Abstracts

Power Saturation Characteristics of GaAs/AlGaAs High Electron Mobility Transistors

A.K. Gupta, R.T. Chen, E.A. Sovero and J.A. Higgins. "Power Saturation Characteristics of GaAs/AlGaAs High Electron Mobility Transistors." 1985 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 85.1 (1985 [MCS]): 50-53.

High electron mobility transistors (HEMTs) employing both single and quadruple GaAs/AlGaAs heterojunctions have been fabricated and tested for power at 10 GHz. The multiple heterojunction layer, with a two-dimensional electron gas (2-DEG) sheet carrier density of 3.2 x 10/sup12/ cm/sup -2/ significantly higher current capability (as required for microwave power devices) than the conventional structure where the 2-DEG density is limited to <= 10/sup 12/ cm/sup -2/. HEMTs with gate dimensions of 0.5 µm x 200 µm were mounted in X-band FET packages for rf evaluation. The QHJ HEMTs yielded a saturated power of 21 dBm (0.63 W/mm), small signal gain of 14.5 dB, power added efficiency of 39%, and third order IMD product of -19 dBc at saturation. The corresponding figures for the SHJ HEMTs were 18 dBm (0.32 W/mm), 15 dB, 43% and -14 dBc, respectively. These are the highest power densities yet reported for a HEMT.

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