

## Joule-Lenz Law with Hyperbolic Heat Conduction Equation for an Amorphous Chalcogenide Semiconductor

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**Abstract.** A heat conduction equation for a chalcogenide glassy semiconductor (CGS) is derived with an account for non-linear temperature dependence of the heat capacity. A possible effect of the dependence on current behavior in CGS is considered. An equation for hypothetical temperature oscillations in CGS is obtained for the case when the system is considered as a medium governed by the Cattaneo-Vernotte-Lykov law for heat flux, which allowed for using hyperbolic heat conduction equation. Formulae for the time dependence of entropy and heat generation in the current filament in CGS are derived. It is shown that current oscillations caused by non-linear temperature dependence of the heat capacity are only possible under extremely strong heat removal with relaxation time exceeding the realistic values by at least three orders of magnitude.

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