Abstracts

The Current Distribution and AC Resistance of a Microstrip Structure

R. Faraji-Dana and Y.L. Chow. "The Current Distribution and AC Resistance of a Microstrip Structure." 1990 Transactions on Microwave Theory and Techniques 38.9 (Sep. 1990 [T-MTT] (Special Issue on Multifunction MMIC's and their System Applications)): 1268-1277.

This paper presents an analysis of the ac resistance in a microstrip structure for any metallization thickness by deriving the current distribution over the strip cross section. The analysis uses the separation of variables technique and the Green's function method. It shows that the skin current of the strip is concentrated toward the ground plane in a microstrip structure. In the extreme case, the ac resistance of the strip can be twice as high as the ac resistance of the same strip isolated. The imperfect ground plane also adds to the total conductor loss of a microstrip line. For a wide strip over a lossy ground plane at high frequency, the ground plane surface current distribution is concentrated directly under the strip, and the ground plane ac resistance can be as large as the strip ac resistance. Therefore, the total ac resistance of the microstrip line can be four times as high as that of an isolated strip conductor.

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