

Title (en)

METHOD FOR PRODUCING A VERTICAL TRANSISTOR IN A TRENCH AND A CORRESPONDING VERTICAL TRANSISTOR

Title (de)

VERFAHREN ZUR HERSTELLUNG EINES VERTIKALTRANSISTORS IN EINEM GRABEN

Title (fr)

PROCEDE DE FABRICATION D'UN TRANSISTOR VERTICAL DANS UNE TRANCHEE ET TRANSISTOR VERTICAL

Publication

EP 1410441 A2 20040421 (DE)

Application

EP 02754852 A 20020708

Priority

- DE 10136333 A 20010726
- EP 0207593 W 20020708

Abstract (en)

[origin: WO03010826A2] In order to produce a vertical transistor, a trench (4) is provided whose lateral wall (6) is formed by a monocrystalline semiconductor substrate (2) and whose bottom (8) is formed by a polycrystalline semiconductor substrate (10). A transition region (12) made of an insulating material is placed between the lateral wall (6) and the bottom (8). A semiconductor layer is deposited selective to the material of the transition region (12) whereby enabling an epitaxial semiconductor layer (24) to grow on the lateral wall (6) and a semiconductor layer (26) to grow on the bottom (8), whereby these a space remains between these layers. The deposited semiconductor layers (24, 26) are covered with a thin dielectric (28) that only partially limits a current flow, and the space is filled with a conductive material (30). During a subsequent thermal treatment, dopants diffuse out of the conductive material (30) and into the epitaxial semiconductor layer (26) and form a dopant region (44) therein. The thin dielectric (28) limits the diffusion of the dopants into the semiconductor substrate (2) and prevents the spreading of crystal lattice faults into the epitaxial semiconductor layer (26).

IPC 1-7

H01L 29/00

IPC 8 full level

H01L 21/336 (2006.01); **H01L 21/8242** (2006.01); **H01L 27/108** (2006.01)

CPC (source: EP KR US)

H01L 21/18 (2013.01 - KR); **H01L 29/66666** (2013.01 - EP US); **H10B 12/0383** (2023.02 - EP US); **H10B 12/053** (2023.02 - EP US); **H10B 12/395** (2023.02 - EP US); **H10B 12/0385** (2023.02 - EP US)

Citation (search report)

See references of WO 03010826A2

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LU MC NL PT SE SK TR

DOCDB simple family (publication)

WO 03010826 A2 20030206; **WO 03010826 A3 20030925**; DE 10136333 A1 20030306; EP 1410441 A2 20040421; JP 2004536466 A 20041202; JP 4056974 B2 20080305; KR 100581773 B1 20060523; KR 20040017837 A 20040227; TW 579578 B 20040311; US 2004256665 A1 20041223; US 7208370 B2 20070424

DOCDB simple family (application)

EP 0207593 W 20020708; DE 10136333 A 20010726; EP 02754852 A 20020708; JP 2003516105 A 20020708; KR 20047001162 A 20020708; TW 91114517 A 20020701; US 48456204 A 20040809