Abstracts

Full-wave design and optimization of MM-wave diode-based circuits in finline technique

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This paper presents a full-wave design and optimization of a quasi planar frequency doubler and a balanced mixer in finline technique by applying the extended finite difference time domain method (FDTD). The structures are based on the junction of a coplanar waveguide and a finline using two Schottky diodes mounted across this junction. The diodes are represented by their large signal device circuit model. The specific problem of embedding the lumped elements in the FDTD mesh at MM-wave frequencies is discussed. A new method for the inclusion of the device into the grid is developed avoiding unphysical reactances. The frequency doubler is designed for optimal conversion loss at 0 dBm input power in a frequency band from 20 to 25 GHz and 40 to 50 GHz, respectively. The operation frequency of the balanced mixer is 30 GHz. The simulation results are validated by the measurements.

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