Abstracts

Characterization of broad-band transmission for coplanar waveguides on CMOS silicon substrates

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This paper presents characteristics of microwave transmission in coplanar waveguides (CPW's) on silicon (Si) substrates fabricated through commercial CMOS foundries. Due to the CMOS fabrication, the metal strips of the CPW are encapsulated in thin films of Si dioxide. Many test sets were fabricated with different line dimensions, all on p-type substrates with resistivities in the range from 0.4 /spl Omega//spl middot/cm to 12.5 /spl Omega//spl middot/cm. Propagation constant and characteristic impedance measurements were performed at frequencies from 0.1 to 40 GHz, using a vector-network analyzer and the through-reflect-line (TRL) deembedding technique. A quasi-TEM equivalent circuit model was developed from the available process parameters, which accounts for the effects of the electromagnetic fields in the CPW structure over a broad frequency range. The analysis was based on the conformal mapping of the CPW multilayer dielectric cross section to obtain accurate circuit representation for the effects of the transverse fields.

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