Abstracts

An Analytical Model for the Photodetection Mechanisms in High-Electron Mobility Transistors

M.A. Romero, M.A.G. Martinez and P.R. Herczfeld. "An Analytical Model for the Photodetection Mechanisms in High-Electron Mobility Transistors." 1996 Transactions on Microwave Theory and Techniques 44.12 (Dec. 1996, Part I [T-MTT]): 2279-2287.

The use of microwave high-electron mobility transistors (HEMT's) as photodetectors or optically controlled circuit elements have attracted interest. A model of the optical characteristics of HEMT's, which takes into account carrier transport as well as the quantum mechanical nature of the two-dimensional (2-D) electron gas channel, is presented. It is shown that the effect of illumination is equivalent to a shift in the gate to source bias voltage, referred to as the internal photovoltaic effect. The theoretical model is supported by experimental results that demonstrate that the HEMT photoresponse is a nonlinear function of light intensity with very high responsivity at low optical power levels.

❑ Return to main document.