Abstracts

4GHz High-Power High-Efficiency Pseudomorphic Power HEMT

S.T. Fu, W.F. Kopp, M.Y. Kao, K.H.G. Duh, P.M. Smith, P.C. Chao and T.H. Yu. "4GHz High-Power High-Efficiency Pseudomorphic Power HEMT." 1993 MTT-S International Microwave Symposium Digest 93.3 (1993 Vol. III [MWSYM]): 1469-1472.

We are reporting on the record power performance of 0.25µm x 8mm double recessed GaAs-based Pseudomorphic High Electron Mobility Transistors (PHEMTs) at 4GHz. The 0.25µm gate-length PHEMTs exhibit typical gate-to-drain breakdown voltage of more than 20 V, peak transconductance of 430mS/mm, and maximum drain current density of 450mA/mm. When the drain was biased up to 11V, the device delivered 5.7 W output power with 12.6dB power gain and 57% power-added efficiency (PAE). The device demonstrates an extremely broad drain bias range for efficient operation. It exhibits a maximum PAE of 72% with output power of 4.1 W under V/sub DS/ = 7 V condition. With 8 V drain bias, when the device was tuned for maximum output power, it delivered 4.3 W of P/sub 2dB/ with 15.4dB power gain and 66% PAE. To the authors' knowledge, this is the highest PAE and power gain yet achieved by a solid state device with this output power at 4GHz.

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