

Accepted Manuscript

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PII: S1359-4311(18)30678-1

DOI: <https://doi.org/10.1016/j.applthermaleng.2018.03.065>

Reference: ATE 11953

To appear in: *Applied Thermal Engineering*

Received Date: 1 February 2018

Revised Date: 15 March 2018

Accepted Date: 20 March 2018

Please cite this article as: L. Gong, Y. Li, Z. Bai, M. Xu, Thermal Performance of Micro-channel Heat Sink with Metallic Porous/Solid Compound Fin Design, *Applied Thermal Engineering* (2018), doi: <https://doi.org/10.1016/j.applthermaleng.2018.03.065>

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**Thermal Performance of Micro-channel Heat Sink with Metallic Porous/Solid
Compound Fin Design**

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Abstract

Rapid development of large-scale integrations of electronic circuits resulted in increasing requirements for chip power dissipation. In this study, a concept of micro-channel heat sink with the metallic porous/solid compound fin design was developed and numerically investigated. Computational investigations were carried out to analyze the effects of metallic porous fins on the hydraulic and thermal performances, and to determine the optimal dimensionless porous fin thickness for designing the porous/solid compound fins. The traditional solid fin heat sink is selected as the comparison model. The results indicate that the viscous shear stress is reduced at the fluid and porous fin interfaces, which leads to decreased pressure drop through the porous fin heat sink. Whereas, the heat transfer performance deteriorates when the solid fins are completely replaced by the porous fins. The novel design of

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