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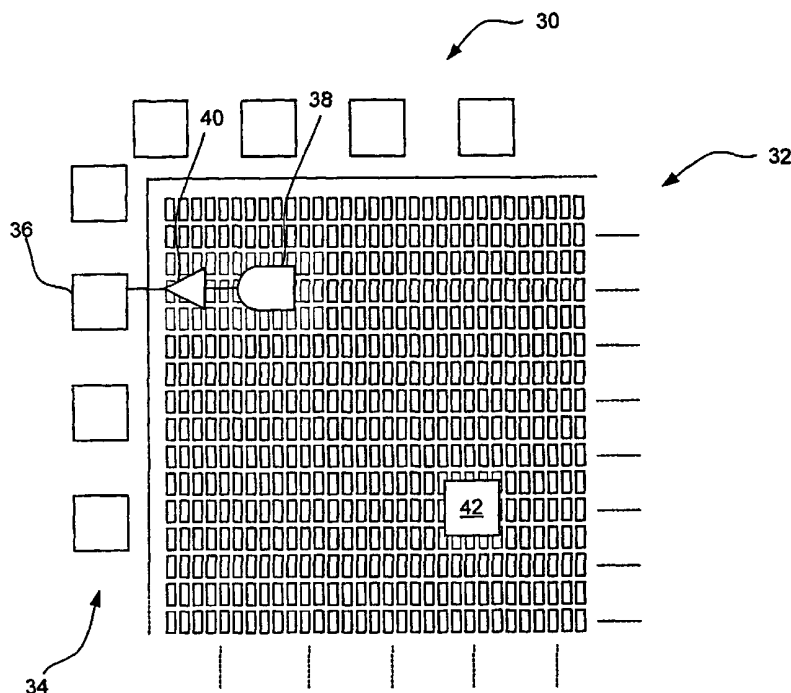
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- (74) Agents: HOIRIIS, David et al.; Honeywell Inc., 101 Columbia Avenue, P.O. Box 2245, Morristown, NJ 07960 (US).
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HIGH PERFORMANCE OUTPUT BUFFER WITH ESD PROTECTION



(57) Abstract: An output buffer with built-in ESD protection is disclosed. The built-in ESD protection is preferably formed using transistors from the sea-of-transistors or sea-of-gates region (14) of an integrated circuit, which may eliminate the need for dedicated ESD devices, and in particular, dedicated ESD devices that are pre-fabricated into the under-layers in and around the perimeter region (18) of the integrated circuit.



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INTERNATIONAL SEARCH REPORT

Interr. .nal Application No

PCT/US 00/32006

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 H01L27/02 H01L27/118 H03K19/003

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 H02H H03K

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, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 793 069 A (SCHUELEIN MARK EDWARD ET AL) 11 August 1998 (1998-08-11) figures 6,10 column 4, line 3 - line 60 column 6, line 38 -column 7, line 16 column 7, line 40 -column 8, line 20	1
A		2-4, 8-11, 25-37
Y	--- US 4 710 842 A (URAGAMI AKIRA ET AL) 1 December 1987 (1987-12-01) figures 1-10 column 2, line 58 -column 5, line 53	1
A		2-4, 8-11, 25-37
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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 :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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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

4 May 2001

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/32006

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 532 178 A (LIAW SHIOU H ET AL) 2 July 1996 (1996-07-02) figure 2 column 3, line 57 -column 4, line 2 ---	1
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A	US 5 867 053 A (KNIGHTLY DANIEL C ET AL) 2 February 1999 (1999-02-02) figure 3 column 3, line 47 -column 4, line 45 ---	25-37
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A	US 4 930 112 A (TANAKA HITOSHI ET AL) 29 May 1990 (1990-05-29) figure 12 column 6, line 47 -column 7, line 19 ---	2,14, 25-29, 31-37
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 00/32006

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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. Claim : 1

CMOS gate array with ESD protection means consisting of selected transistors from the given array.

2. Claims: 2-24

CMOS output buffer with coupling means for the body of the transistors.

3. Claims: 25-37

Tri-state CMOS buffer with three power supplies, two NAND gates and two NOR gates.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern. Patent Application No

PCT/US 00/32006

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