Abstracts

Coupling of large number of vias in electronic packaging structures and differential signaling

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A method is presented for modeling the multi-interaction among large numbers of vertical vias in densely packaged integrated circuits. The analysis of the interior problem is based upon a cylindrical wave expansion of the magnetic field Green's function and the foldy-lax multiple scattering formula. The exterior problem of bent traces is analyzed using the MOM approach. A system matrix equation is obtained by combining the exterior and interior problem, the solution of which gives the propagation characteristics of the entire structure. Using an iterative solver, results are illustrated for problems of several thousand vias with moderate CPU and memory requirements. Also illustrated are the results for common and differential modes in differential signaling, including the effects of surrounding idle vias and shorting vias.

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