

Changing Printed Board Layout to Lower Device Temperature: Prediction and Measurements

Using PICLS to perform thermal analyses and predict temperatures of chip resistors

Thermal Analyses of Printed Boards

Analysis targets

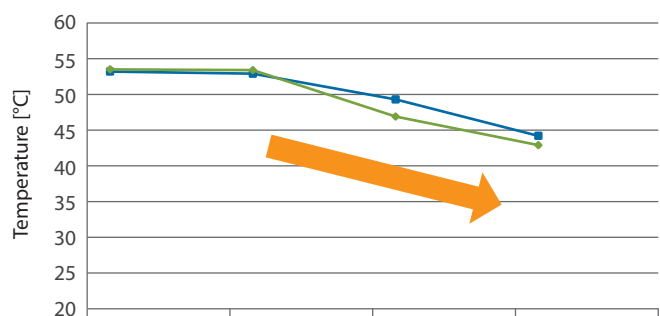
	Model 1	Model 2	Model 3	Model 4
Subject of comparison: R45 chip resistor				
	Original	Half the resistors allocated on the back	Copper foils and vias added	Solid layer added to the inner layer

Modeling

Actual printed board	PICLS
<p>Insulator: 42[mm²] Wiring: 14[mm²]</p>	<p>Uniform thermal properties assigned to models based on proportion of wirings to insulator. $14 \div 42 = 0.33$ Wiring pattern coverage ratio of 33%</p> <p>Time needed to generate model: 5 minutes Time needed for calculation: Seconds</p>

Analysis results

	Model 1	Model 2	Model 3	Model 4
Measured				
PICLS				



Notes

The R45 chip resistor temperatures are shown in the graph for the four models. Both measurement and analysis results show decreasing temperatures proceeding from Model 1 to 4. PICLS can be used to identify temperature trends for different model layouts and features.

PICLS can be used during conceptual design, to quickly evaluate the effects of electronic component allocation and thermal vias on printed circuit board device temperatures.