

ON THE APPLICATION OF THE TLM MODELLING FOR SIMULATING THERMAL FLOW IN A PUNCH-THROUGH DIODE

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ABSTRACT

The temperature distribution in semi-conductor power devices operating under pulse operation is an important factor for the device and integrated circuit designer. This paper introduces the application of the transmission line matrix (TLM) method for simulating thermal flow in a punch-through diode. The TLM updating equation is investigated and tested in order to get better accuracy. The effects of pulse width, power, and device dimensions on the rise of temperature within the device have been simulated using TLM. Furthermore, an approximation is done on how the physical problem fits the corresponding TLM model. Finally, the simulator implementation is tested using a 2D example on a heat source in a punch-through diode with cylindrical structure.

KEY WORDS: TLM, Modelling, Heat flow, Punch through diode, Maxwell's equations