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Experimental investigation of loop heat pipe with a large squared evaporator for cooling electronics

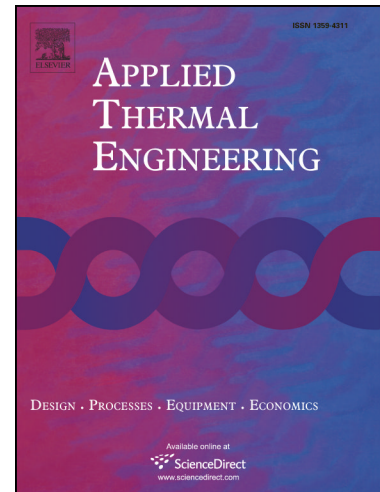
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## Experimental investigation of loop heat pipe with a large squared evaporator for cooling electronics

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**Abstract:** The flat evaporator loop heat pipes (FELHP) possess many advantages because of the presence of the flat thermo-contact surface, but at the same time, one of the noteworthy drawbacks is unable to withstand high vapor pressure inside the evaporator when the evaporator active zone becomes very large, which hinder them further development. In this paper, a new evaporator structure with a strengthened ribbed plate on the side of the heating surface was proposed to overcome deformative nature of the flat surface. This evaporator structure with an active zone of 74mm×74mm was applied in the field of the LHPs for positive pressure system, and can be used for cooling the chips with large thermal footprint. The copper was chosen as the evaporator material, and R245fa as the working fluid. In this investigation, operating performances of the LHP with a strengthened ribbed plate, including startup behavior, transient response to variable heat load, and thermal characteristics, were experimentally tested and theoretically analyzed when the heat sink temperature was controlled at 25°C and 35°C in the horizontal orientation. The experimental results demonstrated that the new system operated normally and achieved good temperature uniformity at the given heat load range from 10W to 160W with the heating block

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