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(54) **A HIGH VOLTAGE DMOS TRANSISTOR**

(57) A modified structure of a lateral n-channel LD-MOS transistor is provided to avoid the rupturing of the gate-oxide which occurs during the operation of the transistor. The LDMOS transistor comprises a dielectric isolation structure which physically isolates the region comprising a parasitic NPN transistor from the region generating a hole current due to weak-impact ionisation, that

is, the extended drain region of the LDMOS transistor. According to an embodiment of the disclosure, this can be achieved using a vertical trench between the two regions. Further embodiments are also proposed to enable a reduction in the gain of the parasitic NPN transistor and in the backgate resistance in order to further improve the robustness of the LDMOS transistor.

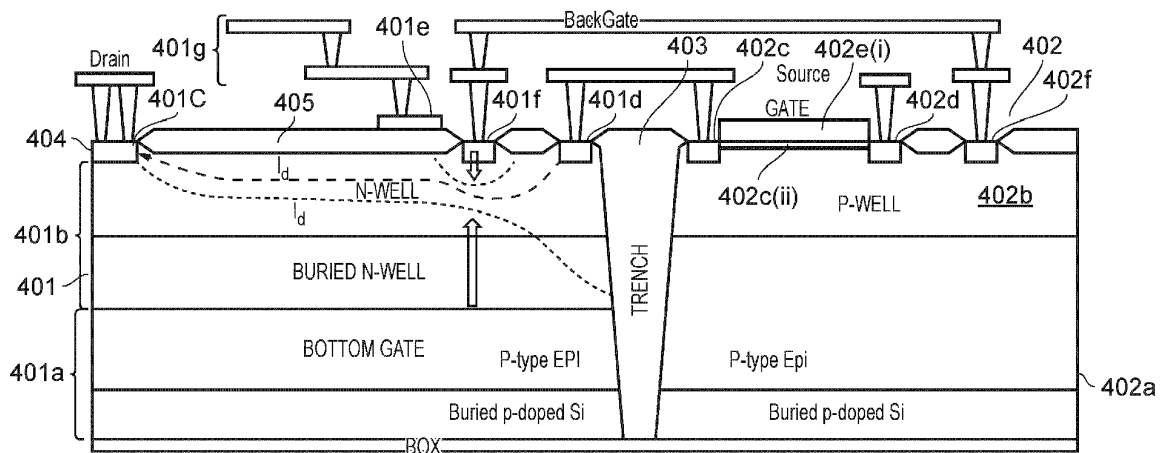


FIG. 4A



EUROPEAN SEARCH REPORT

Application Number
EP 20 21 1255

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2002/017683 A1 (JEON CHANG-KI [KR]) 14 February 2002 (2002-02-14) * paragraphs [0038] - [0087]; figure 7 * -----	1,3-5,7, 8,15	INV. H01L29/78 H01L29/06 H01L27/06
X	US 2007/158681 A1 (KIM SUNG-LYONG [KR] ET AL) 12 July 2007 (2007-07-12) * paragraphs [0031] - [0053]; figures 3-5,6A * -----	1,2,4-8, 15	H01L29/10 H01L29/423 H01L29/40
A	US 6 137 140 A (EFLAND TAYLOR RICE [US] ET AL) 24 October 2000 (2000-10-24) * column 2, line 25 - column 5, line 48; figures 2,3,4A,4B * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01L
-The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 April 2021	Examiner Götz, Andreas
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.02 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

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Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

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No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

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LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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see sheet B

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All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

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As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

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Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

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None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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1-8, 15

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The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 20 21 1255

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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1. claims: 1-8, 15

LDMOS with isolation structure

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2. claims: 9-14

LDMOS with buried p-doped layer aligned with edge of gate

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 21 1255

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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09-04-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 6137140 A	24-10-2000	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82