Abstracts

High-efficiency L and S-band power amplifiers with high-breakdown GaAs-based pHEMTs

J.A. Pusl, R.D. Widman, J.J. Brown, M. Hu, N. Kaur, M. BeZaire and L.D. Nguyen. "High-efficiency L and S-band power amplifiers with high-breakdown GaAs-based pHEMTs." 1998 MTT-S International Microwave Symposium Digest 98.2 (1998 Vol. II [MWSYM]): 711-714.

Performance and reliability data for harmonically-terminated, high-efficiency microwave power amplifiers designed from active harmonic loadpull data utilizing high breakdown voltage AlGaAs-InGaAs-GaAs pHEMTs are reported. Single stage MIC amplifiers fabricated with 2/spl times/25 mm gate width pHEMTs resulted in P/sub out/=20 W and PAE=66% at 1.5 GHz and 2.2 GHz. Balanced hybrid amplifiers with these modules have been fabricated which have P/sub out/=40 W and PAE=64%. To the authors knowledge, this is the highest combination of reliable output power and efficiency ever achieved with pHEMT devices. Single stage amplifiers fabricated with a single 5 mm or 10 mm pHEMT gave P/sub out/=2 W and 4 W, respectively, with PAE=72%. All of these output powers are at power densities of 0.4 W/mm. These devices have undergone DC and RF lifetests with good results. This GaAs-based pHEMT device technology supports amplifier module designs in the 1-20 GHz frequency range.

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