Abstracts

V-Band High-Efficiency High-Power AlInAs/GaInAs/InP HEMT's (Dec. 1993 [T-MTT])

M. Matloubian, L.M. Jelloian, A.S. Brown, L.D. Nguyen, L.E. Larson, M.J. Delaney, M.A. Thompson, R.A. Rhodes and J.E. Pence. "V-Band High-Efficiency High-Power AlInAs/GaInAs/InP HEMT's (Dec. 1993 [T-MTT])." 1993 Transactions on Microwave Theory and Techniques 41.11 (Dec. 1993 [T-MTT] (1993 Symposium Issue)): 2206-2210.

In this paper, we report on the state-of-the-art power performance of InP-based HEMT's at V-band. Power HEMT's were fabricated using two different material layer structures. The power performances of these HEMT's were measured at 59 GHz. We were able to achieve an output power of 155 mW with 4.9 dB gain, and power-added efficiency of 30 percent from a 448-µm-wide HEMT fabricated on a delta-doped channel layer structure. By using a double-doped layer structure, we were able to achieve an output power of 145 mW with 4.2 dB gain, and power-added efficiency of 24 percent. Output power of 288 mW with 3.6 dB gain and power-added efficiency of 20.4 percent were obtained by power combining two of the delta-doped channel HEMT's. These combinations of output power and efficiency are the best reported to date for InP-based HEMT's, and are comparable to the best results reported for AlGaAs/InGaAs on GaAs pseudomorphic HEMT's at this frequency.

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