Abstracts

Switching Characteristics of an Optically Controlled GaAs-MESFET

P. Chakrabarti, S.K. Shrestha, A. Srivastava and D. Saxena. "Switching Characteristics of an Optically Controlled GaAs-MESFET." 1994 Transactions on Microwave Theory and Techniques 42.3 (Mar. 1994 [T-MTT]): 365-375.

The switching characteristics of an optically controlled Metal Semiconductor Field Effect Transistor (MESFET), popularly known as Optical Field Effect Transistor (OPFET), have been derived analytically. The limitations of the existing model have been overcome in the present model. Calculations are being carried out to examine the effect of illumination on the current-voltage characteristics, drain-to-source capacitance (C/sub dc/), internal gate-to-source capacitance (C/sub gs/), drain-to-source resistance (R/sub ds/), the transconductance (g/sub m/), the input RC time constant and the cutoff frequency (f/sub T/) of a GaAs-MESFET. The variations of these parameters with gate length L/sub g/ and the doping concentration N/sub d/ have also been studied in dark and illuminated conditions. The results of numerical calculations show that there is an overall decrease in the input RC time constant of the device in the illuminated condition arising from the internal gate-to-source capacitance and the transconductance. The results obtained on the basis of the model show a close agreement with the reported experimental findings. The simple model presented here is fairly accurate and can be used as a basic tool for circuit simulation purposes.

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