Abstracts

Design and Performance of a Non-Contacting Probe for Measurements on High-Frequency Planar Circuits

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Optimal design of a non-contacting magnetic probe for measurements on the interior of planar high-frequency circuits has been studied, and performance of the probe has been determined. The probe is a relatively simple device that may find uses in circuit design and optimization, troubleshooting, and production testing. In the present work we have studied its design by means of enlarged models tested at frequencies 100 times lower than those of the actual intended use. The nature of its errors has been investigated, and some techniques for error reduction have been found. The accuracy of measurements on circuits with SWR < 3.0 is typically 01.8 dB in magnitude and 7° in phase. S-parameter measurements on general 2-ports can also be made by using the probe at several different positions on the associated transmission lines. This technique effectively eliminates the problem of de-embedding that arises in other kinds of S-parameter measurements. Examples of measurements with the large model probe are presented and compared with theory. Performance appears to be acceptable for the intended applications. The probe has been designed with eventual microfabrication in mind, but difficulties in this final step remain to be resolved.

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