Abstracts

Numerical simulation of an ion-implanted GaAs OPFET

P. Chakrabarti, M. Madheswaran, A. Gupta and N.A. Khan. "Numerical simulation of an ion-implanted GaAs OPFET." 1998 Transactions on Microwave Theory and Techniques 46.10 (Oct. 1998, Part I [T-MTT]): 1360-1366.

A numerical model of an ion-implanted GaAs optical field-effect transistor (OPFET) has been presented. The model is a physics-based one, and overcomes the major limitations of the existing models by considering both the photoconductive effect in the channel and photovoltaic effect at the gate Schottky barrier as well as the channel-substrate barrier. The exact potential profile in the channel and variation of gate depletion width and substrate depletion width in the channel as a function of position between source and drain have been computed for the first time for a nonuniformly doped channel. The model can be used to obtain the drain-current-drain-voltage characteristics, transfer characteristics, transconductance and gate-to-source capacitance of the device under dark and illuminated conditions. The model can be used as a basic tool for accurate simulation of optoelectronic integrated circuits (OEICs) using an OPFET.

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