Abstracts

A Cryogenic GaAs HBT Microwave Amplifier and its Application to a Superconductor Digital IC

K.W. Kobayashi, J.H. Kobayashi, M. Leung, A.K. Oki, M. Matloubian, S. Chan and D.C. Streit. "A Cryogenic GaAs HBT Microwave Amplifier and its Application to a Superconductor Digital IC." 1993 MTT-S International Microwave Symposium Digest 93.1 (1993 Vol. I [MWSYM]): 377-380.

This paper benchmarks the first microwave GaAs HBT amplifier results at 4.2° Kelvin. The amplifier nominal gain is 6 dB and is measured from 130 MHz to 10 GHz at fixture temperatures of 295 K, 77 K, and 4.2 K. The maximum gain variation over temperature was found to be about 2 dB. Maximum gain occured at temperatures around 50-85 K, whereas at 4.2 K, the gain seemed to drop slightly from that at RT. Only slight RF evidence of carrier freeze-out was observed at a fixture temperature of 4.2 K, although, HBT junction temperatures are estimated to be around 25-30 K. Finally, this chip was integrated as a buffer amplifier with an HTS superconductor digital logic gate and has shown functionality up to 320 MHz.

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