Abstracts

Field Theory Design of Rectangular Waveguide Broad-Wall Metal-Insert Slot Coulplers for Millimeter-Wave Applications

F. Arndt, B. Koch, H.-J. Orlok and N. Schroder. "Field Theory Design of Rectangular Waveguide Broad-Wall Metal-Insert Slot Coulplers for Millimeter-Wave Applications." 1985 Transactions on Microwave Theory and Techniques 33.2 (Feb. 1985 [T-MTT]): 95-104.

A design theory for broad-wall metal-insert slot couplers suitable for an inexpensive and very accurate metal-etching manufacturing technique is described. The method of field expansion into suitable eigenmodes used considers the effects of finite insert thickness and higher order mode interaction at the step discontinuities. Computer-optimized design data for -3-dB couplers in the Ka- and W-bands are given. The data of the Ka -band design are transferable into the U- and V-bands by suitable frequency scaling calculation. Since the metal-etching technique is also advantageously applicable for couplers in the centimeter wavelength range, optimized design data for E-plane slot couplers in the often used Ku- and R120-waveguide-bands are included in the tables given. A Ku-band metal-etched four-slot coupler prototype achieves a ±1dB bandwidth of the -3-dB coupling of about 2 GHz, together with -36-dB isolation. The measurements show good agreement with theory.

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