Title (en)

VERTICAL FIELD EFFECT TRANSISTOR, METHOD FOR PRODUCING SAME, AND COMPONENT HAVING VERTICAL FIELD EFFECT TRANSISTORS

Title (de)

VERTIKALER FELDEFFEKTTRANSISTOR, VERFAHREN ZUM HERSTELLEN DESSELBEN UND BAUELEMENT AUFWEISEND VERTIKALE FELDEFFEKTTRANSISTOREN

Title (fr)

TRANSISTOR À EFFET DE CHAMP VERTICAL, SON PROCÉDÉ DE PRODUCTION, ET COMPOSANT AYANT DES TRANSISTORS À EFFET DE CHAMP VERTICAL

Publication

EP 4107785 A1 20221228 (DE)

Application

EP 21706209 A 20210215

Priority

- DE 102020202034 A 20200218
- EP 2021053597 W 20210215

Abstract (en)

[origin: WO2021165184A1] Disclosed is a vertical field effect transistor (10). The vertical field effect transistor (10) has: a first semiconductor layer (13), of a p-conductivity type, on or above a drift region (12); a trench structure (50) penetrating the first semiconductor layer (13) vertically, the trench structure (50) having at least one side wall, on which a field effect transistor (FET) channel region is formed and the FET channel region having a III-V heterostructure (15/16) for forming a two-dimensional electron gas at a boundary surface of the III-V heterostructure (15/16); a source-drain electrode (21) electrically conductively connected to the III-V heterostructure (15/16); and a contact structure (24, 25) provided, at least in part, on or above the drift region (12) and forming a Schottky- or heterocontact at least with the drift region (12), said contact structure (24, 25) being electrically conductively connected to the source-drain electrode (21) and at least the region lying vertically between the contact structure (24, 25) and the drift region (12) is devoid of the first semiconductor layer (13).

IPC 8 full level

H01L 29/778 (2006.01); **H01L 29/06** (2006.01); **H01L 29/10** (2006.01); **H01L 29/20** (2006.01); **H01L 29/417** (2006.01); **H01L 29/423** (2006.01); **H01L 29/872** (2006.01)

CPC (source: EP US)

H01L 29/0619 (2013.01 - EP); **H01L 29/2003** (2013.01 - US); **H01L 29/41725** (2013.01 - US); **H01L 29/41766** (2013.01 - EP); **H01L 29/66462** (2013.01 - US); **H01L 29/7788** (2013.01 - EP US); **H01L 29/7789** (2013.01 - EP); **H01L 29/872** (2013.01 - US); H01L 29/0646 (2013.01 - EP); H01L 29/1066 (2013.01 - EP); H01L 29/2003 (2013.01 - EP); H01L 29/42316 (2013.01 - EP); H01L 29/872 (2013.01 - EP)

Citation (search report)

See references of WO 2021165184A1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

Designated validation state (EPC)

KH MA MD TN

DOCDB simple family (publication)

DE 102020202034 A1 20210819; CN 115136320 A 20220930; EP 4107785 A1 20221228; JP 2023513840 A 20230403; US 2023065808 A1 20230302; WO 2021165184 A1 20210826

DOCDB simple family (application)

DE 102020202034 A 20200218; CN 202180015357 A 20210215; EP 2021053597 W 20210215; EP 21706209 A 20210215; JP 2022549447 A 20210215; US 202117799587 A 20210215