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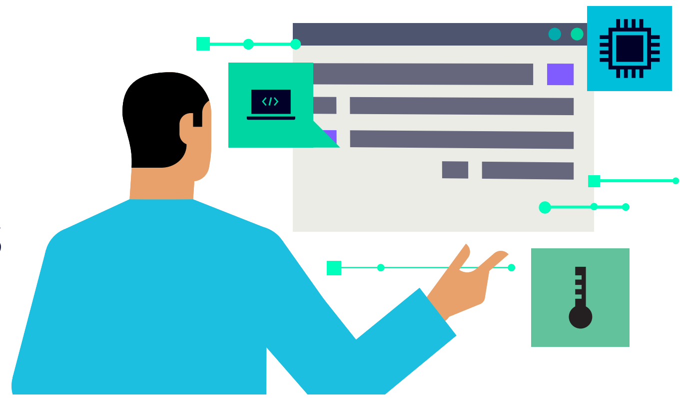
10 tips for predicting component temperatures

Quick-reference checklist



Early design phase:

1. Model key components explicitly:

- ☐ Directly model critical components with high power or thermal sensitivity.
- ☐ Treat smaller, less critical components as background heat sources.

2. Use good power estimates:

- ☐ Continuously update and verify power consumption data for all components.
- ☐ Improve the fidelity of your thermal analysis.

3. Use the right package thermal model:

- ☐ Select appropriate thermal models (2-Resistor, DELPHI, Detailed, BCI-ROMs) based on design stage.
- ☐ Refine models as more information becomes available.

Mid-design phase

4. Use compact thermal models from early design:

- ☐ Leverage compact thermal models from the outset of your design.
- ☐ Accelerate your design cycle with 2-Resistor, Ladder, Delphi, and BCI-ROM models.

5. Create your own models as required:

- ☐ Create your own thermal models if vendor data is insufficient.
- ☐ Utilize tools supporting standard file formats for thermal simulation data exchange.

6. Use power maps:

- ☐ Employ power maps to capture and analyze temperature variations across the die.
- ☐ Use monitor points to track the hottest regions.

Late design phase

7. Validate detailed models with experiments:

- ☐ Confirm the accuracy of your thermal models by calibrating them against experimental measurements.
- ☐ Ensure your simulations reflect real-world performance.

8. Design custom heatsink solutions:

- ☐ Engineer custom heatsink solutions to maximize thermal performance and minimize pressure drop.
- ☐ Consider the contact area between the heatsink and package body.

9. Accurately capture thermal interface material resistance:

- ☐ Accurately measure and integrate the thermal resistance of TIMs into your simulations.
- ☐ Recognize TIM resistance as a significant contributor to junction temperature rise.

Validation & documentation

10. Provide accurate temperatures for mechanical stress prediction:

- ☐ Furnish precise temperature profiles and thermal model geometries like BCI-ROM for finite-element analysis.
- ☐ Predict thermally-induced stresses for improved IC packaging reliability.

Get the full 10 tips for predicting component temperatures white paper here.

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