Abstracts

Characterization of Buried Microstrip Lines for Constructing High-Density Microwave Integrated Circuits

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This paper describes the characterization of a guided wave structure, buried microstrip line (BMSL), which is considered to be promising for constructing high-density microwave and millimeter-wave integrated circuits because of its high isolation characteristics. The BMSL includes a dielectric medium surrounded by ground conductor walls and a strip conductor on the top of the dielectric. The BMSL structure is characterized by the two methods, the rectangular boundary division (RBD) method and the finite-difference time-domain (FDTD) method. The RBD method is employed to obtain basic parameters of the BMSL such as characteristic impedances and coupling coefficients over a wide range of line sizes taking advantages of its high calculation efficiency. On the other hand, the FDTD method has been used for more detailed characterization such as the frequency performances of stub matching circuits. The FDTD method is also used to confirm the validlity of the quasi-TEM wave approximation which the RBD is based on. The analysis results reveal that the BMSL structure possesses much lower coupling coefficients than a conventional miicrostrip line does, from -15 dB to -100 dB depending on their burial depths.

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