Abstracts

Propagation Characteristics of MIS Transmission Lines with Inhomogeneous Doping Profile

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This paper presents a hybrid-mode analysis of slow-wave MIS transmission lines with a gradually inhomogeneous doping profile. In general it was found that, in comparison with homogeneously doped semiconductor layers, a Gaussian-type doping distribution results in lower losses for the slow-wave mode in both thin- and thick-film MIS CPW's. While the effect of the doping profile is more pronounced in thin-film structures which support a slow-wave mode only up to 3 GHz, it is less significant in thick-film structures. On the other hand, numerical analysis indicates that thick-film structures can support a slow-wave mode at moderate loss up to 40 GHz. The behavior of MIS microstrip lines is similar to that of MIS CPW's, except that for thick-film transmission lines an increase in losses can be observed when the doping profile becomes inhomogeneous. The numerical investigation was carried out by using the method of lines. Several transmission lines have been investigated and results are presented for microstrip, coupled microstrips, and coplanar lines.

❑ Return to main document.