Abstracts

Photonic microwave characteristics and modeling of an Al/sub 0.3/Ga/sub 0.7/As/GaAs/In/sub 0.13/Ga/sub 0.87/As double heterostructure pseudomorphic HEMT

S.H. Song, D.M. Kim, H.J. Kim, S.H. Kim, K.N. Kang and M.I. Nathan. "Photonic microwave characteristics and modeling of an Al/sub 0.3/Ga/sub 0.7/As/GaAs/In/sub 0.13/Ga/sub 0.87/As double heterostructure pseudomorphic HEMT." 1998 Microwave and Guided Wave Letters 8.1 (Jan. 1998 [MGWL]): 35-37.

Electrical characteristics of a photonically controlled n-channel Al/sub 0.3/Ga/sub 0.7/As/GaAs/In/sub 0.13/Ga/sub 0.87/As double heterostructure pseudomorphic HEMT (PHEMT) is reported. Experimental results show a high optical sensitivity in the drain saturation current, the transconductance f/sub T/, and f/sub max/ at the optical power density P/sub opt/=78 mW/cm/sup 2/. We also proposed a new optoelectronic equivalent circuit model, which has photonically generated gate capacitances (C/sub gs,opt/ and C/sub gd,opt/) and transconductance (g/sub m,opt/), for accurate description of DC and microwave performance of PHEMT's under optical control, and verified the accuracy of the proposed model with measured and extracted scattering parameters from the equivalent photonic microwave model.

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