Microchannel Heat Sink: Fabrication and Liquid Cooling System for High Heat Flux Integrated Circuits

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Microchannel Heat Sink; Fabrication and Liquid Cooling System for High Heat Flux Integrated Circuits is a book written by Shahi Riaz (Laird Technologies) and Dr. Dereje Agonafer (University of Texas at Arlington). The book illustrates the analytical, computational fluid dynamics (CFD) and experimental studies of microchannel heat sink (MHS). It describes the fabrication process of MHS on a silicon wafer, and demonstrates a liquid closed-loop system using MHS, pump, filter and heat exchanger. The 120-page book is available now on Amazon.
Microchannel Heat Sink: Fabrication and Liquid Cooling System for High Heat Flux Integrated Circuits

In this thesis, analytical, CFD and some experimental studies of microchannel heat sink (MHS) were performed. This thesis develops a closed-loop single-phase microchannel cooling system using de-ionized water as a coolant fluid for high heat flux integrated circuits. The design, fabrication and closed-loop system using MHS, pump, filter and heat exchanger is summarized. A Ni-Cr wire heat source is fabricated as a heater. A copper heat exchanger is designed to dissipate heat from the heated fluid coming out of the MHS. Some experiments were performed in the fabrication of microchannels on a (110) wafer. After the fabrication, MHS was bonded with BOROFLOAT Glass. The parameters in this study include variable flow rates of coolant and power densities of heat source with uniform wall thickness and channel width of the microchannel heat sink.

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