Back Illumination - A Technique to Enhance The Performance of GaAs MESFET

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Abstract
An analytical model of GaAs metal-semiconductor-field-effect transistor (MESFET) with non-uniform doping under back illumination is developed. The model presents the d.c. and a.c. characteristics of GaAs MESFET under back illumination with the fiber inserted up to the active layer-substrate junction. Photovoltaic effects across the Schottky junction and active channel are considered to estimate various characteristics under different illumination conditions. The Continuity equations in the gate depletion and neutral regions are solved analytically. The frequency dependence of photovoltage at the Schottky contact (Vop) is evaluated for estimating the current characteristic under a.c. condition. It has been observed from the results that when GaAs MESFET is illuminated from back an improvement in characteristics over front illumination is experienced due to improved absorption under back illumination.

Reference

- M. Shur, GaAs Devices and circuits , New York: Plenum, 1987, pp 309-322

Index Terms

Computer Science Wireless
Key words

Photodetector

Schottky

Junction

Back Illumination

GaAs OPFET (Optically Illuminated Field-Effect-Transistor)