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FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS
DIVISION ENGINEERING OF ADAPTIVE SYSTEMS EAS

Photo: Jürgen Lösel

HEATVISION – THERMAL VIEW OF YOUR DESIGN

Growing integration density and complexity of integrated circuits increasingly exacerbate the difficulty of predicting electro-thermal interactions in design. Nevertheless, the designer must recognize resulting violations of specifications in time.

This is the only way to avoid quality and performance losses that significantly shorten the lifespan of a circuit. Although existing simulation tools are aimed at considering weaknesses and risks as early as during the design phase, they frequently fail to adequately meet these demands.

For this reason the HeatVision software tool developed by Fraunhofer IIS/EAS offers complete control of your design's thermal conditions.

Your Benefits

- Faster estimate of temperature propagation
- Avoidance of transient errors, such as temperature mismatch or delay
- Assurance of electro-thermal design conditions
- Avoidance of re- and overdesign
- Optimization of thermal behavior
- Graphic visualization of temperature distribution in 2D/3D
- Intuitive operation

HeatVision

HeatVision provides you with the option for quickly analyzing your mixed signal design. Based on the design layout, a steady state analysis accounts for the packaging as per JEDEC standard and provides insight into typical chip temperatures. Dynamic analysis

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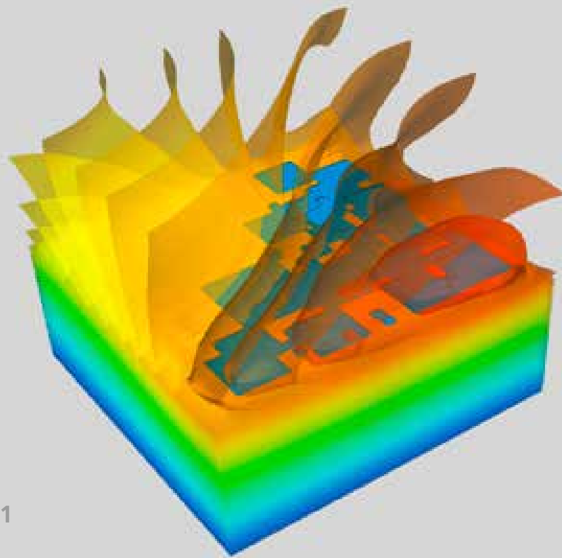

additionally shows transient hot spots and visualizes heat propagation on short time scales.

The results of thermal simulation are automatically annotated on the devices of the design. It also provides the option of extracting an equivalent thermal RC network. Thus even electro-thermal interactions are taken into account directly in a circuit simulation.

Cutting-edge algorithms from model order reduction ensure that large designs consisting of many thousand devices can be simulated without significant time delays. Complete integration into your design environment allows HeatVision to dovetail with your existing flow. In addition, the standalone mode provides an opportunity to check design rules and generate automatic reports. As a result, HeatVision is your ideal partner in the area of thermal sign-off solutions.

Features

- Steady state (operating point) as well as dynamic temperature analysis
- Integration into existing design environments
- Extraction of thermal RC networks
- Back-annotation of temperatures to electrical data points
- Thermal sign-off mode
- Optimization of block-level placement in SoCs or 3D designs
- Use and creation of package models in compliance with JEDEC
- IP protection via encryption

Service and Support

In conjunction with the software tool, we offer the following services to support your design process:

- **Consultation in the field of thermal modeling:**
  We are happy to support you in a thermal analysis of your design. From tool support to training of your employees through to problem analysis and development of methods, we offer everything you need to optimize your designs.
- **Extraction of thermal RC networks:**
  We perform a thermal extraction of your design. You receive a complete RC netlist for further use within your design process and avoid purchasing additional software for your company.
- **Package Modeling:**
  For the purpose of a comprehensive review of your design, we also create thermal replacement models for packaging you can then use in HeatVision or comparable software tools.

Benefit from our experiences and improve reliability and quality of your design.

1 *Analysis of heat distribution in 3D chip stack*

Analysis of temperature development over time

Extraction of thermal netlists: Progression of performance and temperature in a transient electro-thermal simulation