

Analysis of microchannel heat exchangers using FEM

Abstract

A finite element method is applied to evaluate the performance of microchannel heat exchangers that are used in electronic packaging. The present approach is validated against the CFD data available in the literature. A comparison of the predicted results with other available results obtained from different concepts shows that the present method is able to predict the surface temperature, the fluid temperature and thus the total thermal resistance of the microchannel heat sink satisfactorily. The present methodology has an added advantage in that non-uniform surface heat flux distribution over the package base can also be analysed easily. The method used in the present analysis is an alternative to massive CFD calculations.

Keywords — Finite element method, heat sinks, performance measurement, flux, heat exchangers