Abstracts

A 90% Power-Added-Efficiency GaInP/GaAs HBT for L-Band Radar and Mobile Communication Systems

A. Mallet, D. Floriot, J.P. Viaud, F. Blache, J.M. Nebus and S. Delage. "A 90% Power-Added-Efficiency GaInP/GaAs HBT for L-Band Radar and Mobile Communication Systems." 1996 Microwave and Guided Wave Letters 6.3 (Mar. 1996 [MGWL]): 132-134.

A very high 90% power-added efficiency (PAE) with an output power (P/sub out/) of 200 mW and a power gain of 18 dB has been achieved at 1.8 GHz with a 240 µm/sub2/ GaInP/GaAs HBT (Thomson-CSF/LCR). The transistor (common emitter) was biased in class C mode (1/sub c/= O mA; V/sub b'e'/ = 1 V;V/sub c'e'/=7 V) and the load termination at the signal harmonics was optimized. First, a heterojunction bipolar transistor (HBT) nonlinear model has been extracted from pulsed I-V and pulsed S parameter mea-surements. A harmonic balance simulation was performed and suitable collector current/voltage waveforms were determined in order to optimize PAE. Second, a multiharmonic active load-pull system was used in order to measure and optimize the transistor efficiency. Measurement data were found to be in good agreement with simulated results. The main use of this HBT is expected to be in mobile communication systems and T/R modules for active array radars.

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