Abstracts

Theoretical analysis of wurtzite and zincblende phase GaN avalanche transit time device in millimeter-wave frequencies

C.C. Meng, G.R. Liao and J.W. Chen. "Theoretical analysis of wurtzite and zincblende phase GaN avalanche transit time device in millimeter-wave frequencies." 1999 MTT-S International Microwave Symposium Digest 99.4 (1999 Vol. IV [MWSYM]): 1777-1780 vol.4.

GaN is the suitable material for millimeter-wave high power IMPATT oscillators because of its superior electronic properties-high breakdown electric fields and high electron saturation velocity. In this paper, millimeter-wave wurtzite phase and zincblende phase GaN IMPATT oscillators at elevated temperature are analyzed by a Read type large signal model. The power density of GaN IMPATT devices at millimeter-wave frequencies is two orders magnitude higher than that of conventional GaAs and Si IMPATT devices. The simulations showed that GaN wurtzite phase p/sup +/n single-drift flat-profile IMPATT oscillators at 300 GHz have efficiency of 11% and r.f. power density of 1.6 MW/cm/sup 2/ when operated at 800 K.

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