Abstracts

Performance Comparison of 1 Watt Ka-Band MMIC Amplifiers Using Pseudomorphic HEMTs and Ion-Implanted MESFETs

R. Yarborough, P. Saunier and H.Q. Tserng. "Performance Comparison of 1 Watt Ka-Band MMIC Amplifiers Using Pseudomorphic HEMTs and Ion-Implanted MESFETs." 1996 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 98. (1996 [MCS]): 21-24.

We have demonstrated a high-gain, high-efficiency Ka-band three-stage MMIC power amplifier providing >1 watt CW output power, >20 dB power gain, with an average 35% power-added efficiency (37% peak) over a 26.5 to 28 GHz band using 0.25µm AIGaAs/InGaAs pseudomorphic HEMT (pHEMT) process technology. The pHEMT amplifiers exhibit third-order intermodulation products >29 dBc with the output power backed off by 5 dB. As an alternate low-cost solution, we processed three wafers of the Ka-band monolithic amplifier designed with pHEMT technology using direct ion-implanted 0.2µm GaAs MESFETs achieving >1 watt CW output power, >18 dB power gain, with an average 24% power-added efficiency (27% peak) over the band. The MESFET amplifiers demonstrate third-order intermodulation products >21 dBc with the output power backed off by 5 dB. All amplifier results reported here contain no de-embedding of fixture and connector losses. This paper presents 0.25µm pHEMT and 0.2µm MESFET device results, as well as amplifier design and performance over a 26.5 to 28 GHz band.

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