System-Level Analysis of Microchannel Cooling Systems

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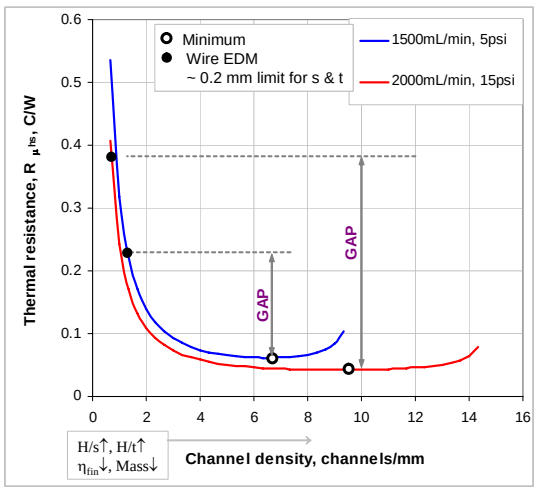
Objective

Develop a design tool for rapid system-level design and analysis which allows for optimization of microchannel heat sinks for available commercial mini-pump flow space & volume specifications

Impact

Successful integration of microchannels into commercially viable microsystems will likely be determined by system-level factors such as energy efficiency, weight, volume, manufacturability, and ultimately, cost.

Approach



Identification of process constraints
Minimum feature size
Maximum aspect ratio

Microchannel optimization for application
ideal design - no constraints

Design for manufacturability
practical design – optimize with process constraints

Candidate processes ranking
based on thermal and process capability
Based on cost effectiveness

Manufacturability GAP
ideal - practical difference

For more information:

M. Iyengar and S. V. Garimella, "Design and Optimization of Microchannel Cooling Systems," Procs. ITHERM06, San Diego, California, May 30 - June 2, 2006.

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