Abstracts

The Coplanar-Slot Transition and a Digital Phase Modulator

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Designed in a planar metal geometry for use at 15 GHz, a quadriphase modulator uses Schottky barrier diodes as its switching elements. The data transition time for two circuits used as a phase modulator/demodulator pair is 200 ps, yielding a modulator useful for 0-2 Giga bit data rates. The phase and amplitude errors of the modulator's best static alignment is ±0.55 deg and ±0.07 dB (typically ±1.0 deg and ±0.15 dB), its insertion loss 9 dB, and its carrier suppression 25-35 dB. The circuit employs a novel microstrip power splitter-dc block, slotline to microstrip and coplanar to microstrip transitions, and a Lange 90° hybrid. The interface between a coplanar and slot transmission line connected by two beam lead Schottky barrier diodes forms the biphase switch. The design is useful for carrier frequencies between 4 and 40 GHz and for data rates to 15% of that frequency.

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