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(71) Applicant (for all designated States except US): **ADVANCED MICRO DEVICES, INC.** [US/US]; One AMD Place, Mail Stop 68, P.O. Box 3453, Sunnyvale, CA 94088-3453 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LENSKI, Markus** [DE/DE]; Wilder-Mann-Strasse 17, 01129 Dresden (DE). **GRAETSCH, Falk** [DE/DE]; Selliner Str. 5b, 01109 Dresden (DE). **REICHEL, Carsten** [DE/DE];

Turner-Strasse 14, 09599 Freiberg (DE). **SCHWAN, Christoph** [DE/DE]; Rathausplatz 2se 20, 57580 Gebhardshain (DE). **BIERSTEDT, Helmut** [DE/DE]; Sagarder Weg 4, 01109 Dresden (DE). **KAMMLER, Thorsten** [DE/DE]; Buchenstrasse 12c, 01458 Ottendorf-Okrilla (DE). **MAZUR, Martin** [DE/DE]; Kastanienweg 18, 01896 Pulsnitz (DE).

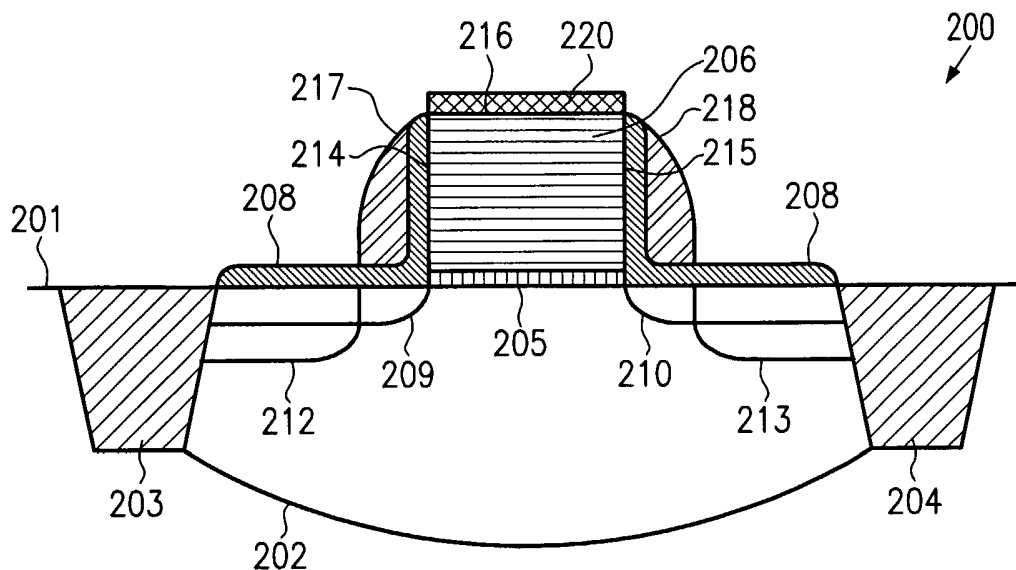
(74) Agent: **DRAKE, Paul, S.**; Advanced Micro Devices, Inc., 5204 East Ben White Boulevard, Mail Stop 562, Austin, TX 78741 (US).

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(54) Title: METHOD OF FORMING SIDEWALL SPACERS



(57) Abstract: The present invention allows the formation of sidewall spacers (217,218) adjacent a feature (206) on a substrate (201) without there being an undesirable erosion of the feature. The feature (206) is covered by one or more protective layers (220,207). A layer of a spacer material (211) is deposited over the feature (206) and etched anisotropically. An etchant used in the anisotropic etching is adapted to selectively remove the spacer material, whereas the one or more protective layers (220, 207) are substantially not affected by the etchant. Thus, the one or more protective layers (220, 207) protect the feature from being exposed to the etchant.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2005/010475

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L21/28 H01L21/336

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)

IPC 7 H01L

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

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

EPO-Internal, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 063 704 A (DEMIRLIOGLU ET AL) 16 May 2000 (2000-05-16)	1-8
A	column 1, line 36 - column 2, line 37 -----	9-15
A	US 6 013 569 A (LUR ET AL) 11 January 2000 (2000-01-11)	1-6, 8-11,13, 14
	column 6, line 49 - column 7, line 52 -----	
A	US 6 200 886 B1 (YU HONG-CHEN ET AL) 13 March 2001 (2001-03-13)	1-6, 8-11,13, 14
	column 2, line 32 - column 3, line 38 -----	
X	US 6 465 853 B1 (HOBBS CHRISTOPHER C ET AL) 15 October 2002 (2002-10-15)	9-11,13, 14
	column 2, line 28 - column 3, line 41 -----	
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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- *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

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Gélébart, J

INTERNATIONAL SEARCH REPORT

International Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 049 114 A (MAITI ET AL) 11 April 2000 (2000-04-11) column 2, line 53 - column 4, line 57 -----	1,2,5,7, 9,10,13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/010475

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8

A method of forming sidewall spacers, comprising:
forming a feature over a substrate, said feature having a side surface and a top surface, said top surface being covered by a first protective layer and a coating layer formed above said first protective layer;
forming a second protective layer over said side surface and said substrate;
removing said coating layer;
conformally depositing a layer of a spacer material over said substrate and said side surface and above said top surface; and
anisotropically etching said layer of spacer material.

2. claims: 9-15

A method of forming sidewall spacers, comprising:
forming a feature over a substrate, said feature having a side surface and a top surface, said top surface being covered by a coating layer;
forming a first protective layer over said side surface and said substrate;
removing said coating layer;
forming a second protective layer over said side surface, said top surface and said substrate;
conformally depositing a layer of a spacer material over said side surface, said top surface and said substrate; and
anisotropically etching said layer of spacer material.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2005/010475

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6063704	A	16-05-2000	NONE	
US 6013569	A	11-01-2000	NONE	
US 6200886	B1	13-03-2001	NONE	
US 6465853	B1	15-10-2002	NONE	
US 6049114	A	11-04-2000	NONE	