

Paul Nistler
AME40463
Trade Studies
2/12/08

The goal of this study is to determine the performance effects of varying the heat sink geometry and to ultimately determine the feasibility of not utilizing forced convection. The current heat sink design diffuses heat via natural convection and this study aims at determining the lowest temperature possible without resorting to using forced convection.

The first step towards analyzing the heat sink will be approximating possible values for the convection coefficient. This study will then extensively use Pro/E's Mechanica module for performing finite element heat transfer analysis based upon the approximated convection coefficient values. Time permitting (but unlikely) one proposed solution will be also analyzed with Fluent to determine the accuracy of the solution and to calibrate the Pro/E finite element model.

This study will chart the temperature trends associated with varying the fin thickness, fin spacing, and base height. The lowest temperature achievable by the individual designs will be plotted for multiple values of the convection coefficient.

The charts will be used to optimize the geometry of the heat sink. If the temperature is deemed to high regardless of the geometry used then a new heat sink will be designed based upon a forced convection model.

This analysis will be completed by 2/21/2008.