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Research on two-phase heat removal devices for power electronics

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Abstract — The development of modern power electronics (electronic modules based on metal–oxide semiconductor field-effect transistors, and insulated gate bipolar transistors, inverter modules, thyristor converters, transmitting modules of active phased array antennas, central processing units of computer equipment, etc.) is accompanied by a constant increase in the level of integration and the corresponding steady increase in the generated heat fluxes per unit volume of electronic components. It is promising to use heat pipes and thermosyphons as heat removal devices, since their equivalent thermal conductivity exceeds that of metals by orders of magnitude. The paper presents the results of an experimental study on the thermal resistance of a vertical aluminum heat pipe with isobutane, an environmental-friendly working fluid, in the heat removal conditions corresponding to the free convection of air. It is shown that the thermal resistance of the aluminum gravitational heat pipe with a threaded capillary structure is

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