Abstracts

Wideband Characterization of a Typical Bonding Wire for Microwave and Millimeter-Wave Integrated Circuits

H.-Y. Lee. "Wideband Characterization of a Typical Bonding Wire for Microwave and Millimeter-Wave Integrated Circuits." 1995 Transactions on Microwave Theory and Techniques 43.1 (Jan. 1995 [T-MTT]): 63-68.

A typical grounded bonding wire with a minimum total length of 480 µm for MMIC's and OEIC's is characterized using the Method of Moments with the incorporation of the ohmic loss as well as the radiation loss over a wide range of frequencies. The distributed ohmic resistance is calculated by an application of the Phenomenological Loss Equivalence Method. The simulated results show the wire resistance and the inductance are greatly increasing to frequencies above 30 GHz due to the high radiation effect enhanced by the slow-wave effect of the ohmic loss. The bonding wire is Klghly inductive in most of the frequency range and the maximum quality factor is mostly limited by the ohmic resistance. The results also show the simple static modeling of computer-aided design software that considers only the free-space wire inductance and the skin-effect resistance, overestimates the wire inductance at low frequencies, and is inappropriate at high frequencies due to the high radiation effect. This approach can be applied to many arbitrarily shaped interconnection wires for wideband design and characterization of high-frequency integrated circuits.

❑ Return to main document.