Abstracts

Thermal Considerations in High Average Power Microwave PIN Diode Switches

J.C. Hill and H.S. Maddix. "Thermal Considerations in High Average Power Microwave PIN Diode Switches." 1990 MTT-S International Microwave Symposium Digest 90.3 (1990 Vol. III [MWSYM]): 1325-1328.

The temperature sensitivity of PIN diode chip parameters responsible for the absorption and removal of heat in high average power switches is discussed. The absorption of heat is controlled by the temperature sensitive forward and reverse bias resistances. The removal of heat is dominated by the variation in thermal impedance as a function of temperature. These variables combine in high power PIN diode switches to produce a phenomenon commonly called thermal runaway. Using an empirical relationship derived from the data presented, a nonlinear model for temperature rise as a function of input power is generated. Reasonable correspondence between the empirical model and measured junction temperature was observed using a 1 KW CW SPDT waveguide switch. Part of this work was performed as part of an Air Force contract.

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