Advanced Materials Research, vol. 795, 2013, pages 603-610

Numerical investigation of heat transfer of twelve Plastic LeadedChip Carrier (PLCC) by using computational fluid dynamic, FLUENT™ software

Abstract

Plastic Leaded Chip Carrier (PLCC) package has been emerged a promising option to tackle the thermal management issue of micro-electronic devices. In the present study, three dimensional numerical analysis of heat and fluid flow through PLCC packages oriented in-line and mounted horizontally on a printed circuit board, is carried out using a commercial CFD code, FLUENT™. The simulation is performed for 12 PLCC under different inlet velocities and chip powers. The contours of average junction temperatures are obtained for each package under different conditions. It is observed that the junction temperature of the packages decreases with increase in inlet velocity and increases with chip power. Moreover, the increase in package density significantly contributed to rise in temperature of chips. Thus the present simulation demonstrates that the chip density (the number of packages mounted on a given area), chip power and the coolant inlet velocity are strongly interconnected; hence their appropriate choice would be crucial.

Keywords

Microprocessors; Plastic Leaded Chip Carrier; Thermal Management