Abstracts

Analysis of Superconducting Microwave Structures: Application to Microstrip Lines

S.M. El-Ghazaly, R.B. Hammond and T. Itoh. "Analysis of Superconducting Microwave Structures: Application to Microstrip Lines." 1992 Transactions on Microwave Theory and Techniques 40.3 (Mar. 1992 [T-MTT]): 499-508.

An accurate analysis for the microwave and millimeter-wave transmission lines, which include high T/sub c/ superconductor materials, is presented. This analysis is based on blending a full electromagnetic wave model with London's equations and the two-fluid model. It is capable of fully characterizing the transmission lines, including obtaining the current distributions inside the superconducting material, the electromagnetic fields, the power handling capability and the quality factor. A simplified model based on the TM-mode solution is also presented. The solution is obtained using the finite-difference scheme. This approach is employed in investigating the super-conducting microstrip structure. Results showing current distributions and quality factors are presented. Variations of the line characteristics with the strip width are also presented. The possibility of developing empirical relations for the current carrying capacity as functions of the critical current density and the critical magnetic flux density is also demonstrated.

❑ Return to main document.