



**COMPUTATIONAL FLUID DYNAMIC ANALYSIS ON MINICHANNEL
ELECTRONIC COOLING DEVICE**

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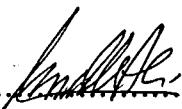
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“ I declared that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree “

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ABSTRACT

Miniaturization process of electronic components occurs at very rapid rate and has resulted in increasing power generated with decreasing of the surface area. Today technologies of electronic component have generated very high heat fluxes resulting in large temperature rises. For the electronic component to functioning effectively, a good heat exchanger is required. Heat flux that produced by electronic component cooled by air has almost reach its limit about 100 W/cm^2 . Minichannel heat pipe is an effective and efficient alternative method to be used for high heat flux removal. Minichannel heat pipe is small device of very high thermal conductance and that are used to remove high heat flux from other device. In this project, the effect of the serpentine element, channel pattern, channel dimension and channel inlet velocity on the heat transfer rate are presented. Computational fluid dynamic (CFD) method is used for the analysis of the minichannel heat pipe. CFD module/software used for the project is STAR CCM. Assumptions that are made are the flow is three dimensional, incompressible, laminar flow and steady state condition. The rate of heat transfer for all the model was analyzed using the CFD software. The results show that reduce in channel hydraulic diameter, using rectangular cross-sectional area flow passage and increase inlet velocity will result in higher heat transfer of the minichannel.

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