Abstracts

Highest efficiency, linear X-band performance using InP DHBTs - 48% PAE at 30 dB C/IM3

L. Kehias, T. Jenkins, T. Quach, P. Watson, R. Welch, R. Worley, A.K. Oki, H.C. Yen, A. Gutierrez-Aitken, W. Okamura and E. Kaneshiro. "Highest efficiency, linear X-band performance using InP DHBTs - 48% PAE at 30 dB C/IM3." 2001 Microwave and Wireless Components Letters 11.9 (Sep. 2001 [MWCL]): 361-363.

InP single heterojunction bipolar transistors have previously demonstrated 5-10 dB lower third-order intermodulation products (IM3) compared to GaAs heterojunction bipolar transistors (HBTs) under low voltage (2 V) operation. This paper reports excellent single-tone and two-tone X-band operation, including high two-tone power-added efficiency (PAE), on linear InP double heterojunction bipolar transistors (DHBTs) operated at V/sub ce/=4 V. The InP DHBT demonstrated a 30 dB carrier to third-order intermodulation product (C/IM3) output power ratio simultaneously with 48% two-tone PAE. This is the highest known efficiency of an X-band device under linear (30 dB C/IM3) operation. This is especially significant for microwave power amplifiers for satellite communication transmitters, where lower intermodulation distortion is normally accomplished by backing off in RF drive and output power, thus sacrificing PAE performance.

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