

A Cryogenically-Cooled Wide-Band HEMT MMIC Low-Noise Amplifier

C.C. Yang, B. Nelson, W. Jones and B. Allen. "A Cryogenically-Cooled Wide-Band HEMT MMIC Low-Noise Amplifier." 1992 *Microwave and Guided Wave Letters* 2.2 (Feb. 1992 [MGWL]): 58-60.

A balanced single-stage wide-band HEMT MMIC low-noise amplifier (LNA) was designed, fabricated, cooled to a temperature of 19 K, and evaluated from 8-18 GHz. The MMIC LNA performed without damage at all test temperatures. The amplifier gain flatness over the 8--18-GHz frequency band was maintained at both room and cryogenic temperature, indicating that the broad-band design topology is relatively insensitive to operation temperature. Gain increased an average of 2 dB, while the noise temperature exhibited as much as an eightfold reduction from 160 K to 20 K at 19 K operation temperature. This is the first result on performance of a cryogenically-cooled HEMT MMIC LNA.

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