Abstracts

W-Band InGaAs HEMT Low Noise Amplifiers

K.H.G. Duh, P.C. Chao, P. Ho, A. Tessmer, S.M.J. Liu, M.Y. Kao, P.M. Smith and J.M. Ballingall. "W-Band InGaAs HEMT Low Noise Amplifiers." 1990 MTT-S International Microwave Symposium Digest 90.1 (1990 Vol. I [MWSYM]): 595-598.

0.15 µm gate length GaAs-based and InP-based lnGaAs channel HEMTs developed in our laboratory have exhibited state-of-the-art noise and gain performance well up to 100 GHz. 94 GHz noise figures of 2.4 and 1.4 dB with gains of 5.4 and 6.5 dB have been measured from GaAs and lnP based HEMTs respectively. High performance W-Band multi-stage amplifiers have been built using these devices. A two-stage GaAs-based amplifier exhibits a noise figure of 4.2 dB with gain of 9.7 dB at 93 GHz and a three-stage amplifier yields 4.5 dB noise figure with 14.8 dB gain at 94 GHz. The best two-stage amplifier built with InP-based HEMTs exhibits a minimum noise figure of 3.2 dB with gain of 11.5 ± 0.4 dB from 88 to 96 GHz. A noise figure as low as 3.3 dB with gain of 17.3 ± 0.5 dB from 88 to 96 GHz has also been demonstrated from a three-stage amplifier. The characteristics and performance of both devices will be presented in the paper.

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