

Modeling of nonstationary heating of semiconductor structures under HEMP actions with short pulse duration

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Abstract: This paper intends to explain the thermal model of the temperature distribution in semiconductor structures that are being subjected to high-power electromagnetic pulses. Taking into account the dependence of the semiconductor thermal conductivity on the temperature, a partial solution of the thermal flow equation with the second-type boundary conditions was used. Also, the role of the thermal conductivity components is evidently demonstrated as they affect the heat transfer. The calculations clearly indicate that the behavior of the thermal transient depends on the pulse duration. This difference in behavior allows forecasting of the thermal damages in the semiconductor devices.

Subject Keywords: HEMP, semiconductor, circuit, temperature, Thermal conductivity.

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