Abstracts

Conductor loss in superconducting planar structures: calculations and measurements

J.C. Booth and C.L. Holloway. "Conductor loss in superconducting planar structures: calculations and measurements." 1999 Transactions on Microwave Theory and Techniques 47.6 (Jun. 1999, Part I [T-MTT]): 769-774.

We present closed-form expressions of the attenuation constant due to conductor loss for superconducting coplanar waveguide and microstrip transmission lines. These expressions, valid for arbitrary conductor thickness, make use of a numerically determined quantity (the stopping distance /spl Delta/) that depends on the material properties and edge shape of the superconducting transmission line. Once /spl Delta/ is determined, the attenuation constant for any planar geometry can be obtained without further numerical calculation, making this technique attractive for use in the design of circuits incorporating superconducting planar elements. The results of this calculation compare favorably with full numerical calculations and also with experimental data on high-temperature superconducting coplanar transmission lines, illustrating the accuracy and applicability of the calculation for determining the conductor loss of superconducting circuit elements.

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