

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P118801PCT	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US2017/054193	International filing date (<i>day/month/year</i>) 28 September 2017 (28.09.2017)	(Earliest) Priority Date (<i>day/month/year</i>)
Applicant INTEL CORPORATION et al.		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

the international application in the language in which it was filed

a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (See Box No. II)

3. **Unity of invention is lacking** (See Box No. III)

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the **drawings** to be published with the abstract is Figure No. 2A

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.

as selected by this Authority, because this figure better characterizes the invention.

b. none of the figures is to be published with the abstract.

A. CLASSIFICATION OF SUBJECT MATTER**H01L 29/78(2006.01)i, H01L 29/423(2006.01)i, H01L 29/66(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01L 29/78; H01L 29/778; H01L 29/08; H01L 21/338; H01L 21/335; H01L 29/10; H01L 29/66; H01L 29/423

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: circuit, gallium, indium, arsenic, source, drain, gate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 9461159 B1 (NORTHROP GRUMMAN SYSTEMS CORPORATION) 04 October 2016 See column 1, lines 31-34, column 2, lines 51-59.	1-10
A		11-20
Y	US 2017-0271499 A1 (QUALCOMM INCORPORATED) 21 September 2017 See paragraphs [0027], [0031] and figure 6B.	1-10
Y	US 2017-0018640 A1 (INTEL CORPORATION) 19 January 2017 See claim 25.	5
A	US 9123741 B2 (NANO AND ADVANCED MATERIALS INSTITUTE LIMITED) 01 September 2015 See column 2, line 55-column 4, line 67 and claim 1.	1-20
A	KR 10-2016-0114010 A (TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY LIMITED) 04 October 2016 See paragraphs [0013]-[0030] and claim 1.	1-20

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

28 June 2018 (28.06.2018)

Date of mailing of the international search report

28 June 2018 (28.06.2018)

Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

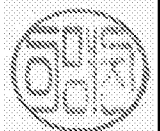
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

LEE, Myung Jin

Telephone No. +82-42-481-8474



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2017/054193

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 9461159 B1	04/10/2016	None	
US 2017-0271499 A1	21/09/2017	None	
US 2017-0018640 A1	19/01/2017	CN 106030816 A EP 3123516 A1 KR 10-2016-0136294 A TW 201543668 A TW 1556426 B US 9666708 B2 WO 2015-147816 A1	12/10/2016 01/02/2017 29/11/2016 16/11/2015 01/11/2016 30/05/2017 01/10/2015
US 9123741 B2	01/09/2015	US 2014-0209979 A1	31/07/2014
KR 10-2016-0114010 A	04/10/2016	CN 105321818 A DE 102015106608 A1 KR 10-1685872 B1 KR 10-1827148 B1 KR 10-2016-0002305 A KR 10-2016-0014090 A TW 201601219 A TW 1553740 B US 2015-0380558 A1	10/02/2016 31/12/2015 20/12/2016 07/02/2018 07/01/2016 05/02/2016 01/01/2016 11/10/2016 31/12/2015