Abstracts

High-power broad-band AlGaN/GaN HEMT MMICs on SiC substrates (Dec. 2001 [T-MTT])

B.M. Green, V. Tilak, S. Lee, H. Kim, J.A. Smart, K.J. Webb, J.R. Shealy and L.F. Eastman. "High-power broad-band AlGaN/GaN HEMT MMICs on SiC substrates (Dec. 2001 [T-MTT])." 2001 Transactions on Microwave Theory and Techniques 49.12 (Dec. 2001 [T-MTT] (Special Issue on 2001 International Microwave Symposium)): 2486-2493.

Broad-band high-power cascode AlGaN/GaN high electron-mobility transistor monolithic-microwave integrated-circuit (MMIC) amplifiers with high gain and power-added efficiency (PAE) have been fabricated on high-thermal conductivity SiC substrates. A cascode gain cell exhibiting 5 W of power at 8 GHz with a small-signal gain of 19 dB was realized. A nonuniform distributed amplifier (NDA) based on this process was designed, fabricated, and tested, yielding a saturated output power of 3-6 W over a dc-8-GHz bandwidth with an associated PAE of 13%-31%. A broad-band amplifier MMIC using cascode cells in conjunction with a lossy-match input matching network showed a useful operating range of dc-8 GHz with an output power of 5-7.5 W and a PAE of 20%-33.% over this range. The third-order intermodulation products of the amplifiers under two-tone excitation were studied and third-order-intercept values of 42 and 43 dBm (computed using two-tone carrier power) for the lossy match and NDA amplifiers were obtained.

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