Abstracts

Modeling and Performance of a 100-Element pHEMT Grid Amplifier

M.P. De Lisio, S.W. Duncan, D.-W. Tu, C.-M. Liu, A. Moussessian, J.J. Rosenberg and D.B. Rutledge. "Modeling and Performance of a 100-Element pHEMT Grid Amplifier." 1996 Transactions on Microwave Theory and Techniques 44.12 (Dec. 1996, Part I [T-MTT]): 2136-2143.

A 100-element hybrid grid amplifier has been fabricated. The active devices in the grid are custom-made pseudomorphic high electron mobility transistor (pHEMT) differential-pair chips. We present a model for gain analysis and compare measurements with theory. The grid includes stabilizing resistors in the gate. Measurements show the grid has a peak gain of 10 dB when tuned for 10 GHz and a gain of 12 dB when tuned for 9 GHz. The maximum 3-dB bandwidth is 15% at 9 GHz. The minimum noise figure is 3 dB. The maximum saturated output power is 3.7 W, with a peak power-added efficiency of 12%. These results are a significant improvement over previous grid amplifiers based on heterojunction bipolar transistors (HBT's).

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