

Optimization of fins used in electronic packaging

Abstract

Purpose-To find the optimal geometries of rectangular and cylindrical fins for maximum heat dissipation. Design/methodology/approach- The objective function for finding the optimized profiles of fins are solved by using the genetic algorithms (GAs). A range of fin shapes are investigated and the optimum solutions for various profile area are obtained. Findings - Provide information to thermal engineers to what extent any particular extended surface or fin arrangements could improve heat dissipation from a surface to the surrounding fluid. Smaller fin volume in fin design is preferable as the heat is dissipated more effectively. Research limitations/implications - Limited to cases where the correlations for heat transfer coefficients are valid. Practical implications - A very useful finding for practising thermal engineer especially in the area of electronic packaging as the parameters for the fin design can easily be found for any chosen profile area. Originality/value - A new method of using GA for optimization of fins is used here. The value of this paper lies in providing data for selecting suitable fins for thermal management in electronic systems.

Keywords — Programming and algorithm theory, optimization techniques, electronics industry, heat transfer