-CON1	
Title of Invention	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD	
☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action ☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.		
Owner	Percent Interest	
YANGTZE MEMORY TECHNOLOGIES CO., LTD.	100%	
The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s) 11081164 as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns. In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later: - expires for failure to pay a maintenance fee; - is held unenforceable; - is found invalid by a court of competent jurisdiction; - is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321; - has all claims canceled by a reexamination certificate; - is reissued; or - is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer. ☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.		

☐ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.	
Applicant claims the following fee status:	
☐ Small Entity ☐ Micro Entity ☒ Regular Undiscounted	
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES	
I certify, in accordance with 37 CFR 1.4(d)(4) that I am:	
☒ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application Registration Number <u>66041</u>	
☐ A sole inventor	
☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application	
☐ A joint inventor; all of whom are signing this request	
Signature	/Zhiwei Zou/
Name	Zhiwei Zou

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
 Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal				
Application Number:		17353727		
Filing Date:		21-Jun-2021		
Title of Invention:		NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		
First Named Inventor/Applicant Name:		Jianquan Jia		
Filer:		Zhiwei Zou/Anna O'Connor		
Attorney Docket Number:		10018-01-0242-US-CON1		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				170

Doc Code: DISQ.E.FILE

Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 17353727

Filing Date: 21-Jun-2021

Applicant/Patent under Reexamination: Jia

Electronic Terminal Disclaimer filed on April 11, 2022

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt	
EFS ID:	45441673
Application Number:	17353727
International Application Number:	
Confirmation Number:	5573
Title of Invention:	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD
First Named Inventor/Applicant Name:	Jianquan Jia
Customer Number:	153988
Filer:	Zhiwei Zou/Anna O'Connor
Filer Authorized By:	Zhiwei Zou
Attorney Docket Number:	10018-01-0242-US-CON1
Receipt Date:	11-APR-2022
Filing Date:	21-JUN-2021
Time Stamp:	13:51:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 170
RAM confirmation Number	E20224AD51 230309
Deposit Account	602227
Authorized User	Anna O'Connor
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	41252	no	2
			bc134a22c86e729e26449b448b0c7935e68c12c8		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37660	no	2
			290c31d3a0e1c657dc02a9c1c15a65dc2545a489		
Warnings:					
Information:					
Total Files Size (in bytes):			78912		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Jianquan Jia

Confirmation No.: 5573

Applicant: YANGTZE MEMORY
TECHNOLOGIES CO. LTD.

Art Unit: 2827

Application No.: 17/353,727

Examiner: Viet Q. Nguyen

Filing Date: June 21, 2021

Atty. Docket: 10018-01-0242-US-CON1

Title: **NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD**

Amendment and Reply Under 37 C.F.R. § 1.111

Mail Stop AMENDMENT

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Commissioner:

In reply to the Office Action dated December 30, 2021, Applicant submits the following
Remarks:

Amendments to the Claims are reflected in the listing of claims which begins on page 2
of this paper.

Remarks begin on page 6 of this paper.

A request for extension of time (EOT) for one (1) month is concurrently submitted herein.
If additional extensions of time are necessary to prevent abandonment of this application, then
such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any additional fees
required to continue prosecution or appeal of this application (including issue fee, fees for net
addition of claims or forwarding to appeal) are hereby authorized to be charged to our Deposit
Account No. 60-2227.

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Canceled)
2. (Previously Presented) A memory device, comprising:
 - a plurality of memory strings;
 - a bit line connected to a first memory string of the plurality of memory strings;
 - a select gate line connected to the first memory string of the plurality of memory strings;
 - a selected word line of a plurality of word lines, wherein the plurality of word lines is connected to the first memory string; and
 - a control circuit configured to:
 - apply a first word line pre-pulse signal of a plurality of word line pre-pulse signals to a first group of the plurality of word lines during a pre-charge period;
 - apply a second word line pre-pulse signal of the plurality of word line pre-pulse signals to a second group of the plurality of word lines during the pre-charge period; and
 - apply a third word line pre-pulse signal of the plurality of word lines pre-pulse signals to a third group of the plurality of word lines during the pre-charge period,wherein a voltage level of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a voltage level of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.
3. (Previously Presented) The memory device of claim 2, wherein the first group of the plurality of word lines, the second group of the plurality of word lines, and the third group of the plurality of word lines are disposed in an order of distance from the selected word line of the plurality of word lines.
4. (Previously Presented) The memory device of claim 2, wherein the first group of the plurality of word lines are disposed adjacent to the selected word line, the second group of the plurality of word lines are disposed between the first group of the plurality of word lines and

the select gate line, and the third group of the plurality of word lines are disposed between the second group of the plurality of word lines and the select gate line.

5. (Previously Presented) The memory device of claim 2, wherein the control circuit is configured to apply a bit line pre-pulse signal to the bit line during the pre-charge period.

6. (Previously Presented) The memory device of claim 5, wherein the first memory string is an unselected memory string, and the bit line is an unselected bit line.

7. (Previously Presented) The memory device of claim 2, wherein the control circuit is configured to apply a word line signal to the selected word line of the plurality of word lines.

8. (Previously Presented) The memory device of claim 2, wherein the control circuit is configured to apply a top dummy word line pre-pulse signal to a top dummy word line of the plurality of word lines during the pre-charge period.

9. (Previously Presented) The memory device of claim 8, wherein a voltage level of the top dummy word line pre-pulse signal is greater than that of the third word line pre-pulse signal.

10. (Previously Presented) The memory device of claim 2, wherein the voltage levels of the first word line pre-pulse signal, the second word line pre-pulse signal, and the third word line pre-pulse signal are positive.

11. (Previously Presented) The memory device of claim 2, wherein a pulse duration of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a pulse duration of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.

12. (Currently Amended) A method of controlling a memory device, the memory device comprising a plurality of memory strings, a bit line connected to a first memory string of the

plurality of memory strings, a select gate line connected the first memory string of the plurality of memory strings, a selected word line of a plurality of word lines, wherein the plurality of word lines is connected to the first memory string, the method comprising:

applying a word line signal to the selected word line of the plurality of word lines connected to the first memory string of the plurality of memory strings during a pre-charge period;

applying a first word line pre-pulse signal of a plurality of word line pre-pulse signals to a first group of the plurality of word lines during the pre-charge period;

applying a second word line pre-pulse signal of the plurality of word line pre-pulse signals to a second group of the plurality of word lines during the pre-charge period; and

applying a third word line pre-pulse signal of the plurality of word line pre-pulse signals to a third group of the plurality of word lines during the pre-charge period;

wherein a voltage level of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a voltage level of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.

13. (Previously Presented) The method of claim 12, wherein the first group of the plurality of word lines, the second group of the plurality of word lines, and the third group of the plurality of word lines are disposed in an order of distance from the selected word line of the plurality of word lines.

14. (Previously Presented) The method of claim 12, wherein the first group of the plurality of word lines are disposed adjacent to the selected word line, the second group of the plurality of word lines are disposed between the first group of the plurality of word lines and the select gate line, and the third group of the plurality of word lines are disposed between the second group of the plurality of word lines and the select gate line.

15. (Previously Presented) The method of claim 12, further comprising applying a bit line pre-pulse signal to the bit line during the pre-charge period.

16. (Previously Presented) The method of claim 15, wherein the first memory string is

an unselected memory string, and the bit line is an unselected bit line.

17. (Previously Presented) The method of claim 12, further comprising apply a top dummy word line pre-pulse signal to a top dummy word line of the plurality of word lines during the pre-charge period.

18. (Previously Presented) The method of claim 17, wherein a voltage level of the top dummy word line pre-pulse signal is greater than that of the third word line pre-pulse signal.

19. (Previously Presented) The method of claim 17, wherein the top dummy word line is disposed between the third group of the plurality of word lines and the select gate line.

20. (Previously Presented) The method of claim 12, wherein the voltage levels of the first word line pre-pulse signal, the second word line pre-pulse signal, and the third word line pre-pulse signal are positive.

21. (Previously Presented) The method of claim 12, wherein a pulse duration of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a pulse duration of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal.

REMARKS

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 2-21 are pending in the application, with claims 2 and 12 being the independent claims. Claim 12 is hereby amended. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Throughout the arguments, Applicant reminds the Examiner that the claims are given their broadest reasonable meaning in view of the specification, and any paraphrasing of the claim features is not to be interpreted as reading any features into, or characterizing of, the claims.

Based on the above amendment and the following remarks, Applicant respectfully requests that the Examiner reconsider all outstanding rejections and that they be withdrawn.

Double Patenting

Claims 2 and 12 are rejected on the ground of non-statutory double patenting as being unpatentable over claims 1 and 9, respectively, of U.S. Patent No. 11,081,164. Claims 3-11 and 13-21 are objected to as being dependent upon rejected claims 2 and 12.

Without acquiescing to the propriety of the rejection and to expedite the prosecution, Applicant respectfully files a terminal disclaimer to obviate the non-statutory double patenting rejection.

Accordingly, Applicant respectfully requests withdrawal of the double patenting rejection.

Conclusion

All of the stated grounds of rejections have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

BAYES PLLC

/Zhiwei Zou/

Zhiwei Zou
Attorney for Applicant
Registration No. 66,041

Date: April 11, 2022

8260 Greensboro Drive, Suite 625
McLean, VA 22102
(703) 995-9887

Electronic Patent Application Fee Transmittal				
Application Number:		17353727		
Filing Date:		21-Jun-2021		
Title of Invention:		NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		
First Named Inventor/Applicant Name:		Jianquan Jia		
Filer:		Zhiwei Zou/Anna O'Connor		
Attorney Docket Number:		10018-01-0242-US-CON1		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 1 month with \$0 paid	1251	1	220	220
Miscellaneous:				
Total in USD (\$)				220

Electronic Acknowledgement Receipt	
EFS ID:	45441981
Application Number:	17353727
International Application Number:	
Confirmation Number:	5573
Title of Invention:	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD
First Named Inventor/Applicant Name:	Jianquan Jia
Customer Number:	153988
Filer:	Zhiwei Zou/Anna O'Connor
Filer Authorized By:	Zhiwei Zou
Attorney Docket Number:	10018-01-0242-US-CON1
Receipt Date:	11-APR-2022
Filing Date:	21-JUN-2021
Time Stamp:	13:53:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 220
RAM confirmation Number	E20224AD53340351
Deposit Account	602227
Authorized User	Anna O'Connor
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Extension of Time	10018-01-0242-US-CON1_1-monthEOT.pdf	177981	no	2
			edcfcad79564c1616c36c103fa8a55c8be71f454		
Warnings:					
Information:					
2		2019-00232-YMTC-PCT-US-CON1_Response to NFOA12302021.pdf	137222	yes	7
			cdb2c4477b0a57bcfac034bb1518926c66648bf1		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Request for Reconsideration-After Non-Final Rejection		1	1	
	Claims		2	5	
	Applicant Arguments/Remarks Made in an Amendment		6	7	
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38142	no	2
			5fc422d78edc46c3a2f0b5a13de92b0b59adb4fa		
Warnings:					
Information:					
Total Files Size (in bytes):			353345		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number (Optional) 10018-01-0242-US-CON1																														
Application Number 17/353,727	Filed June 21, 2021																															
For NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD																																
Art Unit 2827	Examiner Viet Q. Nguyen																															
This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application. The requested extension and fee are as follows (check time period desired and enter the appropriate fee below): <table style="width: 100%; border-collapse: collapse;"><thead><tr><th></th><th style="text-align: center;"><u>Fee</u></th><th style="text-align: center;"><u>Small Entity Fee</u></th><th style="text-align: center;"><u>Micro Entity Fee</u></th><th></th></tr></thead><tbody><tr><td>☒ One month (37 CFR 1.17(a)(1))</td><td style="text-align: right;">\$220</td><td style="text-align: right;">\$110</td><td style="text-align: right;">\$55</td><td style="text-align: right;">\$ <u>220</u></td></tr><tr><td>☐ Two months (37 CFR 1.17(a)(2))</td><td style="text-align: right;">\$640</td><td style="text-align: right;">\$320</td><td style="text-align: right;">\$160</td><td style="text-align: right;">\$ _____</td></tr><tr><td>☐ Three months (37 CFR 1.17(a)(3))</td><td style="text-align: right;">\$1,480</td><td style="text-align: right;">\$740</td><td style="text-align: right;">\$370</td><td style="text-align: right;">\$ _____</td></tr><tr><td>☐ Four months (37 CFR 1.17(a)(4))</td><td style="text-align: right;">\$2,320</td><td style="text-align: right;">\$1,160</td><td style="text-align: right;">\$580</td><td style="text-align: right;">\$ _____</td></tr><tr><td>☐ Five months (37 CFR 1.17(a)(5))</td><td style="text-align: right;">\$3,160</td><td style="text-align: right;">\$1,580</td><td style="text-align: right;">\$790</td><td style="text-align: right;">\$ _____</td></tr></tbody></table> ☐ Applicant asserts small entity status. See 37 CFR 1.27. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously. ☐ A check in the amount of the fee is enclosed. ☐ Payment by credit card. Form PTO-2038 is attached. ☐ The Director has already been authorized to charge fees in this application to a Deposit Account. ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number <u>602227</u>. ☒ Payment made via EFS-Web. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. I am the ☐ applicant. ☒ attorney or agent of record. Registration number <u>66,041</u>. ☐ attorney or agent acting under 37 CFR 1.34. Registration number _____. <u>/Zhiwei Zou/</u> <u>4/11/2022</u> Signature Date <u>Zhiwei Zou</u> <u>(703) 995-9887</u> Typed or printed name Telephone Number NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.				<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>		☒ One month (37 CFR 1.17(a)(1))	\$220	\$110	\$55	\$ <u>220</u>	☐ Two months (37 CFR 1.17(a)(2))	\$640	\$320	\$160	\$ _____	☐ Three months (37 CFR 1.17(a)(3))	\$1,480	\$740	\$370	\$ _____	☐ Four months (37 CFR 1.17(a)(4))	\$2,320	\$1,160	\$580	\$ _____	☐ Five months (37 CFR 1.17(a)(5))	\$3,160	\$1,580	\$790	\$ _____
	<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>																													
☒ One month (37 CFR 1.17(a)(1))	\$220	\$110	\$55	\$ <u>220</u>																												
☐ Two months (37 CFR 1.17(a)(2))	\$640	\$320	\$160	\$ _____																												
☐ Three months (37 CFR 1.17(a)(3))	\$1,480	\$740	\$370	\$ _____																												
☐ Four months (37 CFR 1.17(a)(4))	\$2,320	\$1,160	\$580	\$ _____																												
☐ Five months (37 CFR 1.17(a)(5))	\$3,160	\$1,580	\$790	\$ _____																												

☐ * Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

153988 7590 04/26/2022
Bayes PLLC
8260 Greensboro Drive
Suite 625
McLean, VA 22102

EXAMINER	
NGUYEN, VIET Q	
ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 04/26/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1	5573

TITLE OF INVENTION: NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	07/26/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

153988 7590 04/26/2022
Bayes PLLC
8260 Greensboro Drive
Suite 625
McLean, VA 22102

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

_____ (Typed or printed name)
_____ (Signature)
_____ (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1	5573

TITLE OF INVENTION: NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	07/26/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, VIET Q	2827	365-230060

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1	5573
153988	7590	04/26/2022	EXAMINER	
Bayes PLLC			NGUYEN, VIET Q	
8260 Greensboro Drive			ART UNIT	
Suite 625			PAPER NUMBER	
McLean, VA 22102			2827	

DATE MAILED: 04/26/2022

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b) (2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 17/353,727	Applicant(s) Jia et al.	
	Examiner VIET Q NGUYEN	Art Unit 2827	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to TD filed 4/11/2022.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 2-21. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:
a) ☐ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____. 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.	5. ☐ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____.
---	--

/VIET Q NGUYEN/
Primary Examiner, Art Unit 2827

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Reasons for Allowance

1. The following is an examiner's statement of reasons for allowance:

The prior arts fail to teach or fairly suggest a memory device comprising a plurality of memory strings; a bit line connected to a first memory string of the plurality of memory strings; a select gate line connected to the first memory string of the plurality of memory strings; a selected word line of a plurality of word lines, wherein the plurality of word lines is connected to the first memory string; and a control circuit configured to:

apply a first word line pre-pulse signal of a plurality of word line pre-pulse signals to a first group of the plurality of word lines during a pre-charge period;

apply a second word line pre-pulse signal of the plurality of word line pre-pulse signals to a second group of the plurality of word lines during the pre-charge period; and

apply a third word line pre-pulse signal of the plurality of word lines pre-pulse signals to a third group of the plurality of word lines during the pre-charge period, wherein a voltage level of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a voltage level of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal (claims 2 & 12).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to VIET Q NGUYEN whose telephone number is (571)272-1788. The examiner can normally be reached M-F 7:30-3PM EST.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197

Application/Control Number: 17/353,727
Art Unit: 2827

Page 4

(toll-free). If you would like assistance from a USPTO Customer Service

Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VIET Q NGUYEN/
Primary Examiner, Art Unit 2827

Issue Classification 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

CPC						
Symbol					Type	Version
G11C	/	11	/	4085	F	2013-01-01
G11C	/	11	/	4074	I	2013-01-01
G11C	/	11	/	4094	I	2013-01-01
G11C	/	11	/	4099	I	2013-01-01
G11C	/	11	/	419	I	2013-01-01

CPC Combination Sets					
Symbol				Type	Set
	/		/		

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	14 April 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1 (Final)	5

U.S. Patent and Trademark Office

Part of Paper No.: 20220414

Issue Classification 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

INTERNATIONAL CLASSIFICATION			
CLAIMED			
G11C		8	00
NON-CLAIMED			

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
365	230.06

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	14 April 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1 (Final)	5

U.S. Patent and Trademark Office

Part of Paper No.: 20220414

Issue Classification 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	2	10	11	19	20										
2	3	11	12	20	21										
3	4	12	13												
4	5	13	14												
5	6	14	15												
6	7	15	16												
7	8	16	17												
8	9	17	18												
9	10	18	19												

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	14 April 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1 (Final)	5

<i>Index of Claims</i> 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant				☐ CPA		☒ T.D.		☐ R.1.47		
CLAIM		DATE								
Final	Original	12/27/2021	04/14/2022							
	1	-	-							
1	2	✓	=							
2	3	○	=							
3	4	○	=							
4	5	○	=							
5	6	○	=							
6	7	○	=							
7	8	○	=							
8	9	○	=							
9	10	○	=							
10	11	○	=							
11	12	✓	=							
12	13	○	=							
13	14	○	=							
14	15	○	=							
15	16	○	=							
16	17	○	=							
17	18	○	=							
18	19	○	=							
19	20	○	=							
20	21	○	=							

Search Notes 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

CPC - Searched*		
Symbol	Date	Examiner
G11C 11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
365	230.06	12/26/2021	vn

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
365/230.06	12/26/2021	vn
G11C 11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn
PE2E Search -12.26.21	12/26/2021	vn
PE2E Updated	04/14/2022	vn

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
G11C	11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn

/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	
--	--



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 5573

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
17/353,727	06/21/2021	365	2827	10018-01-0242-US-CON1		
RULE						
APPLICANTS YANGTZE MEMORY TECHNOLOGIES CO., LTD., Wuhan, CHINA; INVENTORS Jianquan Jia, Wuhan, CHINA; Ying Cui, Wuhan, CHINA; Kaikai You, Wuhan, CHINA; ** CONTINUING DATA ***** This application is a CON of 16/709,944 12/11/2019 PAT 11081164 which is a CON of PCT/CN2019/112409 10/22/2019 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 07/01/2021						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /Viet Nguyen/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CHINA	SHEETS DRAWINGS 4	TOTAL CLAIMS 1	INDEPENDENT CLAIMS 1
ADDRESS Bayes PLLC 8260 Greensboro Drive Suite 625 McLean, VA 22102 UNITED STATES						
TITLE NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD						
FILING FEE RECEIVED 1820	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	150364	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 01:41 PM
L2	12886	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 01:47 PM
L3	159	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 02:59 PM
L4	211	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2021/12/26 02:59 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L5	180	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:00 PM
L6	109	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:04 PM
L7	46	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,	OR	ON	ON	2021/12/26 03:05 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L8	9	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:10 PM
L9	25	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L10	12	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L11	21	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2021/12/26 03:11 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L12	11	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L13	19	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L14	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2021/12/26 03:11 PM

			JPO; DERWENT; IBM_TDB)				
L15	12	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L16	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:12 PM
L17	57	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:12 PM
L18	154097	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/04/14 03:42 PM

		G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L19	12886	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L20	173	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L21	230	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/04/14 03:42 PM

			IBM_TDB)				
L22	196	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L23	115	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L24	49	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L25	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2022/04/14 03:42 PM

			IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L26	27	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L27	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L28	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM

L29	11	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L30	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L31	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L32	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/04/14 03:42 PM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L33	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L34	58	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L35	140	L21 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:43 PM
L36	56	L35 AND (cell\$1 WITH	(US-PGPUB; USPAT;	OR	ON	ON	2022/04/14

		string\$1 WITH gate\$1)	USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				03:44 PM
--	--	-------------------------	--	--	--	--	----------

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	41398	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:41 PM
N2	7560614	YANGTZE MEMORY TECHNOLOGIES CO., LTD.	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:43 PM
N3	530242	Jia, Jianquan; Cui, Ying; You, Kaikai	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:43 PM
N4	6894	365/230.06.ccls.	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:47 PM
N5	50	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:54 PM
N6	75	(wordline OR word-line OR (word adj1 line)) near9 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:54 PM
N7	77	(wordline OR word-line OR (word adj1 line)) near12 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:55 PM
N8	78	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:55 PM
N9	68	(N1 OR N4) AND (N2 OR N3) AND N8	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:56 PM
N10	52	N9 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:57 PM
N11	6	"11056196"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26

04/14/2022 03:44:19 PM
Workspace: 17.353727

Page 11 of 12
VN

							01:58 PM
N12	3	"11205471"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:59 PM
N13	3	"11043279"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 02:01 PM

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	17353727	Filing Date	2021-06-21	Docket Number (if applicable)	10018-01-0242-US-CON1	Art Unit	2827
First Named Inventor	Jianquan JIA			Examiner Name	NGUYEN, VIET Q		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☐ Amendment/Reply

☒ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to
Deposit Account No 602227

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature
Applicant Signature

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	Zhiwei Zou/	Date (YYYY-MM-DD)	2022-06-27
Name	Zhiwei Zou	Registration Number	66041

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	17353727
	Filing Date	2021-06-21
	First Named Inventor	Jianquan JIA
	Art Unit	2827
	Examiner Name	NGUYEN, VIET Q
	Attorney Docket Number	10018-01-0242-US-CON1

U.S.PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	7577026	B2	2009-08-18	Dong et al.			
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S.PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	20200006379	A1	2020-01-02	NISHIKAWA et al.			
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	109935256	CN	A	2019-06-25	TOSHIBA MEMORY CORP		
If you wish to add additional Foreign Patent Document citation information please click the Add button.							Add	
NON-PATENT LITERATURE DOCUMENTS							Remove	
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		17353727
	Filing Date		2021-06-21
	First Named Inventor	Jianquan JIA	
	Art Unit	2827	
	Examiner Name	NGUYEN, VIET Q	
	Attorney Docket Number	10018-01-0242-US-CON1	

1			
If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		17353727
	Filing Date		2021-06-21
	First Named Inventor	Jianquan JIA	
	Art Unit	2827	
	Examiner Name	NGUYEN, VIET Q	
	Attorney Docket Number	10018-01-0242-US-CON1	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Zhiwei Zou/	Date (YYYY-MM-DD)	2022-06-27
Name/Print	Zhiwei Zou	Registration Number	66,041

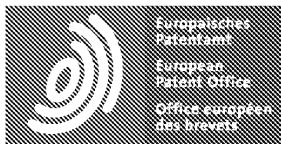
This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



Espacenet

CN109935256A SEMICONDUCTOR MEMORY DEVICE

Applicants: TOSHIBA MEMORY CORP

Inventors: IZUMI TATSUO, KOMIYA REIKO

Classifications:

IPC **G11C11/40;**CPC **G11C16/08 (EP,US); G11C16/10 (EP,US); H01L27/11582 (US); H01L29/1037 (US);**
G11C16/0466 (EP,US); G11C16/0483 (EP,US); G11C16/3459 (EP,US); H01L27/11582 (EP);

Priorities: JP2017242858A 2017-12-19

Application: CN201810846136A 2018-07-27

Publication: CN109935256A 2019-06-25

Published as: CN109935256A; JP2019109952A; TW201928972A; TWI682392B; US10431311B2; US2019189218A1

SEMICONDUCTOR MEMORY DEVICE

Abstract

The embodiment of the invention provides a semiconductor memory device capable of improving the reliability of stored data. A semiconductor memory device according to an embodiment includes a plurality of conductors laminated with an insulator interposed therebetween, and a pillar. The pillar passes through the plurality of conductors and includes first and second columnar portions and a bonding portion. Among the plurality of conductors through which the first columnar portion passes, the conductor closest to the bonding portion functions as a first dummy word line (LDWL) and as a first wordline (WL)(LMH), respectively, with any one of the other conductors. Among the plurality of conductors through which the second columnar portion passes, the conductor closest to the bonding portion functions as a second dummy word line (UDWL) and as a second word line (WL)(UMH), respectively, with any one of the other conductors. In a pre-charging operation in a write operation in which the second word line is selected, a first voltage is applied to each of the second dummy word line and the second word line, and a second voltage lower than the first voltage is applied to the first word line.



(12)发明专利申请

(10)申请公布号 CN 109935256 A

(43)申请公布日 2019.06.25

(21)申请号 201810846136.2

(22)申请日 2018.07.27

(30)优先权数据

2017-242858 2017.12.19 JP

(71)申请人 东芝存储器株式会社

地址 日本东京

(72)发明人 泉达雄 小宫怜子

(74)专利代理机构 北京律盟知识产权代理有限公司
责任公司 11287

代理人 杨林勳

(51)Int.Cl.

G11C 11/40(2006.01)

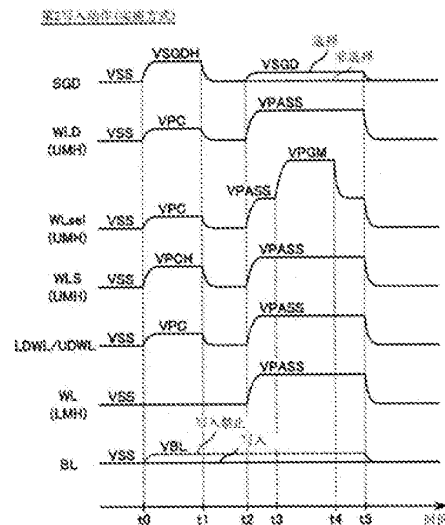
权利要求书3页 说明书13页 附图11页

(54)发明名称

半导体存储装置

(57)摘要

实施方式提供一种能够使存储的数据的可靠性提升的半导体存储装置。实施方式的半导体存储装置包含隔着绝缘体而积层的多个导电体及柱。柱通过多个导电体，且包含第1及第2柱状部、及接合部。第1柱状部所通过的多个导电体中，距接合部最近的导电体与其他任一导电体分别作为第1虚设字线(LDWL)及第1字线(WL)(LMH)发挥功能。第2柱状部所通过的多个导电体中，距接合部最近的导电体与其他任一导电体分别作为第2虚设字线(UDWL)及第2字线(WL)(UMH)发挥功能。在选择第2字线的写入动作中的预充电动作中，对第2虚设字线及第2字线分别施加第1电压，对第1字线施加比第1电压低的第2电压。



1. 一种半导体存储装置,具备:

多个导电体,隔着绝缘体而积层;

柱,通过所述多个导电体,包含第1柱状部、所述第1柱状部的上方的第2柱状部、以及所述第1柱状部及所述第2柱状部间的接合部,且与所述多个导电体的交叉部分分别作为晶体管发挥功能;及

控制器,执行写入动作;

所述第1柱状部所通过的所述多个导电体中,距所述接合部最近的导电体与其他任一个导电体分别作为第1虚设字线、及第1字线发挥功能,

所述第2柱状部所通过的所述多个导电体中,距所述接合部最近的导电体与其他任一个导电体分别作为第2虚设字线、及第2字线发挥功能,

所述控制器是

在所述写入动作中,执行包括包含预充电动作的编程动作的编程循环,

在选择了所述第1字线的所述写入动作中的所述预充电动作中,对所述第1字线、所述第1虚设字线、所述第2虚设字线、及所述第2字线分别施加比接地电压高的第1电压,

在选择了所述第2字线的所述写入动作中的所述预充电动作中,对所述第1字线施加比所述第1电压低的第2电压,对所述第2虚设字线及所述第2字线分别施加所述第1电压。

2. 根据权利要求1所述的半导体存储装置,其中所述控制器在选择了所述第2字线的所述写入动作中的所述预充电动作中,对所述第1虚设字线施加所述第1电压。

3. 根据权利要求2所述的半导体存储装置,其中设置在作为所述第2虚设字线发挥功能的所述导电体与作为所述第2字线发挥功能的所述导电体之间的所述导电体中,任一个导电体作为第3字线发挥功能,且

所述控制器在选择了所述第2字线的所述写入动作中的所述预充电动作中,对所述第3字线施加比所述第1电压高的第3电压。

4. 根据权利要求3所述的半导体存储装置,其中所述第1柱状部所通过的所述多个导电体中,与作为所述第1字线发挥功能的所述导电体相比距离所述接合部更远的导电体中,任一个导电体作为第4字线发挥功能,且

所述控制器在选择了所述第1字线的所述写入动作中的所述预充电动作中,对所述第4字线施加所述第2电压。

5. 根据权利要求3所述的半导体存储装置,其中所述第2柱状部所通过的所述多个导电体中,与作为所述第2字线发挥功能的所述导电体相比距离所述接合部更远的导电体中,任一个导电体作为第5字线发挥功能,且

所述控制器在选择了所述第2字线的所述写入动作中的所述预充电动作中,对所述第5字线施加所述第1电压。

6. 根据权利要求3所述的半导体存储装置,其中所述第1柱状部所通过的所述多个导电体中,与作为所述第1字线发挥功能的所述导电体相比距离所述接合部更近的导电体中,任一个导电体作为第6字线发挥功能,且

所述控制器在选择了所述第1字线的所述写入动作中的所述预充电动作中,对所述第6字线施加所述第1电压。

7. 根据权利要求1所述的半导体存储装置,其中所述控制器在选择了所述第2字线的所

述写入动作中的所述预充电动作中,对所述第1虚设字线施加所述第2电压。

8.根据权利要求7所述的半导体存储装置,其中设置在作为所述第2虚设字线发挥功能的所述导电体与作为所述第2字线发挥功能的所述导电体之间的所述导电体中,任一个导电体作为第3字线发挥功能,且

所述控制器在选择了所述2字线的所述写入动作中的所述预充电动作中,对所述第3字线施加比所述第1电压高的第3电压。

9.根据权利要求8所述的半导体存储装置,其中所述第1柱状部所通过的所述多个导电体中,与作为所述第1字线发挥功能的所述导电体相比距离所述接合部更远的导电体中,任一个导电体作为第4字线发挥功能,且

所述控制器在选择了所述第1字线的所述写入动作中的所述预充电动作中,对所述第4字线施加所述第2电压。

10.根据权利要求8所述的半导体存储装置,其中所述第2柱状部所通过的所述多个导电体中,与作为所述第2字线发挥功能的所述导电体相比距离所述接合部更远的导电体中,任一个导电体作为第5字线发挥功能,且

所述控制器在选择了所述第2字线的所述写入动作中的所述预充电动作中,对所述第5字线施加所述第1电压。

11.根据权利要求8所述的半导体存储装置,其中所述第1柱状部所通过的所述多个导电体中,与作为所述第1字线发挥功能的所述导电体相比距离所述接合部更近的导电体中,任一个导电体作为第6字线发挥功能,且

所述控制器在选择了所述第1字线的所述写入动作中的所述预充电动作中,对所述第6字线施加所述第1电压。

12.根据权利要求1所述的半导体存储装置,其中在所述编程动作中,所述控制器在对所选择的字线施加编程电压之前执行所述预充电动作。

13.根据权利要求12所述的半导体存储装置,其中所述柱所通过的所述多个导电体包含作为选择栅极线发挥功能的导电体,

所述控制器是

在所述预充电动作中,对所述选择栅极线施加比所述第2电压高的第4电压,在对所选择的字线施加编程电压的期间,对所述选择栅极线施加比所述第2电压高且比所述第4电压低的第5电压。

14.根据权利要求1所述的半导体存储装置,其中所述接合部与所述第1柱状部及所述第2柱状部分别相邻。

15.根据权利要求1所述的半导体存储装置,其中设置在作为所述第1虚设字线发挥功能的所述导电体与所述第1柱状部的交叉部分的晶体管、及设置在作为所述第2虚设字线发挥功能的所述导电体与所述第2柱状部的交叉部分的晶体管各自不用于存储数据。

16.一种半导体存储装置,具备:

多个导电体,隔着绝缘体而积层;

柱,通过所述多个导电体,包含第1柱状部、第2柱状部、以及所述第1柱状部及所述第2柱状部间的接合部,且与所述多个导电体的交叉部分分别作为晶体管发挥功能;及

控制器,执行写入动作;

所述第1柱状部所通过的所述多个导电体中任一个导电体作为第1字线发挥功能，
所述第2柱状部所通过的所述多个导电体中任一个导电体作为第2字线发挥功能，
设置在作为所述第2字线发挥功能的所述导电体与所述接合部之间的所述导电体中，
任一个导电体作为第3字线发挥功能，

所述控制器是

在所述写入动作中，执行包括包含预充电动作的编程动作的编程循环，

在选择了所述第1字线的所述写入动作中的所述预充电动作中，对所述第1字线、所述第2字线、及所述第3字线分别施加比接地电压高的第1电压，

在选择了所述第2字线的所述写入动作中的所述预充电动作中，对所述第1字线施加比所述第1电压低的第2电压，对所述第2字线施加所述第1电压，对所述第3字线施加比所述第1电压高的第3电压。

17. 根据权利要求16所述的半导体存储装置，其中所述第1柱状部所通过的所述多个导电体中，与作为所述第1字线发挥功能的所述导电体相比距离所述接合部更远的导电体中，任一个导电体作为第4字线发挥功能，

所述控制器在选择了所述第1字线的所述写入动作中的所述预充电动作中，对所述第4字线施加所述第2电压。

18. 根据权利要求17所述的半导体存储装置，其中所述第1柱状部所通过的所述多个导电体中，与作为所述第1字线发挥功能的所述导电体相比距离所述接合部更近的导电体中，任一个导电体作为第5字线发挥功能，

所述控制器在选择了所述第1字线的所述写入动作中的所述预充电动作中，对所述第5字线施加所述第1电压。

19. 根据权利要求16所述的半导体存储装置，其中所述第2柱状部所通过的所述多个导电体包含作为选择栅极线发挥功能的导电体，

所述控制器是

在所述预充电动作中，对所述选择栅极线施加比所述第2电压高的第4电压，

在对所选择的字线施加编程电压的期间，对所述选择栅极线施加比所述第2电压高且比所述第4电压低的第5电压。

20. 根据权利要求16所述的半导体存储装置，其中所述接合部与所述第1柱状部及所述第2柱状部分别相邻。

半导体存储装置

[0001] [相关申请]

[0002] 本申请享有以日本专利申请2017-242858号(申请日:2017年12月19日)为基础申请的优先权。本申请通过参照该基础申请而包含基础申请的全部内容。

技术领域

[0003] 实施方式涉及一种半导体存储装置。

背景技术

[0004] 作为半导体存储装置,已知有NAND(Not AND,与非)型闪速存储器。

发明内容

[0005] 实施方式提供一种能够使存储的数据的可靠性提升的半导体存储装置。

[0006] 实施方式的半导体存储装置包含多个导电体、柱、及控制器。多个导电体隔着绝缘体而积层。柱通过多个导电体,包含第1柱状部、第2柱状部、以及第1柱状部及第2柱状部间的接合部,且与多个导电体的交叉部分分别作为晶体管发挥功能。控制器执行写入动作。第1柱状部所通过的多个导电体中,距接合部最近的导电体与其他任一个导电体分别作为第1虚设字线、及第1字线发挥功能。第2柱状部所通过的多个导电体中,距接合部最近的导电体与其他任一个导电体分别作为第2虚设字线、及第2字线发挥功能。控制器在写入动作中,执行包括包含预充电动作的编程动作的编程循环。控制器在选择了第1字线的写入动作中的预充电动作中,对第1字线、第1虚设字线、第2虚设字线、及第2字线分别施加比接地电压高的第1电压。控制器在选择了第2字线的写入动作中的预充电动作中,对第1字线施加比第1电压低的第2电压,对第2虚设字线及第2字线分别施加第1电压。

附图说明

[0007] 图1是表示实施方式的半导体存储装置的整体构成的一例的框图;

[0008] 图2是表示实施方式的存储单元阵列的电路构成的一例的电路图;

[0009] 图3是表示实施方式的存储单元晶体管的阈值电压的分布的一例的阈值分布图;

[0010] 图4是表示实施方式的存储单元阵列的截面构成的一例的剖视图;

[0011] 图5是表示实施方式的行解码器模块的电路构成的一例的电路图;

[0012] 图6是表示实施方式的半导体存储装置中的写入动作的一例的流程图;

[0013] 图7是表示实施方式的半导体存储装置中的第1写入动作的编程动作中的各布线的电压的一例的时序图;

[0014] 图8是表示实施方式的半导体存储装置中的第2写入动作的编程动作中的各布线的电压的一例的时序图;

[0015] 图9是表示实施方式的比较例的半导体存储装置中的第2写入动作的编程动作中的各布线的电压的一例的时序图;

[0016] 图10是表示实施方式的比较例的半导体存储装置中的第2写入动作的编程动作中的存储器柱内部的电子的行为的一例的示意图；

[0017] 图11是表示实施方式的比较例的半导体存储装置中的存储单元晶体管的阈值电压的分布的一例的阈值分布图；

[0018] 图12是表示实施方式的变化例的半导体存储装置中的第2写入动作的编程动作中的各布线的电压的一例的时序图。

具体实施方式

[0019] 以下,参照示意性的附图对实施方式进行说明。实施方式例示用于将发明的技术思想具体化的装置及方法。在以下的说明中,对具有大致相同的功能及构成的构成要素标注相同符号。构成参照符号的字母之后的数字以包含相同字母的参照符号的形式被参照,且用于对具有相同构成的要素彼此加以区别。在不需要将以包含相同字母的参照符号表示的要素相互区别的情况下,这些要素通过仅包含相同字母的参照符号被参照。

[0020] [实施方式]

[0021] 以下,对实施方式的半导体存储装置进行说明。

[0022] [1]构成

[0023] [1-1]半导体存储装置10的整体构成

[0024] 图1表示实施方式的半导体存储装置10的整体构成的一例。如图1所示,半导体存储装置10包含存储单元阵列11、输入输出电路12、寄存器部13、逻辑控制器14、定序器15、就绪/忙碌控制电路16、以及电压产生电路17、行解码器模块18、及读出放大器模块19。

[0025] 存储单元阵列11包含块BLK0~BLKn(n为1以上的整数)。块BLK是与位线及字线建立关联的多个非易失性存储单元的集合,例如成为数据的删除单位。并不限于此,关于其他删除动作,分别记载在题为“非易失性半导体存储装置”的在2011年9月18日提出申请的美国专利申请13/235,389号、题为“非易失性半导体存储装置”的在2010年1月27日提出申请的美国专利申请12/694,690号中。这些专利申请的全部内容通过参照而引用在本申请的说明书中。

[0026] 输入输出电路12在与外部的存储器控制器之间收发例如8比特宽度的输入输出信号I/O1~I/O8。输入输出信号I/O例如包含数据DAT、地址信息ADD、或指令CMD等。例如,输入输出电路12将从外部的存储器控制器接收到的数据DAT传输到读出放大器模块19。另外,输入输出电路12将由读出放大器模块19从存储单元阵列11读出并从读出放大器模块19传输来的数据DAT发送到外部的存储器控制器。

[0027] 寄存器部13包含状态寄存器13A、地址寄存器13B、及指令寄存器13C。状态寄存器13A例如保存定序器15的状态信息STS,并根据定序器15的指示将状态信息STS传输到输入输出电路12。地址寄存器13B保存从输入输出电路12传输来的地址信息ADD。地址信息ADD例如包含块地址、页地址、及列地址。指令寄存器13C保存从输入输出电路12传输来的指令CMD。

[0028] 逻辑控制器14根据从外部的存储器控制器接收到的各种控制信号,分别对输入输出电路12及定序器15进行控制。作为各种控制信号,例如使用芯片使能信号/CE、指令锁存使能信号CLE、地址锁存使能信号ALE、写入使能信号/WE、读出使能信号/RE、及写入保护信

号/WP。芯片使能信号/CE是用来使半导体存储装置10成为使能的信号。指令锁存使能信号CLE是用来向输入输出电路12通知接收到的输入输出信号I/O为指令CMD的信号。地址锁存使能信号ALE是用来向输入输出电路12通知接收到的输入输出信号I/O为地址信息ADD的信号。写入使能信号/WE是用来对输入输出电路12命令输入输出信号I/O的输入的信号。读出使能信号/RE是用来对输入输出电路12命令输入输出信号I/O的输出的信号。写入保护信号/WP是用来当电源接通断开时使半导体存储装置10为保护状态的信号。

[0029] 定序器15根据保存在寄存器部13的地址信息ADD及指令CMD,控制半导体存储装置10整体的动作。例如,定序器15控制电压产生电路17、行解码器模块18、读出放大器模块19等而执行写入动作。

[0030] 就绪/忙碌控制电路16根据定序器15的动作状态,产生就绪/忙碌信号RBn。就绪/忙碌信号RBn是用来向外部的控制器通知如下的信号,即,半导体存储装置10是接收来自外部的存储器控制器的命令的就绪状态还是不接收命令的忙碌状态。

[0031] 电压产生电路17根据定序器15的控制产生所需电压,并将所产生的电压供给至存储单元阵列11、行解码器模块18、读出放大器模块19等。例如,电压产生电路17对根据保存在地址寄存器13B的页地址所选择的字线施加所需电压。

[0032] 行解码器模块18根据保存在地址寄存器13B的块地址,选择执行各种动作的块BLK。然后,行解码器模块18将从电压产生电路17供给的电压施加到例如所选择的块BLK中设置的字线。

[0033] 读出放大器模块19从存储单元阵列11读出数据DAT,并将所读出的数据DAT传输到输入输出电路12。另外,读出放大器模块19基于从输入输出电路12接收到的数据DAT,对各位线施加所需电压。

[0034] [1-2]存储单元阵列11的构成

[0035] (存储单元阵列11的电路构成)

[0036] 图2是实施方式的存储单元阵列11的电路构成的一例,抽取1个块BLK进行表示。如图2所示,块BLK包含例如4个串单元SU0~SU3。

[0037] 各串单元SU包含多个NAND串NS。多个NAND串NS分别与位线BL0~BLm(m为1以上的整数)建立关联。另外,各NAND串NS例如包含存储单元晶体管MT0~MT15、虚设晶体管LDT及UDT、以及选择晶体管ST1及ST2。

[0038] 存储单元晶体管MT包含控制栅极及电荷蓄积层,将数据非易失地存储。虚设晶体管LDT及UDT各自例如为与存储单元晶体管MT相同的构成,是不用来存储数据的存储单元晶体管。选择晶体管ST1及ST2分别用于各种动作时的串单元SU的选择。

[0039] 在各NAND串NS中,选择晶体管ST1的漏极连接于对应的位线BL。在选择晶体管ST1的源极与虚设晶体管UDT的漏极之间串联连接着存储单元晶体管MT8~MT15。虚设晶体管UDT的源极连接于虚设晶体管LDT的漏极。在虚设晶体管LDT的源极与选择晶体管ST2的漏极之间串联连接着存储单元晶体管MT0~MT7。

[0040] 在同一块BLK中,存储单元晶体管MT0~MT15各自的控制栅极分别共通连接于字线WL0~WL15。虚设晶体管UDT的控制栅极共通连接于虚设字线UDWL。虚设晶体管LDT的控制栅极共通连接于虚设字线LDWL。串单元SU0~SU3各自中所包含的选择晶体管ST1的栅极分别共通连接于选择栅极线SGD0~SGD3。选择晶体管ST2的栅极共通连接于选择栅极线SGS。

[0041] 对位线BL0~BLm分配互不相同的列地址,各位线BL共通连接多个块BLK间对应的NAND串NS的选择晶体管ST1。字线WL0~WL15以及虚设字线UDWL及LDWL分别针对每一块BLK而设置。源极线SL在多个块BLK间被共用。

[0042] 在1个串单元SU内连接于共通的字线WL的多个存储单元晶体管MT被称为单元组件CU。单元组件CU的存储容量根据存储单元晶体管MT存储的数据的比特数而变化。例如,单元组件CU在各存储单元晶体管MT存储1比特数据的情况下存储1页数据,在存储2比特数据的情况下存储2页数据。

[0043] 以下,以应用使1个存储单元晶体管MT存储2比特数据的MLC(Multi-Level Cell, 多层单元)方式作为存储单元晶体管MT的写入方式的情况为例进行说明。

[0044] (存储单元晶体管MT的阈值分布)

[0045] 图3是存储单元晶体管MT的阈值分布及读出电压的一例,纵轴表示存储单元晶体管MT的个数,横轴表示存储单元晶体管MT的阈值电压 V_{th} 。应用MLC方式的多个存储单元晶体管MT如图3所示,形成4个阈值分布。

[0046] 所述4个阈值分布例如按照阈值电压从低到高的顺序称为“ER”电平、“A”电平、“B”电平、“C”电平。对“ER”电平、“A”电平、“B”电平、及“C”电平各自的阈值分布分配互不相同的2比特数据。删除状态的存储单元晶体管MT的阈值电压包含于“ER”电平。写入有数据的存储单元晶体管MT的阈值电压根据所写入的数据而包含于“ER”电平、“A”电平、“B”电平、或“C”电平。

[0047] 在相邻的阈值分布之间分别设定读出电压。例如,读出电压AR设定在“ER”电平中的最大的阈值电压与“A”电平中的最小的阈值电压之间。在使用读出电压AR的读出动作中,对所选择的字线WL施加读出电压AR,使与“ER”电平对应的存储单元晶体管MT成为接通状态,使包含于“A”电平以上的阈值分布的存储单元晶体管MT成为断开状态。由此,读出放大器模块19可判定存储单元晶体管MT的阈值电压包含于“ER”电平的阈值分布还是包含于“A”电平以上的阈值分布。

[0048] 其他读出电压也同样地设定,读出电压BR设定在“A”电平的阈值分布与“B”电平的阈值分布之间,读出电压CR设定在“B”电平的阈值分布与“C”电平的阈值分布之间。在比最高的阈值分布中的最大的阈值电压高的电压中设定读出通过电压VREAD。栅极被施加读出通过电压VREAD的存储单元晶体管MT无关于存储的数据而成为接通状态。

[0049] (存储单元阵列11的构造)

[0050] 图4是实施方式的存储单元阵列11的截面构造的一例,分别示出省略了层间绝缘膜的存储单元阵列11的截面、以及X轴、Y轴、及Z轴。如图4所示,半导体存储装置10包含半导体基板20、导电体21~28、存储器柱MH、及接触插塞BLC。

[0051] 半导体基板20的表面对应于XY平面。在半导体基板20的上方隔着绝缘膜设置着导电体21。导电体21形成为沿着XY平面的板状,作为源极线SL发挥功能。在导电体21上,在X方向上排列着沿着YZ平面的多个狭缝SLT。导电体21上且相邻的狭缝SLT间的构造体例如对应于1个串单元SU。

[0052] 具体来说,在导电体21上且相邻的狭缝SLT间,从下层起依次设置着导电体22、8个导电体23、导电体24、导电体25、8个导电体26、及导电体27。这些导电体中,在Z方向上相邻的导电体隔着层间绝缘膜而积层。导电体22~27分别形成为沿着XY平面的板状。

[0053] 导电体22作为选择栅极线SGS发挥功能。8个导电体23从下层起依次分别作为字线WL0~WL7发挥功能。导电体24及25分别作为虚设字线LDWL及UDWL发挥功能。8个导电体26从下层起依次分别作为字线WL8~WL15发挥功能。导电体27作为选择栅极线SGD发挥功能。

[0054] 多个存储器柱MH例如沿Y方向呈错位状排列(未图示),且各自作为1个NAND串NS发挥功能。各存储器柱MH以从导电体27的上表面到达至导电体21的上表面的方式,通过导电体22~27而设置。另外,各存储器柱MH是将多个柱状部连结而设置,包含下部柱LMH、上部柱UMH、及下部柱LMH与上部柱UMH间的接合部JT。

[0055] 上部柱UMH设置在下部柱LMH上,下部柱LMH与上部柱UMH之间经由接合部JT而接合。例如,接合部JT的外径比下部柱LMH与接合部JT的接触部分的外径大,且比上部柱UMH与接合部JT的接触部分的外径大。设置着接合部JT的接合层的Z方向上的间隔(导电体24及25间的间隔)比相邻的导电体23的间隔宽,且比相邻的导电体26的间隔宽。

[0056] 另外,存储器柱MH例如包含阻挡绝缘膜29、绝缘膜30、穿隧氧化膜31、及导电性的半导体材料32。阻挡绝缘膜29设置在形成存储器柱MH的存储孔的内壁。绝缘膜30设置在阻挡绝缘膜29的内壁,作为存储单元晶体管MT的电荷蓄积层发挥功能。穿隧氧化膜31设置在绝缘膜30的内壁。半导体材料32设置在穿隧氧化膜31的内壁,在半导体材料32内形成NAND串NS的电流路径。存储器柱MH也可在半导体材料32的内壁包含不同材料。

[0057] 存储器柱MH与导电体22交叉的部分作为选择晶体管ST2发挥功能。存储器柱MH与8个导电体23交叉的部分从下层起依次分别作为存储单元晶体管MT0~MT7发挥功能。存储器柱MH与导电体24交叉的部分作为虚设晶体管LDT发挥功能。如图所示,选择晶体管ST2、存储单元晶体管MT0~MT7、及虚设晶体管LDT分别由下部柱LMH通过的部分形成。

[0058] 存储器柱MH与导电体25交叉的部分作为虚设晶体管UDT发挥功能。存储器柱MH与8个导电体26交叉的部分从下层起依次分别作为存储单元晶体管MT8~MT15发挥功能。存储器柱MH与导电体27交叉的部分作为选择晶体管ST1发挥功能。如图所示,虚设晶体管UDT、存储单元晶体管MT8~MT15、及选择晶体管ST1分别由上部柱UMH通过的区域形成。

[0059] 在较存储器柱MH的上表面更上层,隔着层间绝缘膜设置着导电体28。导电体28成为在X方向上延伸的线状,作为位线BL发挥功能。多个导电体28沿Y方向排列(未图示),导电体28与对应于每一串单元SU的1个存储器柱MH电连接。具体来说,在各串单元SU,在各存储器柱MH内的半导体材料32上设置着导电性的接触插塞BLC,在接触插塞BLC上设置着1个导电体28。存储器柱MH及导电体28间的连接也可经由多个接触插塞、布线等。

[0060] 此外,存储单元阵列11的构成并不限定于所述构成。例如,各块BLK包含的串单元SU的个数可设计为任意个数。另外,各NAND串NS包含的存储单元晶体管MT、虚设晶体管UDT及LDT、以及选择晶体管ST1及ST2分别可设计为任意个数。

[0061] 另外,字线WL、虚设字线UDWL及LDWL、以及选择栅极线SGD及SGS的条数分别根据存储单元晶体管MT、虚设晶体管UDT及LDT、以及选择晶体管ST1及ST2的个数变更。也可对选择栅极线SGS分配分别设置在多层的多个导电体22,也可对选择栅极线SGD分配分别设置在多层的多个导电体27。

[0062] 关于其他存储单元阵列11的构成,例如分别记载在题为“三维积层非易失性半导体存储器”的在2009年3月19日提出申请的美国专利申请12/407,403号、题为“三维积层非易失性半导体存储器”的在2009年3月18日提出申请的美国专利申请12/406,524号、题为

“非易失性半导体存储装置及其制造方法”的在2010年3月25日提出申请的美国专利申请12/679,991号、题为“半导体存储器及其制造方法”的在2009年3月23日提出申请的美国专利申请12/532,030号中。这些专利申请的全部内容通过参照而引用在本申请的说明书中。

[0063] [1-3]行解码器模块18的构成

[0064] 图5表示实施方式的行解码器模块18的电路构成的一例，一并示出电压产生电路17与行解码器模块18之间的布线。如图5所示，行解码器模块18包含行解码器RD0~RDn。

[0065] 行解码器RD0~RDn分别与块BLK0~BLKn建立关联。也就是说，1个行解码器RD与1个块BLK建立关联。以下，着眼于块BLK0对应的行解码器RD0，对行解码器RD的详细的电路构成进行说明。

[0066] 行解码器RD包含块解码器BD以及高耐压n通道MOS (Metal Oxide Semiconductor, 金属氧化物半导体) 晶体管TR0~TR22。块解码器BD将块地址解码，并根据解码结果对传输栅极线TG施加特定的电压。传输栅极线TG共通连接于晶体管TR0~TR22各自的栅极。晶体管TR0~TR22分别连接于从电压产生电路17布线的信号线与设置在块BLK0的布线之间。

[0067] 具体来说，晶体管TR0的漏极连接于信号线SGSD，晶体管TR0的源极连接于块BLK0的选择栅极线SGS。晶体管TR1~TR8各自的漏极分别连接于信号线CG0~CG7，晶体管TR1~TR8各自的源极分别连接于设置在块BLK0的字线WL0~WL7各自的一端。晶体管TR9的漏极连接于信号线LCGD，晶体管TR9的源极连接于虚设字线LDWL。

[0068] 晶体管TR10的漏极连接于信号线UCGD，晶体管TR10的源极连接于虚设字线UDWL。晶体管TR11~TR18各自的漏极分别连接于信号线CG8~CG15，晶体管TR11~TR18各自的源极分别连接于设置在块BLK0的字线WL8~WL15各自的一端。晶体管TR19~22各自的漏极分别连接于信号线SGDD0~SGDD3，晶体管TR19~22各自的源极分别连接于选择栅极线SGD0~SGD3。

[0069] 通过以上构成，行解码器模块18可选择执行各种动作的块BLK，并对所选择的块BLK施加从电压产生电路17供给的电压。具体来说，在各种动作时，选择及非选择块BLK对应的块解码器BD分别将“H”电平及“L”电平的电压施加到传输栅极线TG。

[0070] 例如，在选择了块BLK0的情况下，行解码器RD0中包含的晶体管TR0~TR22成为接通状态，其他行解码器RD中包含的晶体管TR0~TR22成为断开状态。也就是说，形成设置在块BLK0的各布线与对应的信号线之间的电流路径，而将设置在其他块BLK的各布线与对应的信号线之间的电流路径阻断。结果，通过电压产生电路17分别施加到各信号线的电压经由行解码器RD0，分别施加到所选择的块BLK0中设置的各布线。

[0071] [2]动作

[0072] (写入动作的概略)

[0073] 在实施方式的半导体存储装置10的写入动作中，定序器15重复执行编程动作与验证动作的组合即编程循环。

[0074] 在编程动作中，对写入对象的存储单元晶体管MT的控制栅极施加编程电压VPGM，而该存储单元晶体管MT的阈值电压上升。编程电压VPGM是可将电子注入到存储单元晶体管MT的电荷蓄积层的高电压，每当重复编程循环时便会升高。另外，在编程动作中，例如使用自升压技术，抑制写入禁止的存储单元晶体管MT中的阈值电压的上升。

[0075] 进而，实施方式的编程动作包含预充电动作。预充电动作是以下动作，即使写入

对象的存储单元晶体管MT对应的NAND串NS的通道中的残留电子减少,而使写入禁止的存储单元晶体管MT对应的NAND串NS的通道电位上升。预充电动作在对所选择的字线WL施加编程电压VPGM之前执行。

[0076] 验证动作是判定存储单元晶体管MT的阈值电压是否已达到所需电压的读出动作。实施验证动作的读出电平可随着写入动作进行而适当变更。通过验证动作的存储单元晶体管MT在之后的编程动作中被设定为写入禁止。

[0077] 图6是表示实施方式的半导体存储装置10的写入动作的一例的流程图。在写入动作中,首先,半导体存储装置10如图6所示,从外部的存储器控制器接收指示写入动作的指令CMD、写入数据DAT、及地址信息ADD(步骤S10)。

[0078] 接着,定序器15确认接收到的地址信息ADD所指定的地址(步骤S11)。具体来说,定序器15确认根据接收到的地址信息ADD选择的字线WL与下部柱LMH对应还是与上部柱UMH对应。

[0079] 在所选择的字线WL与下部柱LMH对应的情况下(步骤S12为是(YES)),定序器15执行第1写入动作(步骤S13)。另一方面,在所选择的字线WL与上部柱UMH对应的情况下(步骤S12为否(NO)),定序器15执行第2写入动作(步骤S14)。

[0080] 然后,定序器15当通过执行第1写入动作或第2写入动作,使所选择的字线WL对应的各存储单元晶体管MT的阈值电压分别变化为基于对应的写入数据DAT的电压时,结束写入动作。

[0081] 在以上所说明的第1写入动作与第2写入动作之间,编程动作中的预充电动作的方法不同。以下,分别对第1写入动作及第2写入动作的详细动作进行说明。

[0082] 在以下的说明中,将所选择的字线WL称为选择字线WLse1。将连接于写入对象的存储单元晶体管MT的位线BL称为写入对象的位线BL。将连接于写入禁止的存储单元晶体管MT的位线BL称为写入禁止的位线BL。

[0083] 在选择了与下部柱LMH对应的字线WL的情况下,将设置在选择字线WLse1与虚设字线LDWL之间的字线WL称为字线WLD,在选择了与上部柱UMH对应的字线WL的情况下,将设置在选择字线WLse1与选择栅极线SGD之间的字线WL称为字线WLD。

[0084] 在选择了与下部柱LMH对应的字线WL的情况下,将设置在选择字线WLse1与选择栅极线SGS之间的字线WL称为字线WLS,在选择了与上部柱UMH对应的字线WL的情况下,将设置在选择字线WLse1与虚设字线UDWL之间的字线WL称为字线WLS。

[0085] (第1写入动作)

[0086] 图7表示实施方式的半导体存储装置10中的第1写入动作的编程动作中的选择栅极线SGD、字线WL、虚设字线LDWL及UDWL、以及位线BL各自的电压的一例。另外,在第1写入动作中,选择与下部柱LMH对应的字线WL,因此,图7表示与下部柱LMH对应的字线WLD及WLS各自的电压。

[0087] 如图7所示,在时刻t0以前的初始状态下,各选择栅极线SGD、各字线WL、虚设字线LDWL及UDWL、以及位线BL各自的电压例如成为电压VSS。电压VSS是半导体存储装置10的接地电压。

[0088] 在时刻t0,行解码器模块18对各选择栅极线SGD施加电压VSGDH,对上部柱UMH的字线WL、虚设字线LDWL及UDWL、下部柱LMH的字线WLD、以及选择字线WLse1分别施加电压VPC。

电压VSGDH及VPC分别是比电压VSS高的电压。电压VPC例如设定为比电压VSGDH低的电压。

[0089] 如果对选择栅极线SGD施加电压VSGDH,则选择晶体管ST1成为接通状态。如果对上柱UMH的字线WL、虚设字线LDWL及UDWL、下部柱LMH的字线WLD、以及选择字线WLsel分别施加电压VPC,则这些布线对应的晶体管分别成为接通状态。

[0090] 另外,在时刻t0,读出放大器模块19对写入对象的位线BL施加电压VSS,对写入禁止的位线BL施加电压VBL。电压VBL是比电压VSS高的电压。

[0091] 此时,在连接着写入对象的位线BL的NAND串NS中,由于选择字线WLsel对应的存储单元晶体管MT与选择晶体管ST1之间的晶体管成为接通状态,以及对应的位线BL被施加电压VSS,所以从选择字线WLsel对应的存储单元晶体管MT到选择晶体管ST1为止的区域中的通道内的残留电子被吸引到位线BL。

[0092] 另一方面,在连接着写入禁止的位线BL的NAND串NS中,由于选择字线WLsel对应的存储单元晶体管MT与选择晶体管ST1之间的晶体管成为接通状态,以及对应的位线BL被施加电压VBL,所以从选择字线WLsel对应的存储单元晶体管MT到选择晶体管ST1为止的区域中的通道电位变得比连接于写入对象的位线BL的NAND串NS的通道电位高。

[0093] 在时刻t1,行解码器模块18使各选择栅极线SGD、上部柱UMH的字线WL、虚设字线LDWL及UDWL、下部柱LMH的字线WLD、以及选择字线WLsel各自的电压下降至VSS。

[0094] 如果各选择栅极线SGD的电压下降至VSS,则各选择栅极线SGD所对应的选择晶体管ST1成为断开状态,各自所对应的NAND串NS的通道成为浮动状态。此时,连接着写入禁止的位线BL的NAND串NS的通道电位保持通过时刻t0时的动作上升后的状态。

[0095] 以上所说明的时刻t0及t1时的动作对应于第1写入动作的编程动作中的预充电动作。

[0096] 在时刻t2,行解码器模块18对所选择的串单元SU对应的选择栅极线SGD施加电压VSGD,并对非选择的串单元SU对应的选择栅极线SGD施加电压VSS。电压VSGD是比电压VSS高且比电压VSGDH低的电压。

[0097] 如果对选择栅极线SGD施加电压VSGD,且对位线BL施加电压VBL,则选择晶体管ST1成为断开状态,对应的NAND串NS的通道成为浮动状态。也就是说,在所选择的串单元SU中,连接于写入禁止的位线BL的NAND串NS的通道成为浮动状态。

[0098] 然后,行解码器模块18对上部柱UMH的字线WL、虚设字线LDWL及UDWL、下部柱LMH的字线WLD及WLS、以及选择字线WLsel分别施加电压VPASS。电压VPASS是比电压VSGD高的电压。

[0099] 如果对上柱UMH的字线WL、虚设字线LDWL及UDWL、下部柱LMH的字线WLD及WLS、以及选择字线WLsel分别施加电压VPASS,则成为浮动状态的NAND串NS的通道电位因与字线WL的耦合而上升(自升压)。另一方面,在连接于写入对象的位线BL的NAND串NS中,由于该位线BL被施加电压VSS,所以通道电位的上升得到抑制。

[0100] 在时刻t3,行解码器模块18对选择字线WLsel施加编程电压VPGM。

[0101] 如果对选择字线WLsel施加编程电压VPGM,则通过选择字线WLsel与连接于写入对象的位线BL的NAND串NS的通道的电压差,向写入对象的存储单元晶体管MT的电荷蓄积层注入电子,从而该存储单元晶体管MT的阈值电压上升。

[0102] 另一方面,选择字线WLsel与连接于写入禁止的位线BL的NAND串NS的通道的电压

差通过自升压而变小,所以写入禁止的存储单元晶体管MT中的阈值电压的变动得到抑制。

[0103] 在时刻t4,行解码器模块18使选择字线WLse1的电压下降至VPASS。

[0104] 在时刻t5,行解码器模块18使上部柱UMH的字线WL、虚设字线LDWL及UDWL、下部柱LMH的字线WLD及WLS、以及选择字线WLse1各自的电压下降至VSS。这样一来,成为浮动状态的NAND串NS的通道电压随着字线WL的电压下降而下降。

[0105] 另外,在时刻t5,行解码器模块18使所选择的串单元SU对应的选择栅极线SGD的电压下降至VSS,读出放大器模块19使写入禁止的位线BL的电压下降至VSS。这样一来,各布线的电压恢复为初始状态。

[0106] 以上所说明的一系列动作对应于1次编程动作。定序器15当编程动作结束时执行验证动作,并根据该验证结果,决定是否执行下一编程循环。然后,定序器15当例如通过重复编程循环检测到已通过最高电平的验证时,结束第1写入动作。

[0107] (第2写入动作)

[0108] 图8表示实施方式的半导体存储装置10中的第2写入动作的编程动作中的选择栅极线SGD、字线WL、虚设字线LDWL及UDWL、以及位线BL各自的电压的一例。另外,在第2写入动作中,选择与上部柱UMH对应的字线WL,因此,图8表示与上部柱UMH对应的字线WLD及WLS各自的电压。

[0109] 如图8所示,第2写入动作的编程动作相对于利用图7所说明的第1写入动作的编程动作而言,时刻t0及t1各自所对应的动作(预充电动作)不同。

[0110] 具体来说,在时刻t0,行解码器模块18对各选择栅极线SGD施加电压VSGDH,对上部柱UMH的字线WLD、选择字线WLse1、以及虚设字线LDWL及UDWL分别施加电压VPC,对上部柱UMH的字线WLS施加电压VPCH,对下部柱LMH的字线WL施加例如电压VSS。电压VPCH是比电压VPC高的电压。优选栅极被施加电压VPCH的存储单元晶体管MT无关于存储的数据而成为接通状态,电压VPCH例如设定为相当于电压VREAD的电压。

[0111] 如果对选择栅极线SGD施加电压VSGDH,则选择晶体管ST1成为接通状态。如果对上部柱UMH的字线WLD、选择字线WLse1、以及虚设字线LDWL及UDWL分别施加电压VPC,则这些布线对应的晶体管分别成为接通状态。

[0112] 另外,如果对上部柱UMH的字线WLS施加电压VPCH,则与上部柱的字线WLS对应的存储单元晶体管MT例如无关于保存的数据而成为接通状态。

[0113] 另外,在时刻t0,读出放大器模块19对写入对象的位线BL施加电压VSS,对写入禁止的位线BL施加电压VBL。电压VBL是比电压VSS高的电压。

[0114] 此时,在连接着写入对象的位线BL的NAND串NS中,由于虚设晶体管LDT与选择晶体管ST1之间的晶体管成为接通状态,以及对应的位线BL被施加电压VSS,所以从虚设晶体管LDT到选择晶体管ST1为止的区域中的通道内的残留电子被吸引到位线BL。

[0115] 另一方面,在连接着写入禁止的位线BL的NAND串NS中,由于虚设晶体管LDT与选择晶体管ST1之间的晶体管成为接通状态,以及对应的位线BL被施加电压VBL,所以从虚设晶体管LDT到选择晶体管ST1为止的区域中的通道电位变得比连接于写入对象的位线BL的NAND串NS的通道电位高。

[0116] 在时刻t1,行解码器模块18使各选择栅极线SGD、上部柱UMH的字线WLD及WLS、选择字线WLse1、虚设字线LDWL及UDWL、以及下部柱LMH的字线WL各自的电压下降至VSS。第2写入

动作中的其他动作由于与第1写入动作相同,所以省略说明。

[0117] [3]效果

[0118] 根据以上所说明的实施方式的半导体存储装置10,能够使半导体存储装置存储的数据的可靠性提升。以下,对实施方式的半导体存储装置10的详细效果进行说明。

[0119] 作为在存储单元三维地积层而成的半导体存储装置中增加存储单元的积层数的方法,考虑沿积层方向连结地形成多个存储孔,利用经连结的存储孔形成1个存储器柱MH。在该情况下,在半导体存储装置的制造步骤中,可降低存储孔加工时的蚀刻步骤的深宽比,从而可降低蚀刻步骤的工艺难易度。

[0120] 在具有这种构造的半导体存储装置中,存储器柱MH例如包含用来将下层侧的存储孔与上层侧的存储孔连结的接合部JT。与接合部JT相邻的存储单元晶体管MT(或虚设晶体管)间的间隔多数情况下设计为比其他存储单元晶体管MT间的间隔宽。

[0121] 在这种情况下,存在以下倾向,即,与接合部JT相邻的存储单元晶体管MT的特性与其他存储单元晶体管MT的特性不同。而且,存在以下倾向,即,在NAND串NS的通道内的接合部JT对应的区域,与其他区域相比,电子更容易残留。接合部JT中的残留电子在对于与上部柱UMH对应的存储单元晶体管MT的写入动作中,可能会导致误写入。以下,对由接合部JT引起的误写入的模型的一例进行说明。

[0122] 图9表示实施方式的比较例的第2写入动作的编程动作中的选择栅极线SGD、字线WL、虚设字线LDWL及UDWL、以及位线BL各自的电压的一例。

[0123] 如图9所示,比较例的第2写入动作的编程动作相对于利用图8所说明的实施方式的第2写入动作的编程动作而言,时刻t0及t1各自所对应的动作(预充电动作)不同。

[0124] 具体来说,在时刻t0,行解码器模块18对各选择栅极线SGD施加电压VSGDH,对上部柱UMH的字线WLD、及选择字线WLsel分别施加电压VPC,对上部柱UMH的字线WLS、虚设字线LDWL及UDWL、以及下部柱LMH的字线WL分别施加例如电压VSS。

[0125] 此时,在连接着写入对象的位线BL的NAND串NS中,与利用图7所说明的实施方式的第1写入动作的编程动作同样地,从选择字线WLsel对应的存储单元晶体管MT到选择晶体管ST1为止的区域中的通道内的残留电子被吸引到位线BL。也就是说,在比较例的预充电动作中,对接近的字线施加电压VPC,在残留电子被吸引的通道区域中不包含接合部JT。

[0126] 图10表示实施方式的比较例的第2写入动作的编程动作中的半导体柱内部的电子的行为的一例。另外,图10抽取存储单元阵列11的一部分区域进行表示,例示出选择了上部柱UMH的字线WL8的情况。

[0127] 如图10所示,在比较例的第2写入动作的编程动作中,对上部柱UMH的字线WL8施加编程电压时,接合部JT中的NAND串NS的通道(半导体材料32)内的残留电子有可能被注入到所选择的存储单元晶体管MT的电荷蓄积层。

[0128] 这个现象可能会在选择与上部柱UMH对应的存储单元晶体管MT的第2写入动作中产生。原因在于,在选择与下部柱LMH对应的存储单元晶体管MT的第1写入动作中,在预充电动作中NAND串NS的通道内的残留电子被吸引的区域中包含与接合部JT对应的区域。

[0129] 图11表示实施方式的比较例的存储单元晶体管MT的阈值分布的一例。根据所述原因,存在以下情况,即,比较例的与上部柱UMH对应的存储单元晶体管MT的阈值分布相对于与下部柱LMH对应的存储单元晶体管MT的阈值分布,具有如图11所示的上下端的扩展。

[0130] 相对于此,在实施方式的第2写入动作的编程动作中的预充电动作中,行解码器模块18对与接合部JT相邻的虚设字线UDWL及LDWL分别施加电压VPC,对上部柱UMH的字线WLS施加电压VPCH。

[0131] 也就是说,在实施方式的预充电动作中,虚设晶体管LDT及UDT成为接通状态,对接合部JT的区域也施加虚设字线UDWL及LDWL的电压。进而,对写入已结束的与上部柱UMH的字线WLS对应的存储单元晶体管MT施加电压VPCH,因此,无关于写入的数据,这些存储单元晶体管MT成为接通状态。

[0132] 结果,在实施方式的半导体存储装置10中,从选择字线WLsel对应的存储单元晶体管MT到选择晶体管ST1为止的区域中的通道内的残留电子被吸引到位线BL,所以能够使与接合部JT对应的区域中的残留电子减少。

[0133] 由此,实施方式的半导体存储装置10可抑制接合部JT中的残留电子所引起的误写入,从而可抑制与上部柱UMH对应的存储单元晶体管MT中的阈值分布的扩展。因此,实施方式的半导体存储装置10可抑制读出动作中的错误比特数,从而能够使存储的数据的可靠性提升。

[0134] [变化例等]

[0135] 实施方式的半导体存储装置包含多个导电体、柱<例如图4、MH>、及控制器<例如图1、15>。多个导电体隔着绝缘体而积层。柱通过多个导电体,包含第1柱状部<例如图4、LMH>、第2柱状部<例如图4、UMH>、以及第1柱状部及第2柱状部间的接合部<例如图4、JT>,且与多个导电体的交叉部分分别作为晶体管发挥功能。控制器执行写入动作。第1柱状部所通过的多个导电体中,距接合部最近的导电体<例如图4、24>与其他任一个导电体<例如图4、23>分别作为第1虚设字线<例如图4、LDWL>、及第1字线<例如图4、WL (LMH)>发挥功能。第2柱状部所通过的多个导电体中,距接合部最近的导电体<例如图4、25>与其他任一个导电体<例如图4、26>分别作为第2虚设字线<例如图4、UDWL>、及第2字线<例如图4、WL (UMH)>发挥功能。控制器在写入动作中,执行包括包含预充电动作的编程动作的编程循环。控制器在选择了第1字线的写入动作中的预充电动作<例如图7、第1写入动作>中,对第1字线、第1虚设字线、第2虚设字线、及第2字线分别施加比接地电压高的第1电压<例如图7、VPC>。控制器在选择了第2字线的写入动作中的预充电动作<例如图8、第2写入动作>中,对第1字线施加比第1电压低的第2电压<例如图8、VSS>,对第2虚设字线及第2字线分别施加第1电压。由此,半导体存储装置10能够使存储的数据的可靠性提升。

[0136] 此外,在实施方式所说明的第2写入动作中,也能够使上部柱UMH对应的虚设字线UDWL与下部柱LMH对应的虚设字线LDWL进行不同动作。以下,利用图12对本变化例进行说明。

[0137] 图12表示实施方式的变化例的第2写入动作的编程动作中所选择的块BLK对应的选择栅极线SGD、字线WL、虚设字线LDWL及UDWL、以及位线BL各自的电压的一例。

[0138] 如图12所示,变化例的第2写入动作的编程动作相对于利用图8所说明的实施方式的第2写入动作的编程动作而言,时刻t0及t1时的虚设字线LDWL及UDWL的动作不同。

[0139] 具体来说,在时刻t0,行解码器模块18对各选择栅极线SGD施加电压VSGDH,对上部柱UMH的字线WLD、选择字线WLsel、及虚设字线LDWL分别施加电压VPC,对上部柱UMH的字线WLS、虚设字线UDWL、以及下部柱LMH的字线施加例如电压VSS。实施方式的变化例的第2写入

动作的其他动作由于与利用图8所说明的实施方式的第2写入动作相同,所以省略说明。

[0140] 像这样,在变化例的第2写入动作的预充电动作中,对虚设晶体管LDT施加电压VSS。在变化例的第2写入动作的预充电动作中,与上部柱UMH对应的虚设晶体管UDT成为接通状态,所以,能够使接合部中的NAND串NS的通道内的残留电子相比较例的第2写入动作的预充电动作减少。

[0141] 因此,变化例的第2写入动作可抑制接合部JT中的残留电子所引起的误写入,从而可抑制与上部柱UMH对应的存储单元晶体管MT中的阈值分布的扩展。因此,实施方式的变化例的半导体存储装置10可抑制读出动作中的错误比特数,从而能够使存储的数据的可靠性提升。

[0142] 在所述实施方式中,以应用使1个存储单元晶体管MT存储2比特的数据的MLC (Multi-Level Cell) 方式作为存储单元晶体管MT的写入方式的情况为例进行了说明,但并不限于此。例如,也能够使1个存储单元晶体管MT存储1比特的数据,也可存储3比特以上的数据。在这种情况下,通过应用所述实施方式中的第2写入动作,也能够使存储的数据的可靠性提升。

[0143] 在所述实施方式中,以利用与接合部JT相邻的晶体管作为虚设晶体管的情况为例进行了说明,但并不限于此。例如,也可利用相对于接合部JT设置在一侧的晶体管作为虚设晶体管,也可利用设置在另一侧的晶体管作为存储单元晶体管,还可利用设置在两侧的晶体管作为存储单元晶体管。在这种情况下,在第2写入动作中,通过使连接于与接合部JT相邻的存储单元晶体管的字线的动作与利用图8所说明的与上部柱UMH对应的字线WLS同样地动作,也能够获得与实施方式相同的效果。

[0144] 在所述实施方式中,以与接合部JT的一侧或另一侧相邻的虚设晶体管设置有1个的情况为例进行了说明,但并不限于此。例如,也可利用与接合部JT接近的区域中的多个晶体管作为虚设晶体管。在这种情况下,在第2写入动作中,通过使与接合部JT接近的虚设字线的动作与利用图8所说明的虚设字线UDWL或LDWL同样地动作,也能够获得与实施方式相同的效果。

[0145] 在所述实施方式中,以1根存储器柱MH由下部柱LMH及上部柱UMH的2段构造形成的情况为例进行了说明,但并不限于此。例如,1根存储器柱也可包含3段以上的柱部、及2个以上的接合部JT。在这种情况下,例如,在设置着选择晶体管ST2的柱执行第1写入动作,在其他柱执行第2写入动作。在该第2写入动作中,例如,在预充电动作中,可从最下层的接合部JT对上层的字线及虚设字线施加电压VPC或VPCH,以能够将所有接合部JT中的残留电子去除,也可从该接合部JT对上层的字线及虚设字线施加电压VPC或VPCH,以能够将与所选择的字线对应的柱接近的接合部JT中的残留电子去除。

[0146] 在所述实施方式中,以接合部JT的外径比下部柱LMH与接合部JT的接触部分的外径大且比上部柱UMH与接合部JT的接触部分的外径大的情况为例进行了说明,但并不限于此。例如,在下部柱LMH的上表面与上部柱UMH的下表面直接接合的构造的情况下,该下部柱LMH的上表面与该上部柱UMH的下表面接触的区域相当于接合部JT。

[0147] 在所述实施方式中,利用分别示出选择栅极线、字线、及虚设字线的电压的时序图对写入动作进行了说明,这些布线的电压成为例如与电压产生电路17对行解码器模块18供给电压的信号线的电压相同的电压。

[0148] 也就是说,在所述实施方式中,对各布线施加的电压、或施加电压的期间可通过调查对应的信号线的电压而粗略知晓。在根据连接于电压产生电路17的各信号线的电压估计选择栅极线、字线、及虚设字线等的电压的情况下,也可考虑行解码器RD中包含的晶体管TR的电压降。在该情况下,选择栅极线、字线、及虚设字线各自的电压与施加到分别对应的信号线的电压相比,降低晶体管TR的电压降的量。

[0149] 本说明书中,所谓“连接”,表示电连接,不排除例如在中间插入其他元件。另外,本说明书中,所谓“断开状态”,表示对应的晶体管的栅极被施加小于该晶体管的阈值电压的电压,不排除例如晶体管的漏电流之类的微小电流流过。

[0150] 此外,在所述各实施方式中,

[0151] (1) 在读出动作中,施加到“A”电平的读出动作中选择的字线的电压例如为0~0.55V之间。并不限于此,也可设为0.1~0.24V、0.21~0.31V、0.31~0.4V、0.4~0.5V、0.5~0.55V中的任一范围之间。

[0152] 施加到“B”电平的读出动作中选择的字线的电压例如为1.5~2.3V之间。并不限于此,也可设为1.65~1.8V、1.8~1.95V、1.95~2.1V、2.1~2.3V中的任一范围之间。

[0153] 施加到“C”电平的读出动作中选择的字线的电压例如为3.0V~4.0V之间。并不限于此,也可设为3.0~3.2V、3.2~3.4V、3.4~3.5V、3.5~3.6V、3.6~4.0V中的任一范围之间。

[0154] 作为读出动作的时间(t_{Read}),也可设为例如25~38 μs 、38~70 μs 、70~80 μs 之间。

[0155] (2) 写入动作如上所述包含编程动作与验证动作。最初施加到编程动作时所选择的字线的电压例如为13.7~14.3V之间。并不限于此,也可设为例如13.7~14.0V、14.0~14.6V中的任一范围之间。作为施加到编程动作时非选择的字线的电压,也可设为例如6.0~7.3V之间。并不限于该情况,也可设为例如7.3~8.4V之间,还可设为6.0V以下。

[0156] 在写入动作中,选择第奇数条字线时最初施加到所选择字线的电压、与选择第偶数条字线时最初施加到所选择字线的电压也可不同。在写入动作中,也可根据非选择字线为第奇数条字线还是第偶数条字线来改变要施加的通过电压。

[0157] 作为将编程动作设为ISPP方式(Incremental Step Pulse Program,增量阶跃脉冲编程)时的编程电压的升高幅度,列举例如0.5V左右。

[0158] 作为写入动作的时间(t_{Prog}),也可设为例如1700~1800 μs 、1800~1900 μs 、1900~2000 μs 之间。

[0159] (3) 删除动作中,最初施加到形成在半导体基板上部且在上方配置着所述存储单元的阱的电压例如为12.0~13.6V之间。并不限于该情况,也可例如13.6~14.8V、14.8~19.0V、19.0~19.8V、19.8~21.0V之间。

[0160] 作为删除动作的时间(t_{Erase}),也可设为例如3000~4000 μs 、4000~5000 μs 、4000~9000 μs 之间。

[0161] 已对本发明的若干实施方式进行了说明,但这些实施方式是作为例子提出的,并不意图限定发明的范围。这些新颖的实施方式能以其他多种方式实施,可以在不脱离发明主旨的范围内进行各种省略、置换、变更。这些实施方式或其变化包含在发明的范围或主旨中,并且包含在权利要求书所记载的发明及其均等的范围内。

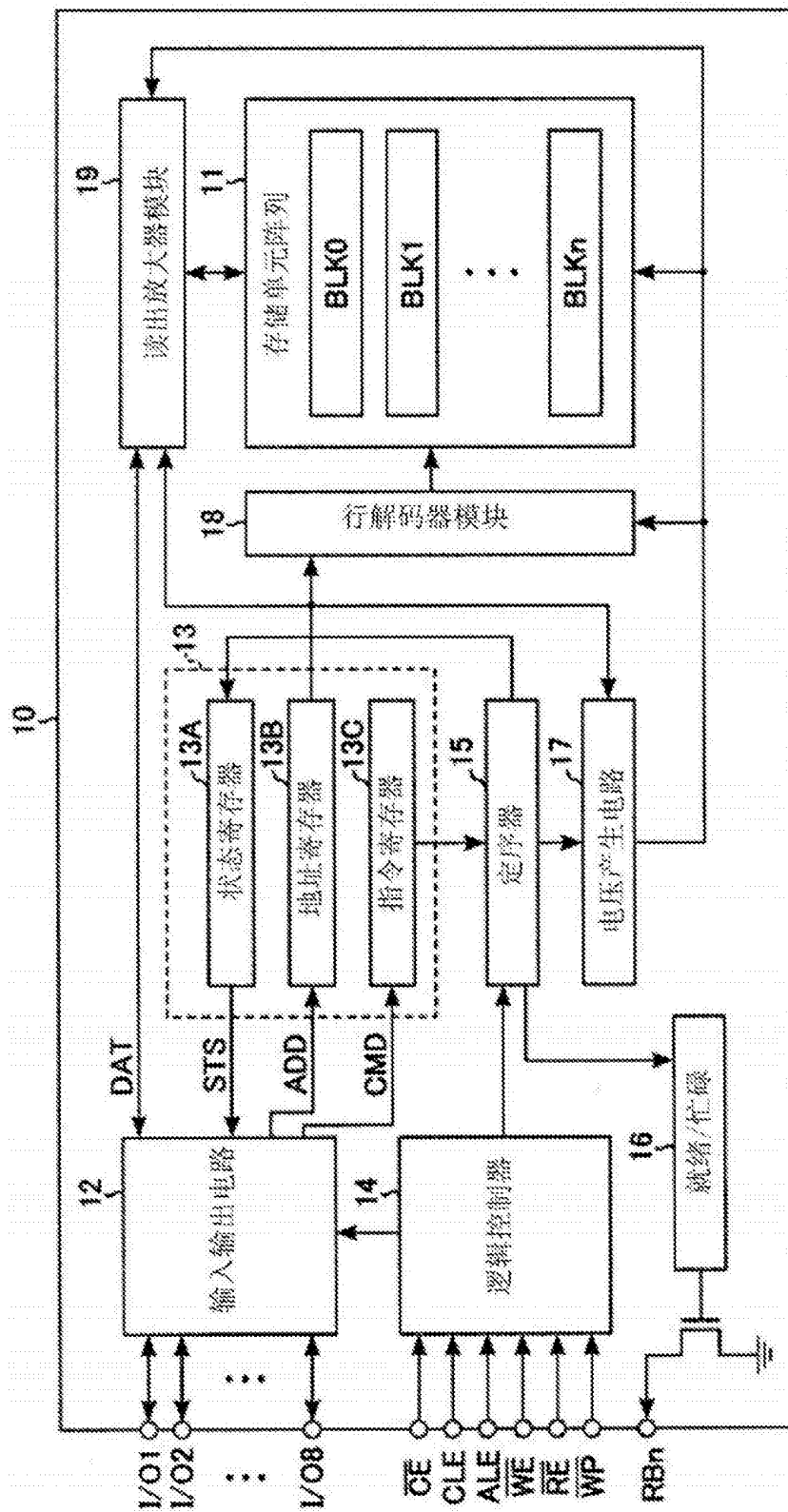


图1

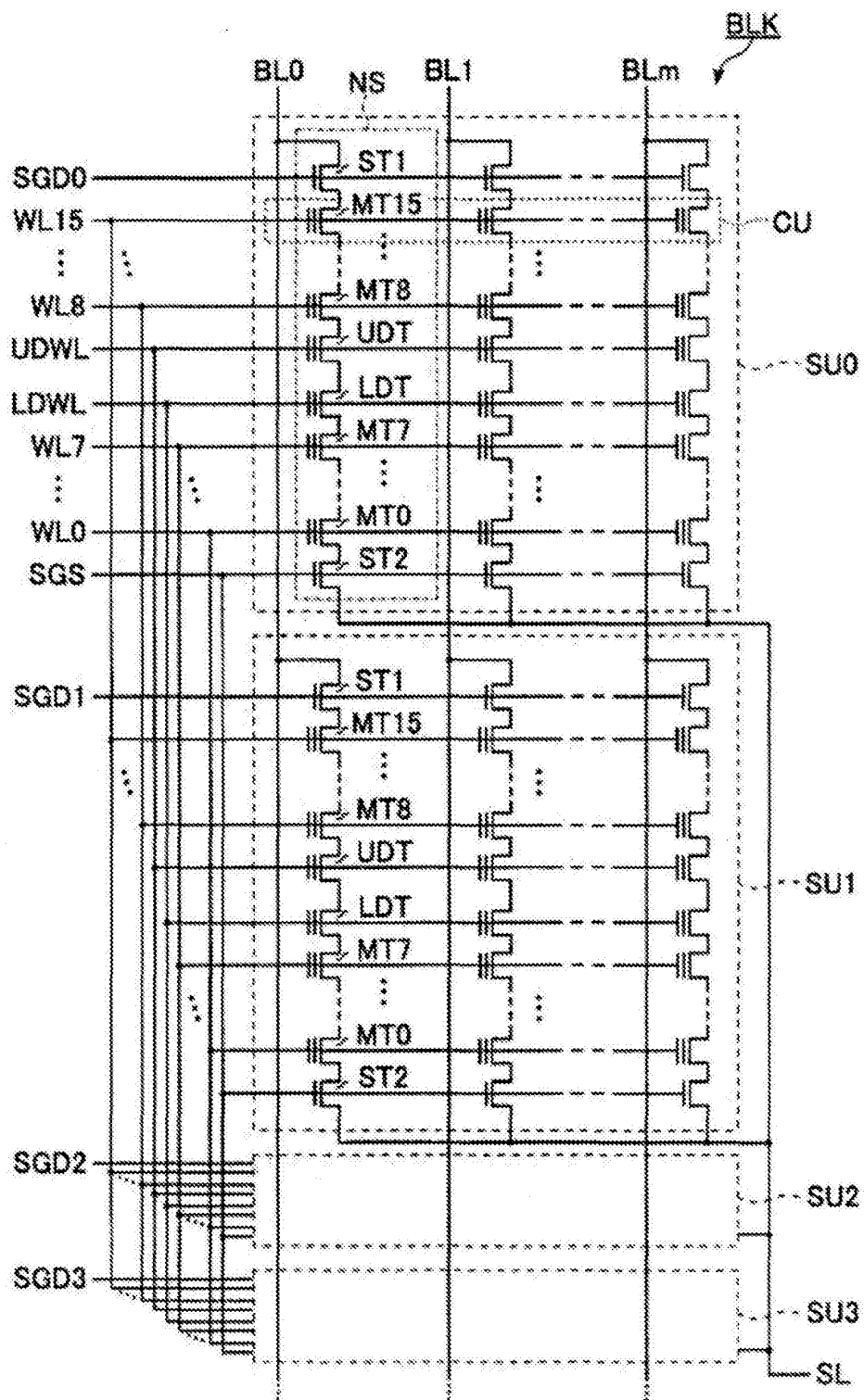


图2

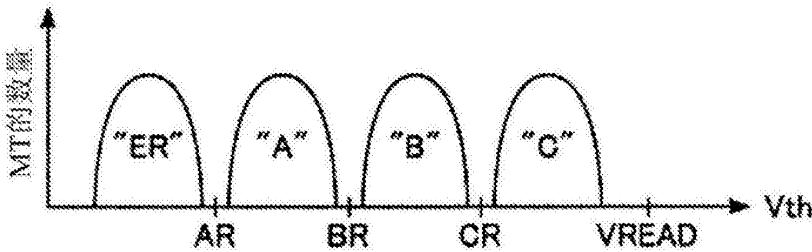


图3

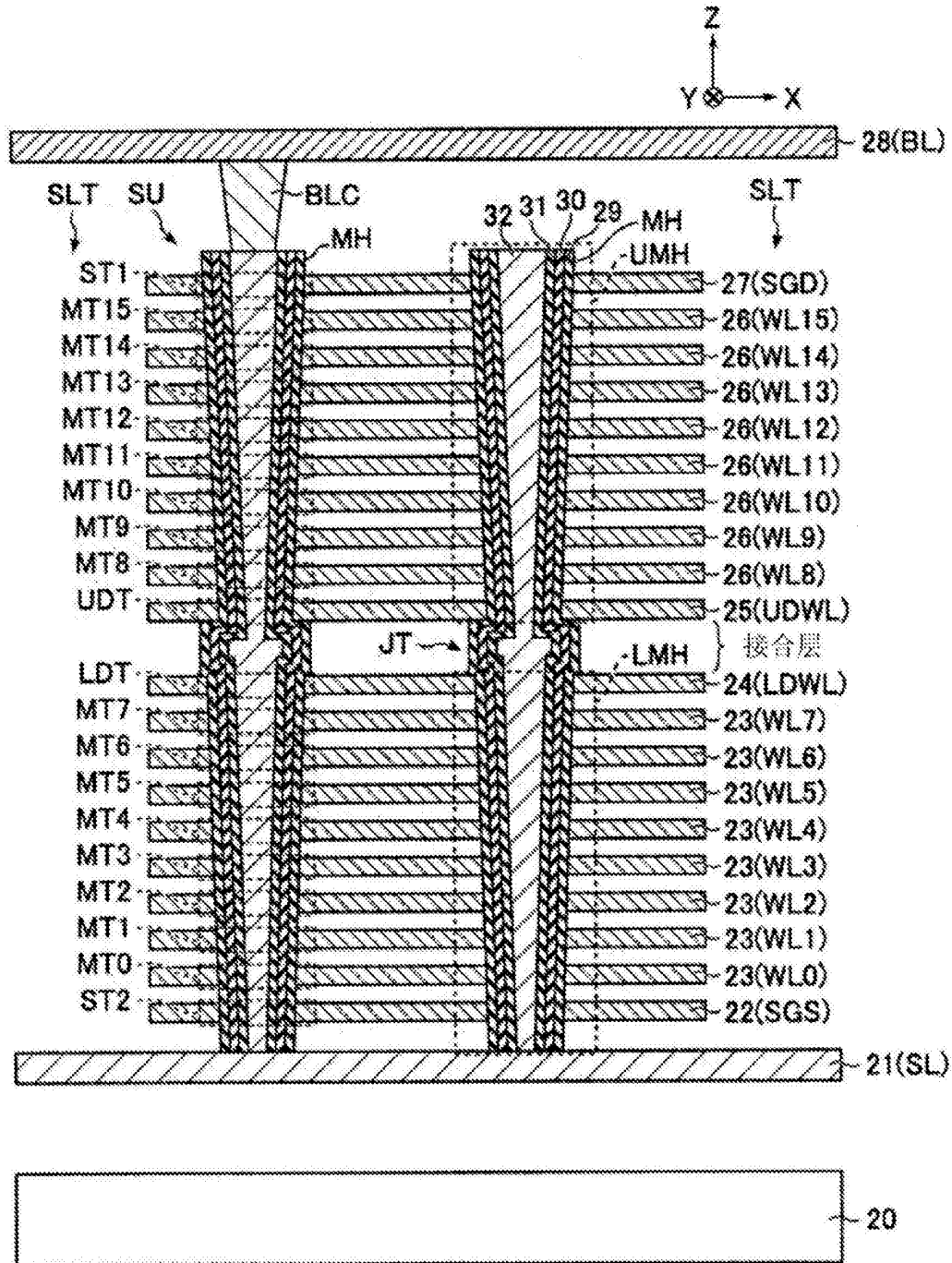


图4

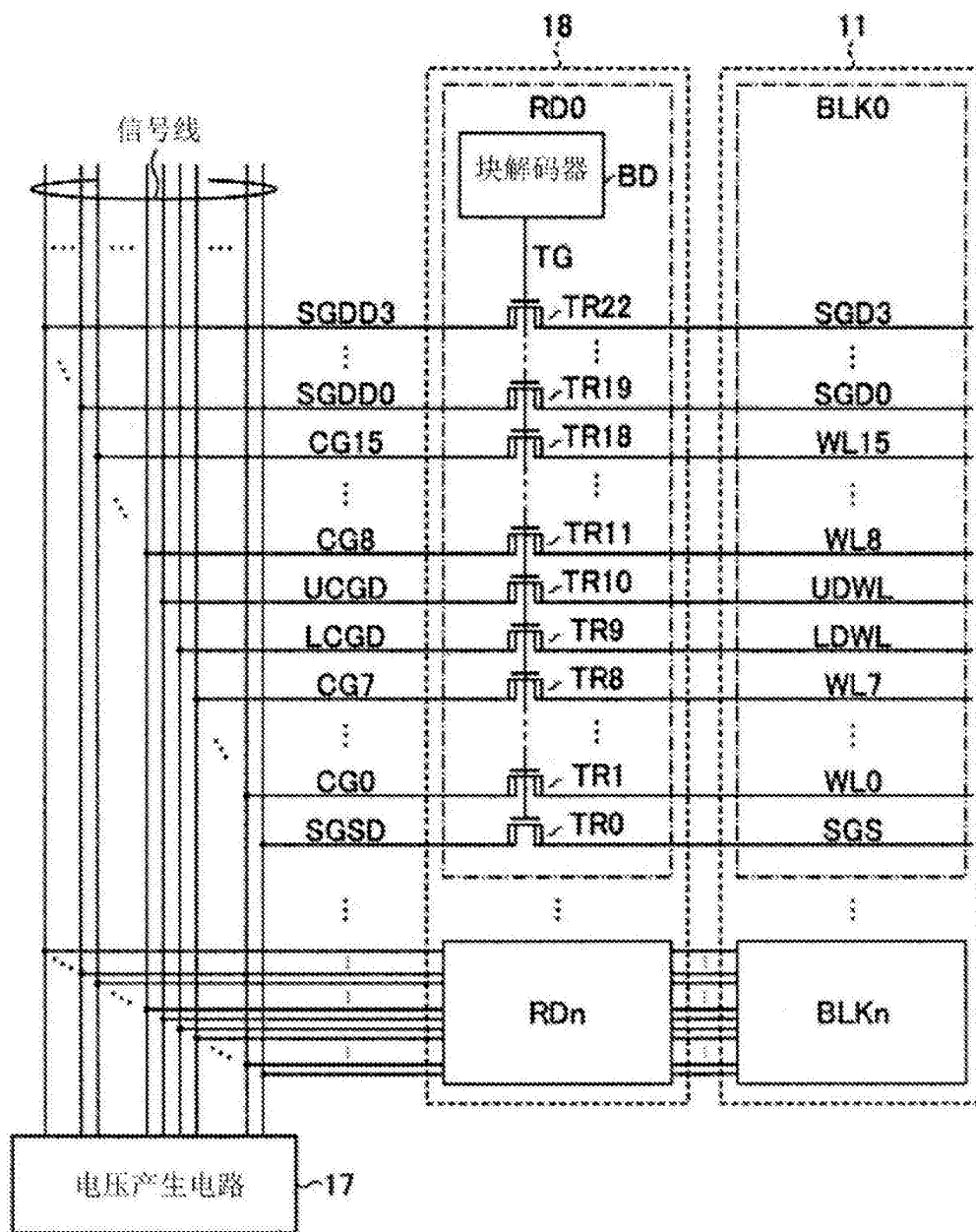


图5

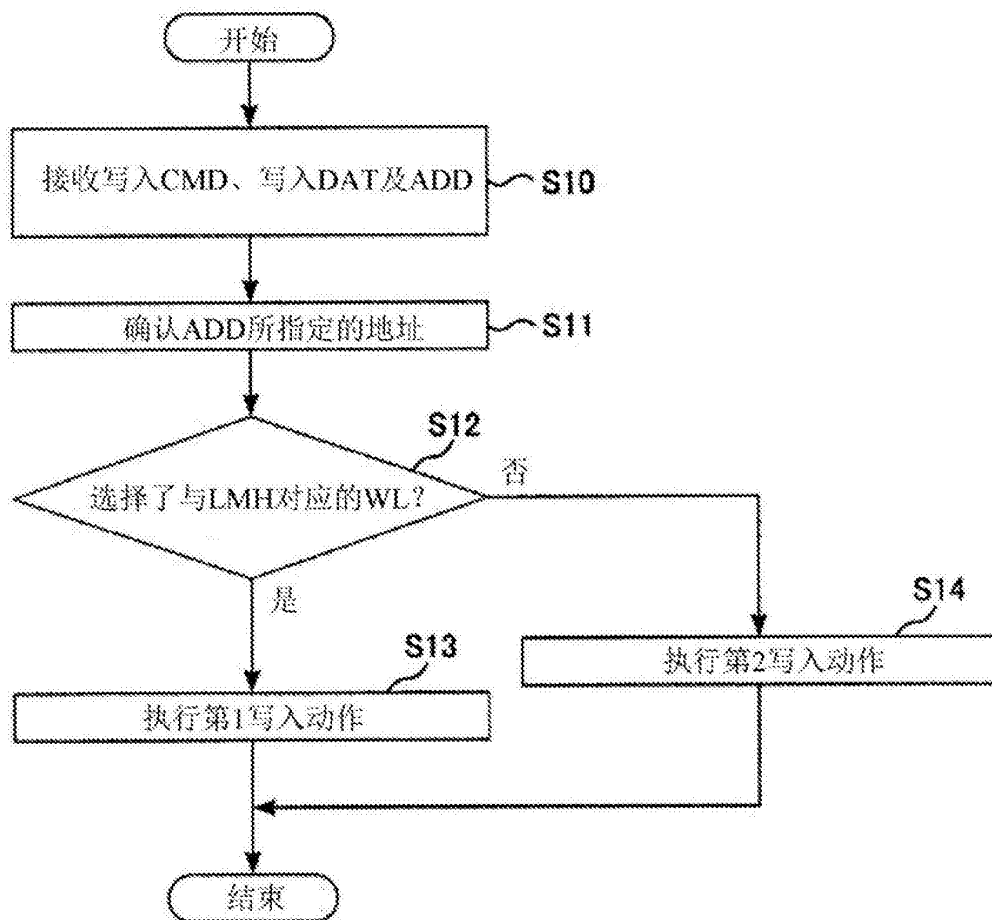


图6

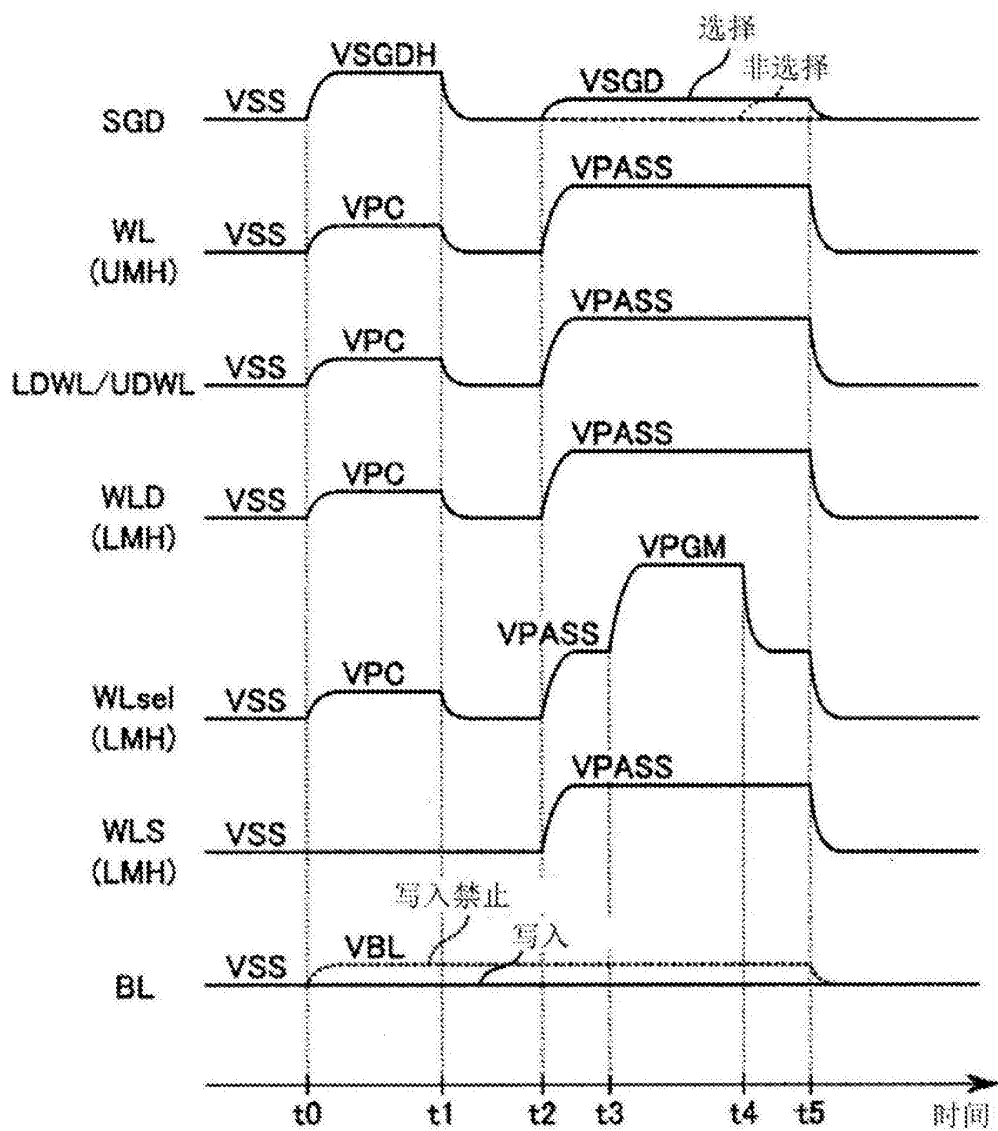
第1写入动作

图7

第2写入动作(实施方式)

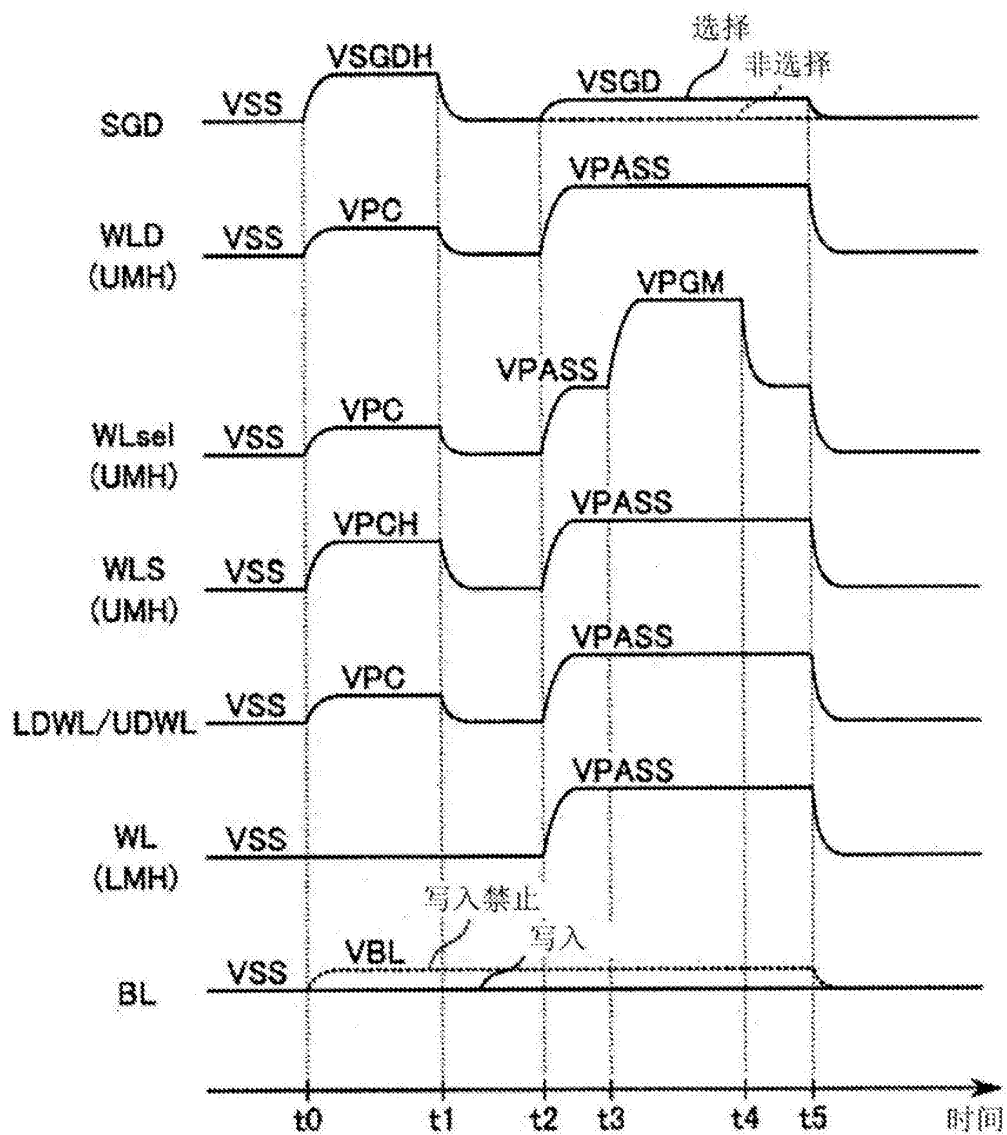


图8

第2写入动作(比较例)

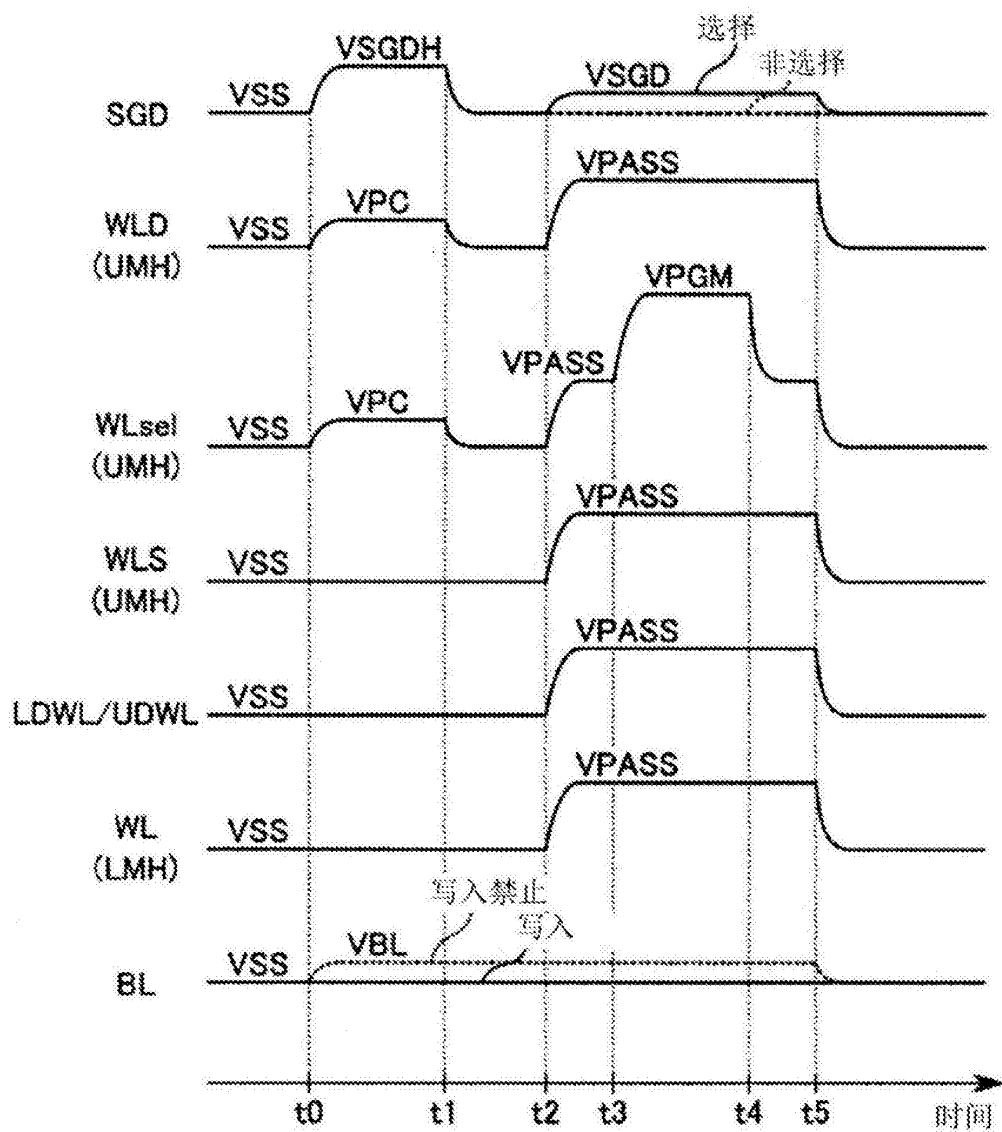


图9

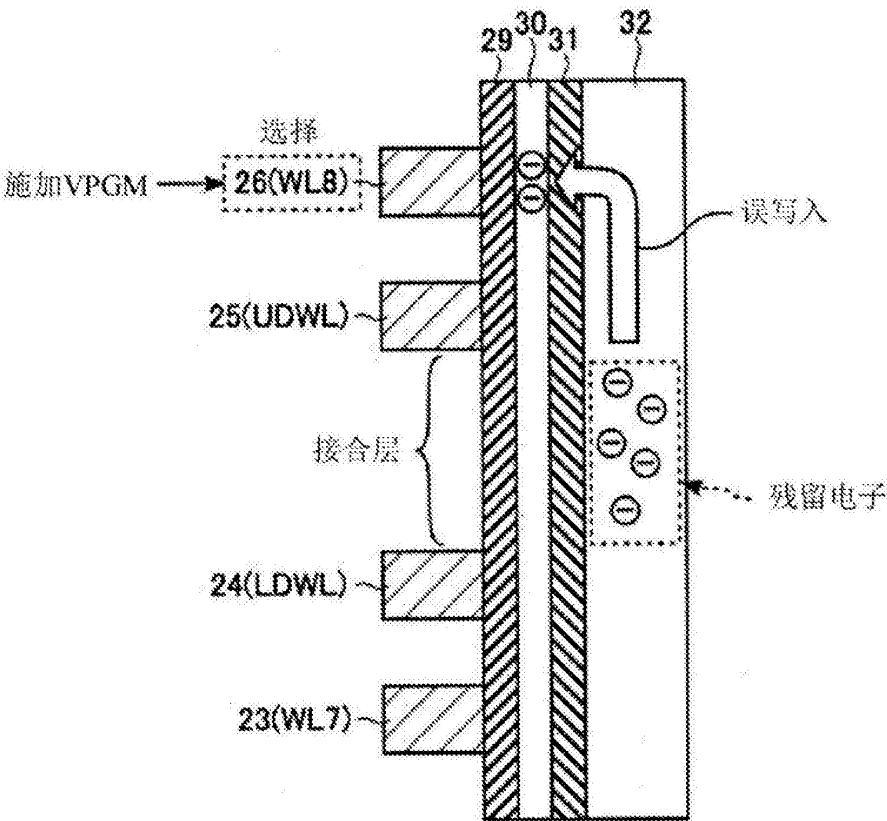


图10

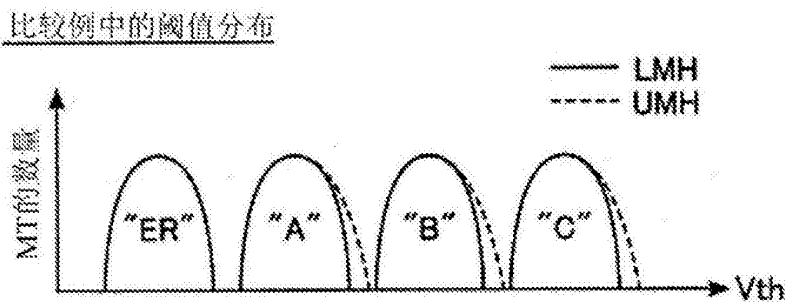


图11

第2写入动作(变化例)

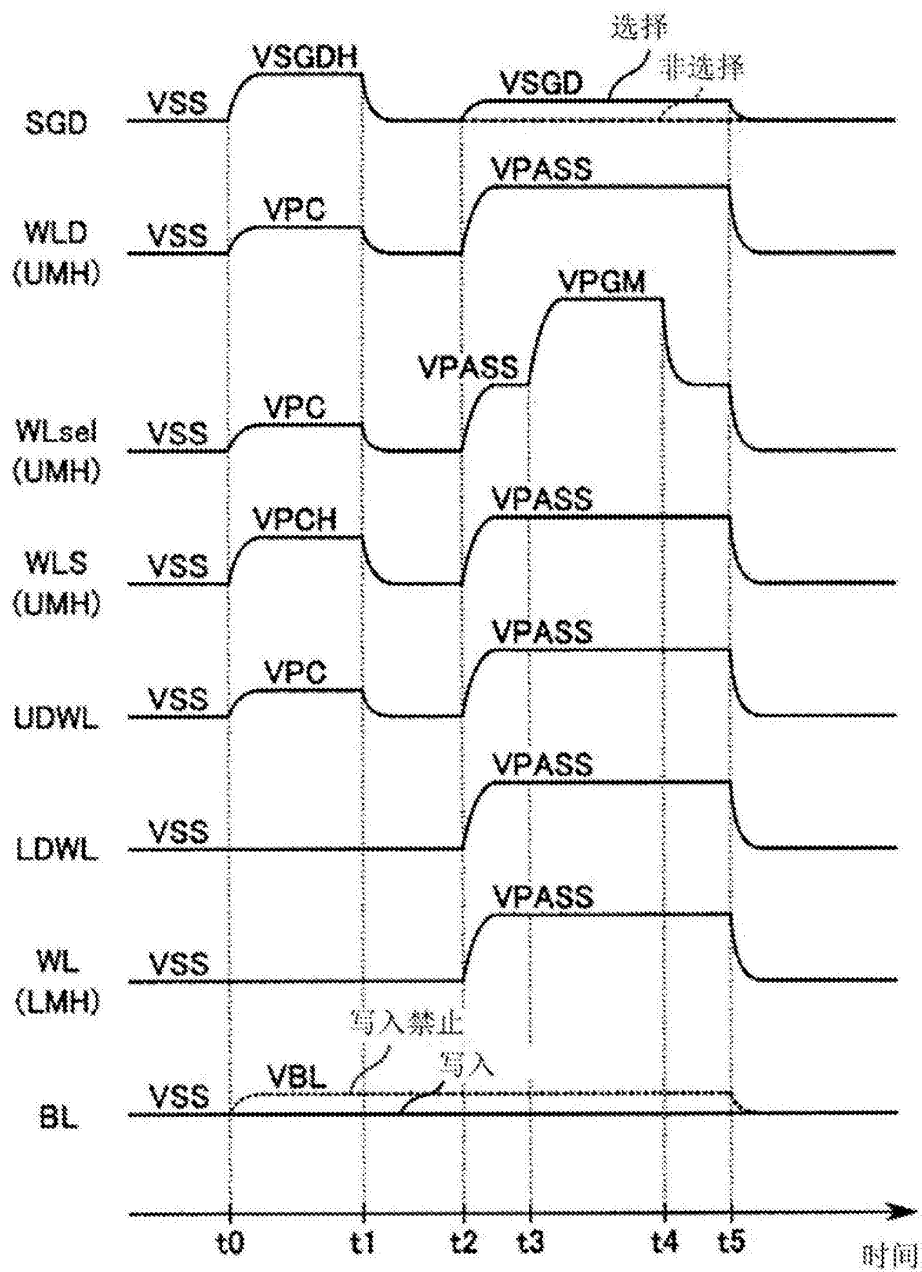


图12

Electronic Patent Application Fee Transmittal				
Application Number:		17353727		
Filing Date:		21-Jun-2021		
Title of Invention:		NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		
First Named Inventor/Applicant Name:		Jianquan Jia		
Filer:		Zhiwei Zou/Anna O'Connor		
Attorney Docket Number:		10018-01-0242-US-CON1		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1360	1360
Total in USD (\$)				1360

Electronic Acknowledgement Receipt	
EFS ID:	46051448
Application Number:	17353727
International Application Number:	
Confirmation Number:	5573
Title of Invention:	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD
First Named Inventor/Applicant Name:	Jianquan Jia
Customer Number:	153988
Filer:	Zhiwei Zou/Anna O'Connor
Filer Authorized By:	Zhiwei Zou
Attorney Docket Number:	10018-01-0242-US-CON1
Receipt Date:	27-JUN-2022
Filing Date:	21-JUN-2021
Time Stamp:	14:00:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1360
RAM confirmation Number	E20226QE01160884
Deposit Account	602227
Authorized User	Anna O'Connor
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	10018-01-0242-US-CON1_RCE.pdf	697610	no	3
			f6880b723e8dc06c1e833df0a1b80e496a90217a		
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	10018-01-0242-US-CON1_IDS2-SB08.pdf	612044	no	4
			995d260325c187421258e82a57743a9128787155		
Warnings:					
Information:					
3	Foreign Reference	CN109935256A_Bibl.pdf	6509177	no	29
			db19ae5da9b832b16ef7934f1ef0a6101c60e570		
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	37905	no	2
			4980220a879e1115dcc60b1f721616a0f6078284		
Warnings:					
Information:					
Total Files Size (in bytes):			7856736		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

153988 7590 07/15/2022
Bayes PLLC
8260 Greensboro Drive
Suite 625
McLean, VA 22102

EXAMINER	
NGUYEN, VIET Q	
ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 07/15/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1	5573

TITLE OF INVENTION: NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	10/17/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

153988 7590 07/15/2022
Bayes PLLC
8260 Greensboro Drive
Suite 625
McLean, VA 22102

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1	5573

TITLE OF INVENTION: NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	10/17/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, VIET Q	2827	365-230060

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

1 _____

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1	5573
153988	7590	07/15/2022	EXAMINER	
Bayes PLLC			NGUYEN, VIET Q	
8260 Greensboro Drive			ART UNIT	
Suite 625			PAPER NUMBER	
McLean, VA 22102			2827	

DATE MAILED: 07/15/2022

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b) (2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 17/353,727	Applicant(s) Jia et al.	
	Examiner VIET Q NGUYEN	Art Unit 2827	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE & IDS on 6/27/22.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 2-21. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:
a) ☐ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892) 2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>6/27/22</u> . 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.	5. ☐ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____.
---	--

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Reasons for Allowance

1. The following is an examiner's statement of reasons for allowance:

The prior arts fail to teach or fairly suggest a memory device comprising a plurality of memory strings; a bit line connected to a first memory string of the plurality of memory strings; a select gate line connected to the first memory string of the plurality of memory strings; a selected word line of a plurality of word lines, wherein the plurality of word lines is connected to the first memory string; and a control circuit configured to:

 apply a first word line pre-pulse signal of a plurality of word line pre-pulse signals to a first group of the plurality of word lines during a pre-charge period;

 apply a second word line pre-pulse signal of the plurality of word line pre-pulse signals to a second group of the plurality of word lines during the pre-charge period; and

 apply a third word line pre-pulse signal of the plurality of word lines pre-pulse signals to a third group of the plurality of word lines during the pre-charge period, wherein a voltage level of the second word line pre-pulse signal is greater than that of the first word line pre-pulse signal, and a voltage level of the third word line pre-pulse signal is greater than that of the second word line pre-pulse signal (claims 2 & 12).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to VIET Q NGUYEN whose telephone number is (571)272-1788. The examiner can normally be reached M-F 7:30-3PM EST.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197

Application/Control Number: 17/353,727
Art Unit: 2827

Page 4

(toll-free). If you would like assistance from a USPTO Customer Service

Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VIET Q NGUYEN/
Primary Examiner, Art Unit 2827

<i>Index of Claims</i> 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	12/27/2021	04/14/2022	07/01/2022	07/07/2022					
	1	-	-	-	-					
1	2	✓	=	=	=					
2	3	O	=	=	=					
3	4	O	=	=	=					
4	5	O	=	=	=					
5	6	O	=	=	=					
6	7	O	=	=	=					
7	8	O	=	=	=					
8	9	O	=	=	=					
9	10	O	=	=	=					
10	11	O	=	=	=					
11	12	✓	=	=	=					
12	13	O	=	=	=					
13	14	O	=	=	=					
14	15	O	=	=	=					
15	16	O	=	=	=					
16	17	O	=	=	=					
17	18	O	=	=	=					
18	19	O	=	=	=					
19	20	O	=	=	=					
20	21	O	=	=	=					

Issue Classification 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

CPC						
Symbol					Type	Version
G11C	/	11	/	4085	F	2013-01-01
G11C	/	11	/	4074	I	2013-01-01
G11C	/	11	/	4094	I	2013-01-01
G11C	/	11	/	4099	I	2013-01-01
G11C	/	11	/	419	I	2013-01-01

CPC Combination Sets					
Symbol				Type	Set
	/		/		

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	07 July 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1 (Final)	5

U.S. Patent and Trademark Office

Part of Paper No.: 20220707

Issue Classification 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

INTERNATIONAL CLASSIFICATION			
CLAIMED			
G11C		8	00
NON-CLAIMED			

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
365	230.06

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	07 July 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1 (Final)	5

U.S. Patent and Trademark Office

Part of Paper No.: 20220707

Issue Classification 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	2	10	11	19	20										
2	3	11	12	20	21										
3	4	12	13												
4	5	13	14												
5	6	14	15												
6	7	15	16												
7	8	16	17												
8	9	17	18												
9	10	18	19												

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	07 July 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1 (Final)	5

U.S. Patent and Trademark Office

Part of Paper No.: 20220707

Search Notes 	Application/Control No. 17/353,727	Applicant(s)/Patent Under Reexamination Jia et al.
	Examiner VIET Q NGUYEN	Art Unit 2827

CPC - Searched*		
Symbol	Date	Examiner
G11C 11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
365	230.06	12/26/2021	vn

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
365/230.06	12/26/2021	vn
G11C 11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn
PE2E Search -12.26.21	12/26/2021	vn
PE2E Updated	04/14/2022	vn
PE2E Updated	07/01/2022	vn
PE2E Updated	07/07/2022	vn

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
G11C	11/4085, 11/4074, 11/4094, 11/4099, 11/419	12/26/2021	vn

/VIET Q NGUYEN/ Primary Examiner, Art Unit 2827	
--	--

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	17353727
	Filing Date	2021-06-21
	First Named Inventor	Jianquan JIA
	Art Unit	2827
	Examiner Name	NGUYEN, VIET Q
	Attorney Docket Number	10018-01-0242-US-CON1

U.S.PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	7577026	B2	2009-08-18	Dong et al.			
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S.PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	20200006379	A1	2020-01-02	NISHIKAWA et al.			
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	109935256	CN	A	2019-06-25	TOSHIBA MEMORY CORP		
If you wish to add additional Foreign Patent Document citation information please click the Add button.							Add	
NON-PATENT LITERATURE DOCUMENTS							Remove	
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	17353727
Filing Date	2021-06-21
First Named Inventor	Jianquan JIA
Art Unit	2827
Examiner Name	NGUYEN, VIET Q
Attorney Docket Number	10018-01-0242-US-CON1

1	
---	--

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/VIET Q NGUYEN/	Date Considered	06/30/2022
--------------------	-----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	17353727
Filing Date	2021-06-21
First Named Inventor	Jianquan JIA
Art Unit	2827
Examiner Name	NGUYEN, VIET Q
Attorney Docket Number	10018-01-0242-US-CON1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Zhiwei Zou/	Date (YYYY-MM-DD)	2022-06-27
Name/Print	Zhiwei Zou	Registration Number	66,041

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	150364	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 01:41 PM
L2	12886	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 01:47 PM
L3	159	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 02:59 PM
L4	211	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2021/12/26 02:59 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L5	180	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:00 PM
L6	109	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:04 PM
L7	46	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,	OR	ON	ON	2021/12/26 03:05 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L8	9	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:10 PM
L9	25	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L10	12	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L11	21	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2021/12/26 03:11 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L12	11	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L13	19	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L14	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2021/12/26 03:11 PM

			JPO; DERWENT; IBM_TDB)				
L15	12	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:11 PM
L16	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:12 PM
L17	57	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/12/26 03:12 PM
L18	154097	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/04/14 03:42 PM

		G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L19	12886	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L20	173	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L21	230	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/04/14 03:42 PM

			IBM_TDB)				
L22	196	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L23	115	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L24	49	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L25	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2022/04/14 03:42 PM

			IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L26	27	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L27	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L28	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM

L29	11	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L30	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L31	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L32	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/04/14 03:42 PM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L33	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L34	58	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:42 PM
L35	140	L21 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/04/14 03:43 PM
L36	56	L35 AND (cell\$1 WITH	(US-PGPUB; USPAT;	OR	ON	ON	2022/04/14

		string\$1 WITH gate\$1)	USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				03:44 PM
L37	157984	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L38	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L39	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO,	OR	ON	ON	2022/06/30 02:31 PM

			NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L40	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L41	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L42	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L43	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT,	OR	ON	ON	2022/06/30 02:31 PM

			AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L44	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L45	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L46	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,	OR	ON	ON	2022/06/30 02:31 PM

			SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L47	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L48	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L49	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L50	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2022/06/30 02:31 PM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L51	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L52	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L53	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	OR	ON	ON	2022/06/30 02:31 PM

			TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L54	157984	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L55	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L56	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L57	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/06/30 02:31 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L58	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L59	120	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L60	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN,	OR	ON	ON	2022/06/30 02:31 PM

			WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L61	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L62	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L63	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L64	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/06/30 02:31 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L65	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L66	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L67	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2022/06/30 02:31 PM

			JPO; DERWENT; IBM_TDB)				
L68	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L69	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L70	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L71	144	L21 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/06/30 02:31 PM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L72	57	L35 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/06/30 02:31 PM
L73	157984	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L74	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/07/01 03:02 PM

			IBM_TDB)				
L75	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L76	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L77	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L78	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2022/07/01 03:02 PM

			IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L79	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L80	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L81	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM

L82	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L83	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L84	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L85	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/07/01 03:02 PM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L86	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L87	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L88	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L89	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01

			USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				03:02 PM
L90	157984	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L91	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L92	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO,	OR	ON	ON	2022/07/01 03:02 PM

			NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L93	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L94	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L95	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L96	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT,	OR	ON	ON	2022/07/01 03:02 PM

			AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L97	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L98	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L99	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,	OR	ON	ON	2022/07/01 03:02 PM

			SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L100	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L101	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L102	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L103	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2022/07/01 03:02 PM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L104	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L105	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L106	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	OR	ON	ON	2022/07/01 03:02 PM

			TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L107	144	L21 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L108	57	L35 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L109	157984	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L110	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/07/01 03:02 PM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L111	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L112	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L113	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA,	OR	ON	ON	2022/07/01 03:02 PM

			VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L114	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L115	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L116	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L117	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/07/01 03:02 PM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L118	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L119	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L120	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2022/07/01 03:02 PM

			JPO; DERWENT; IBM_TDB)				
L121	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L122	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L123	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L124	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/07/01 03:02 PM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L125	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L126	157984	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L127	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/07/01 03:02 PM

			IBM_TDB)				
L128	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L129	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L130	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L131	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2022/07/01 03:02 PM

			IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L132	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L133	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L134	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM

L135	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L136	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L137	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L138	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/07/01 03:02 PM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L139	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L140	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L141	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L142	59	"10157674"	(US-PGPUB; USPAT;	OR	ON	ON	2022/07/01

			USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				03:02 PM
L143	144	L21 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L144	57	L35 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/01 03:02 PM
L145	158085	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO,	OR	ON	ON	2022/07/07 11:47 AM

			NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L146	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L147	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L148	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L149	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2022/07/07 11:47 AM

			AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L150	120	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L151	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L152	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,	OR	ON	ON	2022/07/07 11:47 AM

			SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L153	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L154	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L155	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L156	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2022/07/07 11:47 AM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L157	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L158	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L159	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	OR	ON	ON	2022/07/07 11:47 AM

			TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L160	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L161	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L162	158085	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L163	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/07/07 11:47 AM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L164	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L165	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L166	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA,	OR	ON	ON	2022/07/07 11:47 AM

			VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L167	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L168	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L169	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L170	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/07/07 11:47 AM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L171	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L172	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L173	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2022/07/07 11:47 AM

			JPO; DERWENT; IBM_TDB)				
L174	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L175	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L176	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L177	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/07/07 11:47 AM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L178	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L179	144	L21 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L180	57	L35 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/07/07 11:47 AM

			IBM_TDB)				
L181	158085	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L182	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L183	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L184	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2022/07/07 11:47 AM

			IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L185	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L186	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L187	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM

L188	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L189	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L190	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L191	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/07/07 11:47 AM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L192	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L193	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L194	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L195	13	"10777254"	(US-PGPUB; USPAT;	OR	ON	ON	2022/07/07

			USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				11:47 AM
L196	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L197	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L198	158085	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO,	OR	ON	ON	2022/07/07 11:47 AM

			NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L199	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L200	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L201	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L202	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2022/07/07 11:47 AM

			AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L203	120	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L204	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L205	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,	OR	ON	ON	2022/07/07 11:47 AM

			SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L206	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L207	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L208	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L209	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2022/07/07 11:47 AM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L210	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L211	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L212	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	OR	ON	ON	2022/07/07 11:47 AM

			TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L213	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L214	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L215	144	L21 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L216	57	L35 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/07/07 11:47 AM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L217	158085	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L218	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L219	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA,	OR	ON	ON	2022/07/07 11:47 AM

			VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L220	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L221	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L222	120	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L223	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/07/07 11:47 AM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L224	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L225	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L226	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2022/07/07 11:47 AM

			JPO; DERWENT; IBM_TDB)				
L227	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L228	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L229	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L230	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/07/07 11:47 AM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L231	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L232	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L233	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/07/07 11:47 AM

			IBM_TDB)				
L234	158085	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L235	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L236	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L237	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2022/07/07 11:47 AM

			IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L238	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L239	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L240	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM

L241	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L242	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L243	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L244	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL,	OR	ON	ON	2022/07/07 11:47 AM

			NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L245	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L246	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L247	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L248	13	"10777254"	(US-PGPUB; USPAT;	OR	ON	ON	2022/07/07

			USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				11:47 AM
L249	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L250	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L251	144	L21 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL,	OR	ON	ON	2022/07/07 11:47 AM

			PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L252	57	L35 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L253	158085	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L254	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L255	180	(wordline OR word-line OR (word adj1 line))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2022/07/07 11:47 AM

		near5 pre-pulse\$1	AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L256	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L257	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L258	120	L5 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE,	OR	ON	ON	2022/07/07 11:47 AM

			SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L259	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L260	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L261	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L262	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY,	OR	ON	ON	2022/07/07 11:47 AM

			CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L263	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L264	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L265	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH,	OR	ON	ON	2022/07/07 11:47 AM

			TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L266	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L267	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L268	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L269	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU,	OR	ON	ON	2022/07/07 11:47 AM

			CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L270	158085	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L271	12888	365/230.06.ccls.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L272	180	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA,	OR	ON	ON	2022/07/07 11:47 AM

			VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L273	242	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L274	208	(L1 OR L2) AND L4	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L275	120	L5 AND (precharg\$4 OR pre-charge\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L276	50	L6 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA,	OR	ON	ON	2022/07/07 11:47 AM

			EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L277	10	"11081164"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L278	28	"11205471"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L279	13	"10998049"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO;	OR	ON	ON	2022/07/07 11:47 AM

			JPO; DERWENT; IBM_TDB)				
L280	22	"11024371"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L281	12	"10957408"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L282	20	"11017838"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L283	40	"10153029"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB,	OR	ON	ON	2022/07/07 11:47 AM

			HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L284	13	"10777254"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L285	11	"9620232"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L286	59	"10157674"	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2022/07/07 11:47 AM

			IBM_TDB)				
L287	144	L21 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM
L288	57	L35 AND (cell\$1 WITH string\$1 WITH gate\$1)	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, MC, MD, MY, NL, NO, NZ, OA, PH, PL, PT, RO, RS, RU, SE, SG, SI, SK, SU, TH, TN, TR, TW, UA, VN, WO)); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/07/07 11:47 AM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	41398	(G11C11/4085 OR G11C11/4074 OR G11C11/4094 OR G11C11/4099 OR G11C11/419 OR G11C16/0483 OR G11C16/10 OR G11C16/24 OR G11C16/08 OR G11C16/3427).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:41 PM
N2	7560614	YANGTZE MEMORY TECHNOLOGIES CO., LTD.	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:43 PM
N3	530242	Jia, Jianquan; Cui, Ying; You, Kaikai	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:43 PM
N4	6894	365/230.06.ccls.	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:47 PM

N5	50	(wordline OR word-line OR (word adj1 line)) near5 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:54 PM
N6	75	(wordline OR word-line OR (word adj1 line)) near9 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:54 PM
N7	77	(wordline OR word-line OR (word adj1 line)) near12 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:55 PM
N8	78	(wordline OR word-line OR (word adj1 line)) near15 pre-pulse\$1	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:55 PM
N9	68	(N1 OR N4) AND (N2 OR N3) AND N8	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:56 PM
N10	52	N9 AND (precharg\$4 OR pre-charg\$4)	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:57 PM
N11	6	"11056196"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:58 PM
N12	3	"11205471"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 01:59 PM
N13	3	"11043279"	(US-PGPUB; USPAT)	OR	ON	ON	2021/12/26 02:01 PM



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 5573

SERIAL NUMBER 17/353,727	FILING or 371(c) DATE 06/21/2021 RULE	CLASS 365	GROUP ART UNIT 2827	ATTORNEY DOCKET NO. 10018-01-0242-US-CON1		
APPLICANTS YANGTZE MEMORY TECHNOLOGIES CO., LTD., Wuhan, CHINA; INVENTORS Jianquan Jia, Wuhan, CHINA; Ying Cui, Wuhan, CHINA; Kaikai You, Wuhan, CHINA; ** CONTINUING DATA ***** This application is a CON of 16/709,944 12/11/2019 PAT 11081164 which is a CON of PCT/CN2019/112409 10/22/2019 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 07/01/2021						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/Viet Nguyen/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CHINA	SHEETS DRAWINGS 4	TOTAL CLAIMS 1	INDEPENDENT CLAIMS 1
ADDRESS Bayes PLLC 8260 Greensboro Drive Suite 625 McLean, VA 22102 UNITED STATES						
TITLE NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD						
FILING FEE RECEIVED 1820	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit			

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

153988 7590 07/15/2022
Bayes PLLC
8260 Greensboro Drive
Suite 625
McLean, VA 22102

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Anna O'Connor	(Typed or printed name)
/Anna O'Connor/	(Signature)
October 14, 2022	E-FILED (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	06/21/2021	Jianquan Jia	10018-01-0242-US-CON1	5573

TITLE OF INVENTION: NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	10/17/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, VIET Q	2827	365-230060

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

1 BAYES PLLC

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2

3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

YANGTZE MEMORY TECHNOLOGIES CO., LTD.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

WUHAN, CHINA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 60-2227

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature Zhiwei ZouDate 10/14/2022Typed or printed name Zhiwei ZouRegistration No. 66,041

Electronic Patent Application Fee Transmittal				
Application Number:		17353727		
Filing Date:		21-Jun-2021		
Title of Invention:		NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD		
First Named Inventor/Applicant Name:		Jianquan Jia		
Filer:		Zhiwei Zou/Anna O'Connor		
Attorney Docket Number:		10018-01-0242-US-CON1		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1200

Electronic Acknowledgement Receipt	
EFS ID:	46821028
Application Number:	17353727
International Application Number:	
Confirmation Number:	5573
Title of Invention:	NON-VOLATILE MEMORY DEVICE AND CONTROL METHOD
First Named Inventor/Applicant Name:	Jianquan Jia
Customer Number:	153988
Filer:	Zhiwei Zou/Anna O'Connor
Filer Authorized By:	Zhiwei Zou
Attorney Docket Number:	10018-01-0242-US-CON1
Receipt Date:	14-OCT-2022
Filing Date:	21-JUN-2021
Time Stamp:	16:21:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1200
RAM confirmation Number	E20220DG22253291
Deposit Account	602227
Authorized User	Anna O'Connor
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	10018-01-0242-US-CON1_IFTransmittal.pdf	316822	no	1
			d1c786d3b416df253216acdaeff2a5c875cee615		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37751	no	2
			5033cac0bf02aa058c98093565565d281ebc784		
Warnings:					
Information:					
Total Files Size (in bytes):			354573		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/353,727	11/15/2022	11501822	10018-01-0242-US-CON1	5573

153988 7590 10/26/2022
Bayes PLLC
8260 Greensboro Drive
Suite 625
McLean, VA 22102

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional inventors):

Jianquan Jia, Wuhan, CHINA;
Ying Cui, Wuhan, CHINA;
Kaikai You, Wuhan, CHINA;

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

YANGTZE MEMORY TECHNOLOGIES CO., LTD., Wuhan, CHINA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR103 (Rev. 10/09)

Micron Ex. 1002, p. 276
Micron v. YMTC
IPR2024-00795