NUMERICAL INVESTIGATION OF HEAT SPREADER & ULTRA-THIN VAPOR CHAMBER FOR HEAT SPREADING AND REMOVAL IN HIGH POWER DENSITY ELECTRONIC DEVICES

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ABSTRACT

A numerical analysis carried out on a flat-plate type heat pipe called "vapor chamber". The vapor chamber is an advanced cooling heat spreader for high-performance Integrated Circuit microchips, such as new generation CPUs in notebook computers and workstations. Computational modelling of vapor chamber is carried out using CFD tool ANSYS. The thickness of vapor chamber was kept 1.35 mm which was considered to be ultra-thin vapor chamber. Computational fluid dynamics is employed to develop a conduction model of the vapor chamber and there by analyze various components involved for temperature rise when subjected to Power. Then new model of vapour chamber with graphite foam embedded in vapor space and sintered copper as wick material consider. This model is compared with the both simple copper heat spreader and vapor chamber without graphite foam to judge the effectiveness and merits of vapor Chamber technology. Here effect of isotropic and orthotropic approach is also study and compare for better approach selection. vapor chamber widely used in application like IC cooling technology of notebook computer, hard disk drive cooling of PCs, 3D projectors, Telecom equipment application.