Abstracts

Performance Optimization of Millimeter-Wave Mixer Circuits

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The performance optimization of millimeter-wave mixers incorporating GaAS Schottky barrier diodes is investigated in terms of a computer-aided analysis of a waveguide mixer equivalent circuit verified by complex impedance measurements performed directly at the operating frequency of 94 GHz. A complex impedance bridge was devised to measure RF input impedance at an arbitrary reference plane. This was used to examine the embedding effects due to the full diode mounting structure with a matched load or variable position backshort. A parasitic conversion loss optimization program was devised based upon the time invariant elements of the experimentally derived model. Predictions of the model are compared with state-of-the-art mixer performance at 94 GHz.

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