Abstracts

A flip-chip MMIC design with coplanar waveguide transmission line in the W-band

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This paper describes a design method for flip-chip monolithic millimeter-wave integrated circuits (MMICs) with a coplanar waveguide (CPW) transmission line for W-band applications. We proposed a test structure for obtaining accurate flip-chip CPW line models. We examined the transmission line characteristics of the CPW line using the test structure in the millimeter-wave range and modeled them. Using the CPW line models, we designed and fabricated both two- and three-stage amplifiers using 0.15-/spl mu/m InGaP/InGaAs high electron-mobility transistor technology. The maximum power gain of the two-stage amplifier is 12 dB at 79 GHz. The three-stage amplifier has a maximum power gain of 16 dB at 77 GHz. The agreement of measured S-parameters with calculated results demonstrates that the proposed test structure is suitable for characterizing flip-chip CPW lines and provides very accurate models.

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