Abstracts

High-Performance InP-Based HEMT Millimeter-Wave Low-Noise Amplifiers

K.H.G. Duh, P.C. Chao, P. Ho, M.Y. Kao, P.M. Smith, J.M. Ballingall and A.A. Jabra. "High-Performance InP-Based HEMT Millimeter-Wave Low-Noise Amplifiers." 1989 MTT-S International Microwave Symposium Digest 89.2 (1989 Vol. II [MWSYM]): 805-808.

Quarter-micron lnAIAs/lnGaAs planar-doped HEMTs lattice-matched to lnP developed in our laboratory have exhibited state-of-the-art noise and gain performance at frequencies up to 94 GHz. Minimum noise figures of 0.5, 1.2, and 2.1 dB have been measured at 18, 60, and 94 GHz, respectively. Small signal gains as high as 15.4 and 12.0 dB have also been obtained at 63 and 95 GHz, respectively. Using 0.25 µm InP-based HEMTs, a V-Band three-stage amplifier yields an average noise figure of 3.0 dB with a gain of 22.0 ± 0.2 dB from 60 to 65 GHz. At W-Band, a two-stage amplifier exhibits a noise figure of 4.5 dB with a gain of 10.2 dB at 90.4 GHz and a three-stage amplifier shows a noise figure of 4.8 dB with a gain of 15.0 dB at 90.4 GHz. These results clearly show the great potential of InP-based HEMTs for high performance millimeter-wave low noise receiver applications.

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