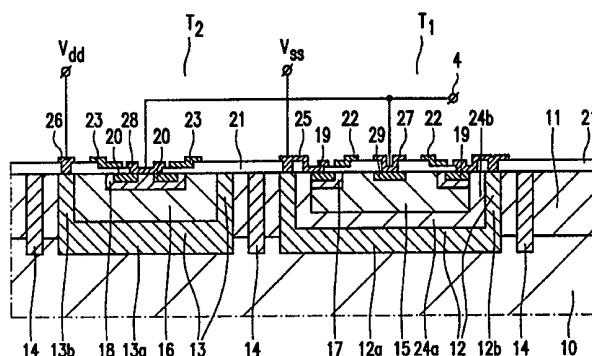




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/IB98/01589 (22) International Filing Date: 12 October 1998 (12.10.98) (30) Priority Data: 97203346.8 28 October 1997 (28.10.97) EP (71) Applicant: KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL). (71) Applicant (for SE only): PHILIPS AB [SE/SE]; Kottbygatan 7, Kista, S-164 85 Stockholm (SE). (72) Inventor: LUDI KHUIZE, Adrianus, Willem; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). (74) Agent: HOUBIERS, Ernest, E., M., G.; Internationaal Octrooibureau B.V., P.O. Box 220, NL-5600 AE Eindhoven (NL).		(81) Designated States: JP, KR, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> (88) Date of publication of the international search report: 8 July 1999 (08.07.99)

(54) Title: SEMICONDUCTOR DEVICE COMPRISING A HALF-BRIDGE CIRCUIT



(57) Abstract

The invention relates to a half-bridge circuit comprising two series-connected n-channel DMOS transistors, in which the source of the one transistor, the low-side transistor T_1 , is connected to a low-voltage terminal V_{ss} , and the drain of the other transistor, the high-side transistor T_2 , is connected to a high-voltage terminal V_{dd} . The drain of the low-side transistor and the source of the high-side transistor are connected to the output terminal (4). The circuit is arranged in a semiconductor body having an n-type or p-type epitaxial layer (11) which is applied to a p-type substrate (10). In the epitaxial layer, two n-type regions are defined for the transistors, each of said regions forming a drift region of one of the transistors and being surrounded by a cup-shaped n-type zone in the semi-conductor body. Within the n-type cup-shaped zone (12) of the low-side transistor T_1 , there is provided a p-type cup-shaped zone which isolates the drift region (15) of T_1 from the cup-shaped zone (12) and which is connected, along with the cup-shaped zone (12), the backgate region (17) and the source (19) of T_1 to V_{ss} . In the high-side transistor, the n-type cup-shaped region (13) is connected, together with the drain, to V_{dd} . As in the case of the low-side transistor, the n-type cup-shaped zone is at a fixed voltage, it is precluded that electrons are injected by this zone into the substrate, and consequently, also the risk of latch-up and disturbances in the rest of the circuit is precluded. It is also precluded that, at a higher resistivity of the substrate, voltage jumps occur in the substrate, which could also give rise to latch-up and disturbances. In addition, at least the low-side transistor can be constructed in such a manner that the RESURF condition is met, thus enabling the device to be used aslo at a high voltage.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 98/01589

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H01L 27/088, H01L 29/78, H01L 29/06

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)

IPC6: H01L

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

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

WPI, PAJ, EPODOC, NPC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5703390 A (YUKIO ITOH), 30 December 1997 (30.12.97), see whole document --	1-4
A	IEEE JOURNAL OF SOLID-STATE CIRCUITS, Volume 29, No 8, August 1994, R. Gariboldi et al, "A Monolithic Quad Line Driver for Industrial Applications", see whole document --	1-4
A	EP 0544048 A1 (SGS-THOMSON MICROELECTRONICS S.R.L.), 2 June 1993 (02.06.93), see whole document --	1-4



Further documents are listed in the continuation of Box C.



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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.
A	EP 0544047 A1 (SGS-THOMSON MICROELECTRONICS S.R.L.), 2 June 1993 (02.06.93), see whole document --	1-4
A	EP 0261556 A1 (SGS MICROELETTRONICA S.P.A.), 30 March 1988 (30.03.88), see whole document -- -----	1-4

INTERNATIONAL SEARCH REPORT

Information on patent family members

07/04/99

International application No.

PCT/IB 98/01589

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