Abstracts

High-power high-efficiency X-band AlGaAs/GaAs heterojunction bipolar transistors with undercut collectors

Hin-Fai Chau, G. Wilcox, Wenliang Chen, M. Tutt and T. Henderson. "High-power high-efficiency X-band AlGaAs/GaAs heterojunction bipolar transistors with undercut collectors." 1997 Microwave and Guided Wave Letters 7.9 (Sep. 1997 [MGWL]): 288-290.

We report on the power performance of X-band AlGaAs/GaAs heterojunction bipolar transistors with undercut collectors for reduced base-collector capacitance. A 10/spl times/(2.8/spl times/50) /spl mu/m/sup 2/ HBT unit cell exhibited 2.09 W continuous wave (CW) output power (4.18 W/mm power density), 62.2% power-added efficiency, and 7.13 dB associated gain at 10 GHz at a collector bias voltage of 10 V. When tuned for maximum efficiency, the same transistor delivered a CW output power of 1.36 W, a power-added efficiency of 74.2%, and an associated gain of 7.32 dB at the same frequency and collector bias voltage. To our knowledge, this is the first demonstration of high-power (>1.3 W), high-efficiency (>74%) AlGaAs/GaAs HBT's using a simple collector undercut technique without the need for significant modifications of baseline HBT process.

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