Abstracts

Characterization and modeling of multiple coupled on-chip interconnects on silicon substrate

Ji Zheng, V.K. Tripathi and A. Weisshaar. "Characterization and modeling of multiple coupled on-chip interconnects on silicon substrate." 2001 Transactions on Microwave Theory and Techniques 49.10 (Oct. 2001, Part I [T-MTT] (Mini-Special Issue on Electrical Performance of Electronic Packaging (EPEP))): 1733-1739.

A quasi-magnetostatic integral formulation approach is applied to compute the frequency-dependent series resistance and inductance parameters for coupled microstrip on-chip interconnects on silicon. The method is based on the simultaneous discretization of interconnect conductors and silicon substrate, and takes into account the substrate skin effect (eddy currents), as well as the conductor skin and proximity effects. An efficient equivalent-circuit model based on "effective substrate current loops" is extracted from the frequency-dependent R and L parameters for a class of coupled microstrip-type on-chip interconnects. The frequency response of the proposed model consisting of only passive R, L elements agrees well with the broad-band characteristics of the distributed resistance and inductance parameters of the interconnect obtained by electromagnetic simulation. Model extraction results are presented for asymmetric coupled interconnects to demonstrate the proposed method.

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