Abstracts

Spike Leakage of Thin Si PIN Limiters

A.L. Ward, R.J. Tan and R. Kaul. "Spike Leakage of Thin Si PIN Limiters." 1994 Transactions on Microwave Theory and Techniques 42.10 (Oct. 1994 [T-MTT]): 1879-1885.

Thin PIN diode limiters (10 µm or less) are used to protect sensitive microwave components from fast-risetime microwave pulses having energies exceeding 1 to 10 µJ. This paper analyzes and experimentally confirms the performance of these PIN limiters. It is shown that spike leakage is a transit-time effect that is controlled by the mobility of the carriers. A p-type background I-region should yield less spike leakage energy for a given thickness. It is proposed that the hysteresis effect observed when limiters are operated under cw conditions is due to space charge effects and stored charges remaining after the reverse-biased half cycle. Detailed agreement between the measured and calculated device voltage waveforms requires accurate modeling of the circuit parasitics because of the high rate-of-change currents arising from avalanching.

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