scSTREAM

Cradle
MSC Software Company

Heat Release Design for Printed Circuit Board

Case Study for OKI Printed Circuits Co., Ltd.

The number of prototypes has been reduced successfully using scSTREAM

Model

Dimension	: 150×150×1.6t(mm)
Num. of Layers	: FR-4 2 Layers
Circuits	: Altera FPGA BGA package Peripheral circuit
Operation	: 66MHz Shift Register

2 Layers(Before)

10 Layers (After)

* Both cases are identical in circuit schematic, parts placement, and total thickness of PCB.

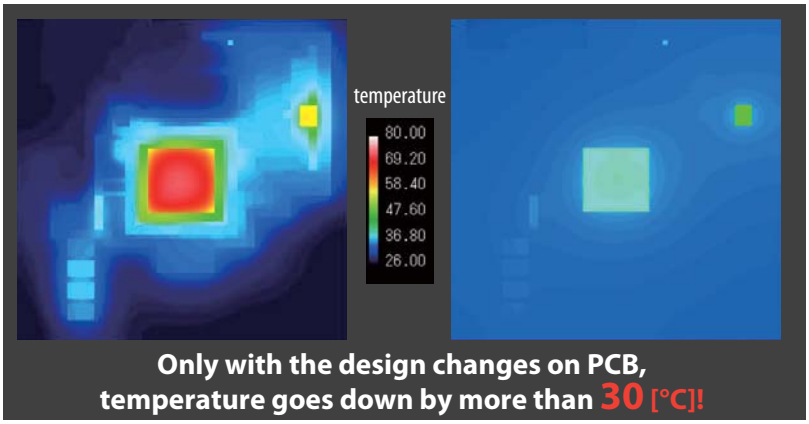
If the heat release could be mainly through natural convectioninstead of forced convection, it is possible to;

1) Reduce the space for cooling fan, flow path, etc.
2) Reduce noise level and improve the acoustic environment
3) Improve quality and reliability
4) Reduce the cost

Design Changes

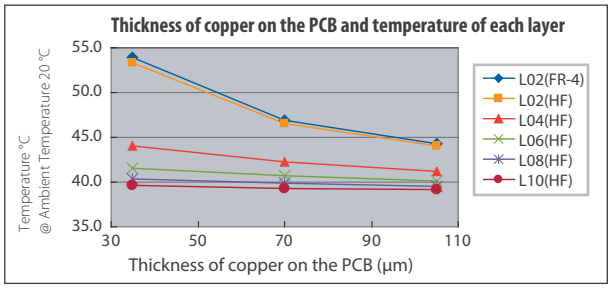
- For increasing the thermal conductivity of PCB
  The number of layers; 2 layers -->10 layers
  Halogen-free insulation
  Increase the residual copper area ratio
- For improving thermal conductivity of Board in PKG
  Ground connection of Chip NC pins
- For improving thermal heat transfer in PCB
  Additional aluminum fin at the back and at the edge of PCB
  Additional pin-fin at the dead space of PCB

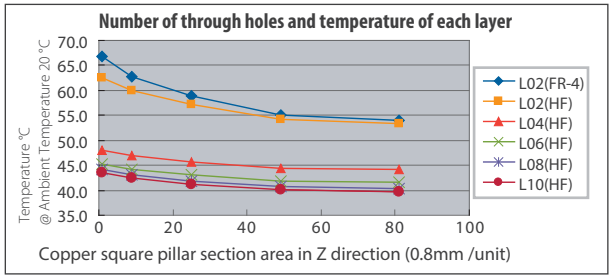
Analysis Results

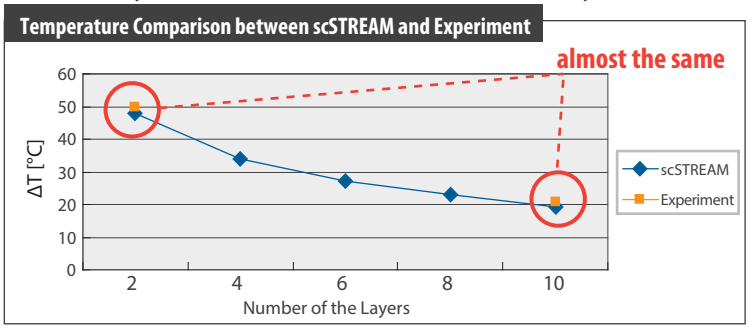


Only with the design changes on PCB, temperature goes down by more than 30 [°C]!

2 Layers(Before) 10 Layers (After)







Temperature for various different number of layers are predicted. Adequate design can be provided to accommodate each customer's need.

Customer Comments

This is the era that even manufacturers of printed circuit board use CFD software in order to improve their designs and make a better proposal.

For proposing the best solution, Software Cradle's scSTREAM is a dependable tool on thermal design and assessment.