Abstracts

5 mW GaAs HBT Low Power Consumption X-Band Amplifier (1994 [MCS])

K.W. Kobayashi, A.K. Oki, L.T. Tran, D.K. Umemoto and D.C. Streit. "5 mW GaAs HBT Low Power Consumption X-Band Amplifier (1994 [MCS])." 1994 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 94.1 (1994 [MCS]): 147-150.

We report on a 5 mW GaAs HBT low power consumption X-band amplifier which benchmarks the highest gain to dc power quotient figure of merit reported for HBT technology. This amplifier untilizes the inherently high maximum available/stable gain of our 2µm Self-aligned Base Ohmic Metal GaAs HBTs. The X-band amplifier design consists of 4-sections and can achieve 13.1 dB gain at 12 GHz with less than 5 mW of power consumption. The amplifier is resistively self-biased with 2.1 Volts, and each 2x1O µm² single-emitter HBT draws 0.5 mA with a Vce bias of 2 Volts. The corresponding 1-dB compression is -21.5 dBm. By increasing the total bias current to 50 mA, the amplifier achieves a gain of 39 dB, an IP3 of 13.5 dBm, and a P-1dB of 5.5 dBm while consuming a total of 235 mW.

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