Title (en)

CHARGE STORAGE DEPLETION REGION DISCHARGE PROTECTION.

Title (de)

SCHUTZ GEGEN DIE ENTLADUNG EINER VERARMUNGSZONE EINES LADUNGSSPEICHERS.

Title (fr)

PROTECTION CONTRE LA DECHARGE D'UNE ZONE D'APPAUVRISSEMENT D'UNE MEMOIRE DE CHARGE.

Publication

EP 0197948 A4 19880107 (EN)

Application

EP 85903970 A 19850812

Priority

US 65611284 A 19840928

Abstract (en)

[origin: WO8602202A1] A means and method for shielding semiconductor charge storage devices (12-14) from the effects of particles or ionizing radiation (15a-b) absorbed within the bulk (31b) of the semiconductor substrate (31), by providing a free carrier shield consisting of a buried layer (31c) of very low lifetime in the undisturbed material below the depletion regions (12a, 14d) associated with the charge storage devices (12-14). The very low lifetime layer (31c) is obtained by ion implantation of a super-saturated zone of impurities such as oxygen which provide deep recombination centers and which react chemically with the substrate material (31) so as to provide thermally stable complexes which do not anneal away during post implant heating cycles. Concentrations of lifetime killing impurities significantly exceeding the solid solubility limit are achieved so that the lifetime reduction in the carrier shield region (31c) greatly exceeds that obtainable by prior art methods. Partial shielding is also provided against carriers injected by nearby junctions (13) or introduced by charge pumping during circuit operation.

IPC 1-7

H01L 29/167; H01L 21/04; H01L 21/00

IPC 8 full level

H01L 21/265 (2006.01); **G11C 11/34** (2006.01); **H01L 21/322** (2006.01); **H01L 21/324** (2006.01); **H01L 27/10** (2006.01); **H01L 27/108** (2006.01); **H01L 29/167** (2006.01); **H01L 29/94** (2006.01)

CPC (source: EP KR)

H01L 21/3221 (2013.01 - EP); **H01L 29/167** (2013.01 - EP KR); **H01L 29/94** (2013.01 - EP); **H10B 12/30** (2023.02 - EP)

Citation (search report)

- [XP] EP 0133954 A1 19850313 - TOSHIBA KK [JP]
- [X] FR 2301923 A1 19760917 - SIEMENS AG [DE]
- [A] EP 0070713 A2 19830126 - FUJITSU LTD [JP]
- JOURNAL OF THE ELECTROCHEMICAL SOCIETY, vol. 131, no. 1, January 1984, pages 180-185, Manchester, New Hampshire, US; R.K. TSUI et al.: "The efects of substrate oxygen content and preannealing on the properties of silicon epitaxial layers"
- SOLID STATE TECHNOLOGY, vol. 24, no. 7, July 1981, pages 55-61, Port Washington, New York, US; R.A. CRAVEN et al.: "Internaal gettering in silicon"
- See references of WO 8602202A1

Designated contracting state (EPC)

DE FR GB IT NL

DOCDB simple family (publication)

WO 8602202 A1 19860410; EP 0197948 A1 19861022; EP 0197948 A4 19880107; JP S62500340 A 19870205; KR 860700314 A 19860801

DOCDB simple family (application)

US 8501523 W 19850812; EP 85903970 A 19850812; JP 50354785 A 19850812; KR 860700312 A 19860528