Abstracts

Low Noise High Electron Mobility Transistors (1984 [MCS])

J.J. Berenz, K. Nakano and K.P. Weller. "Low Noise High Electron Mobility Transistors (1984 [MCS])." 1984 Microwave and Millimeter-Wave Monolithic Circuits Symposium Digest 84.1 (1984 [MCS]): 83-87.

Sub-half-micron gate length High Electron Mobility Transistors (HEMT) were fabricated by direct-write electron beam lithography for low noise EHF amplifiers. Modulation-doped epitaxial structures were grown by molecular beam epitaxy having 8,000 cm²/ V-sec room temperature and 77,600 cm²/ V-sec liquid nitrogen Hall mobility for 10/sup 12/ electrons/cm². Gate lengths as narrow as 0.28 micron were defined in a recess etched through the n/sup +/ GaAs contact layer. The dc transconductance of 0.4 micron gate length depletion mode devices exceeded 260 mS/mm. Preliminary measurement of noise figure and associated gain made at room temperature yielded 2.7 dB noise figure and 5.9 dB associated gain at 34 GHz for devices having 0.37 micron gate length. Enhancement mode devices were also fabricated having 240 mS/mm dc transconductance. These devices yielded 1.5 dB noise figure and 10.5 dB associated gain at 18 GHz for 0.35 micron gate length. These results are comparable to the best quarter-micron gate length GaAs MESFET noise figures yet reported.

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