Numerical Study of Laminar Forced Convection Cooling of Circuit Board Mounted Heat Source Array

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Abstract

This paper deals with the numerical study of optimal distribution of rectangular heat sources populated on a substrate board for electronic cooling. The simulations are performed for laminar forced convection conjugate heat transfer with vertical orientation of substrate board. The laminar forced convection - conjugate heat transfer simulations are carried out using COMSOL Multiphysics® with heat fluxes of 1500, 2000 and 2500 W/m2 and at different air velocities and ambient temperatures. The simulations are carried out for various positions of heat sources so as to determine the optimal configuration. Out of the possible 168 million configurations, random sampling is performed to select three hundred possible random configurations to decide the optimal configuration.

Reference

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sources placed near the bottom on a pcb". Proc. World Acad. Sci. Eng. Technol, 6,pp. 266–273, (2012).
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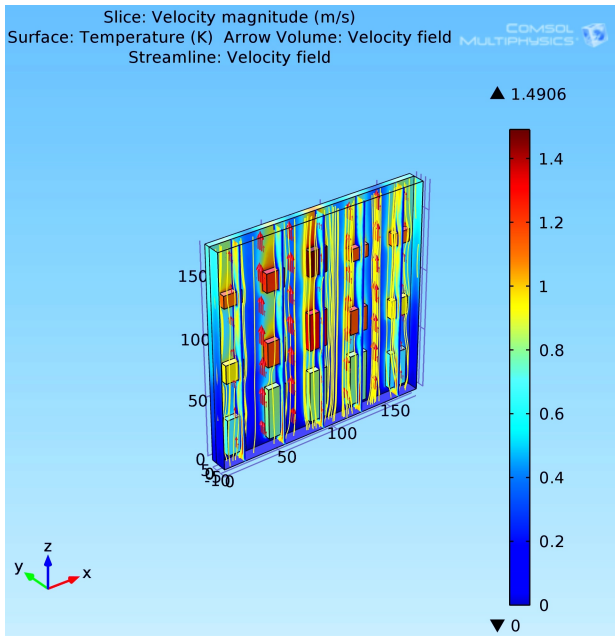
Figures used in the abstract
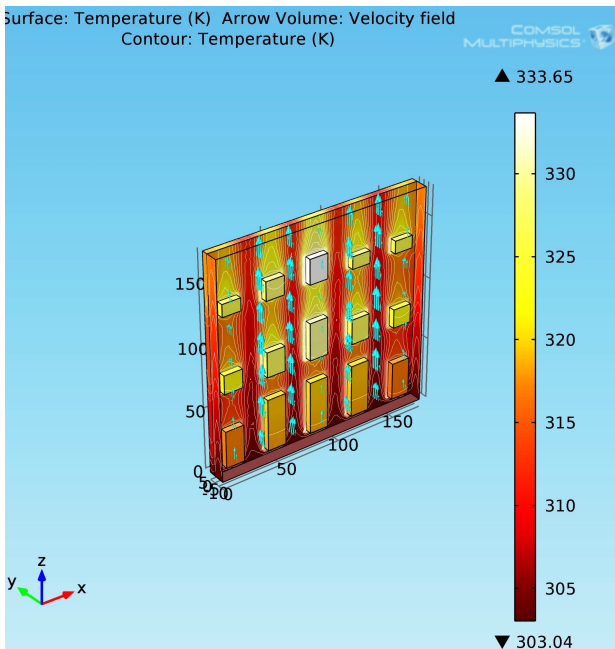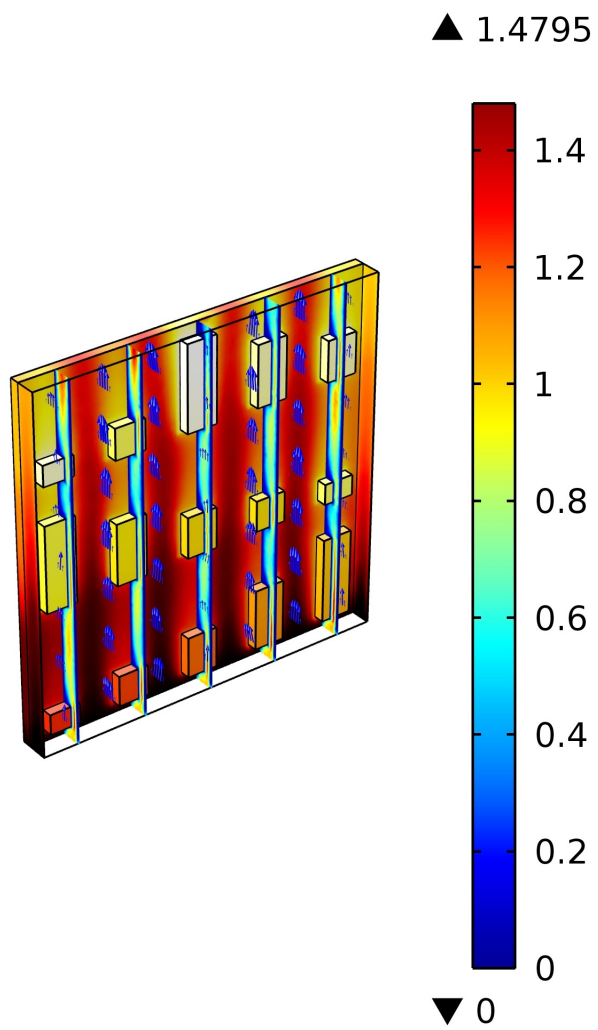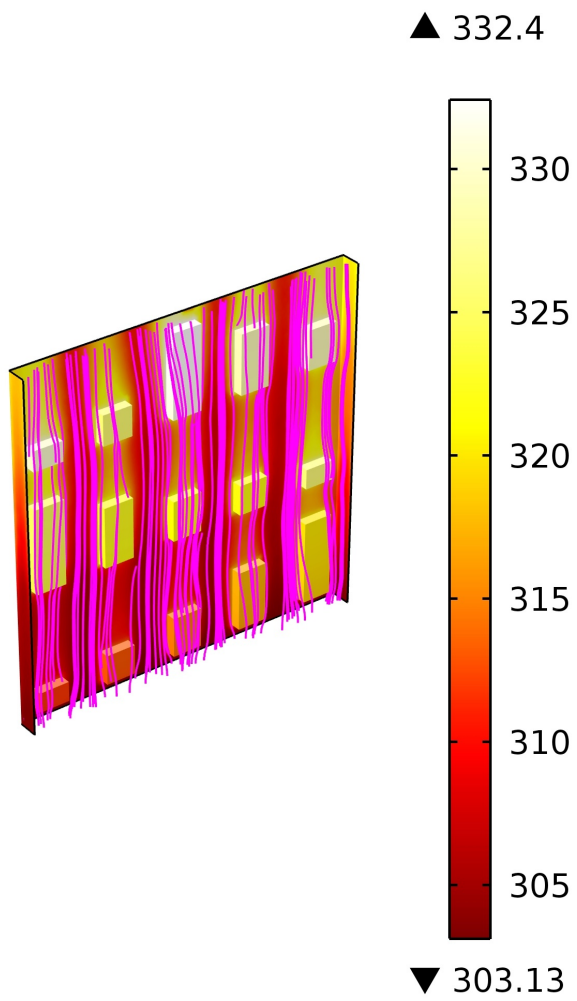

Figure 1: Velocity plot 1.

Figure 2: Temperature plot 1.

Figure 3: Velocity plot 2.

Figure 4: Temperature plot 2.