



1 Thermal characterization of power modules mounted on a water-glycol cooled heat sink

THERMAL CHARACTERIZATION RESISTANCE R_{TH} AND IMPEDANCE Z_{TH} MEASUREMENTS

Fields of research and service

- Thermal characterization of new packaging concepts, materials, devices and technologies for power electronic devices
- Static and dynamic thermal measurements (R_{th} , Z_{th})
- Heat sinks for single and multi devices (up to 20 samples per heat sink)
- Design and assembly of power modules for testing silver sintering, soldering, wire bonding)
- FEM-Simulation of thermal behavior from semiconductor to coolant
- Workshops for test result interpretation

Measurement system

- Temperature acquisition via device under test (indirect measurement principle)
- Direct temperature measurement by thermography, PT100 and thermo-couples
- Heating current from 0.1 A up to 2000 A
- Heating voltage up to 35 V
- Heating and cooling power up to 20 kW
- Coolant temperatures from - 60 up to + 350 °C possible
- Coolant flow up to 25 l/min
- Maximum pressure: 8 bar

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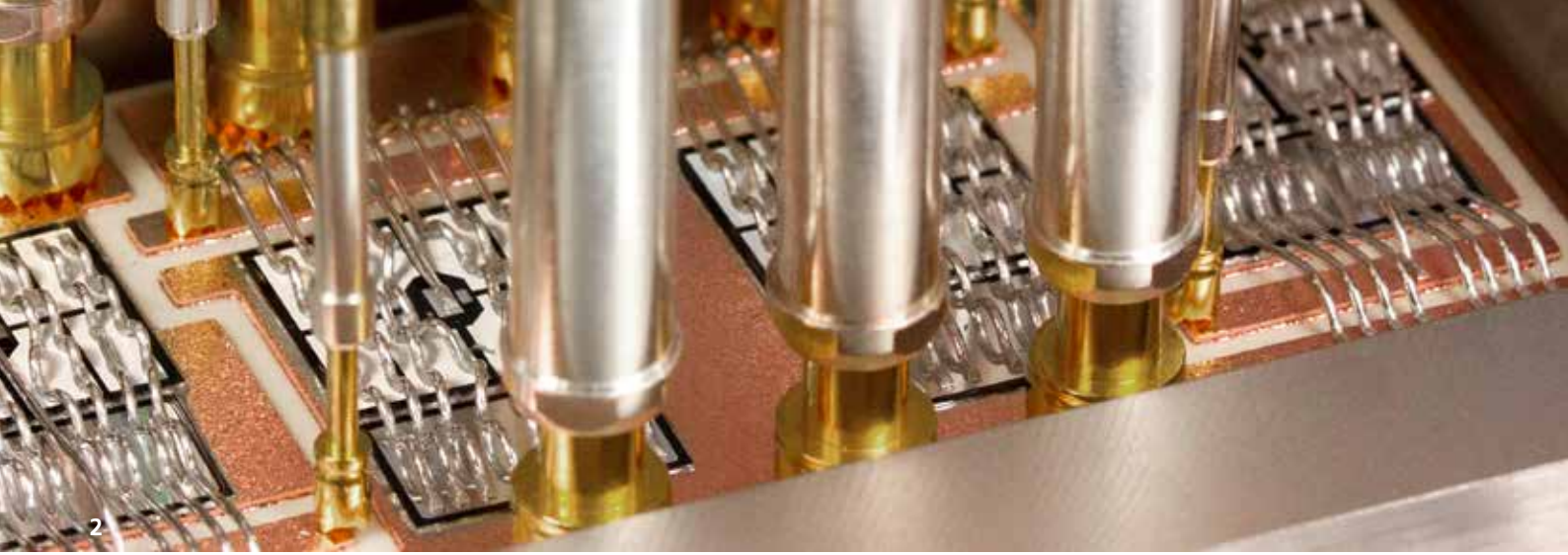
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Devices for testing

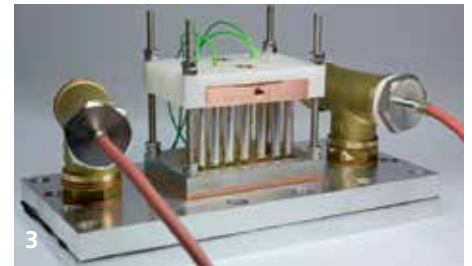
- IGBTs, MOSFETs, JFETs, thyristors
- Resistors
- Schottky-diodes, pn-diodes
- Si, SiC and GaN devices

Packaging for testing

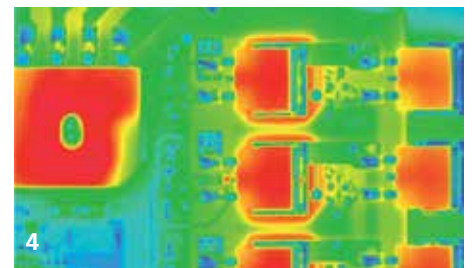
- Power modules with or without baseplate
- PCB-Boards with discretes (To-devices, D²Paks, etc.)
- Direct or indirect water cooled systems
- Liquid and air cooled devices
- With or without housing or molding
- In-house test layouts and samples

Additional services

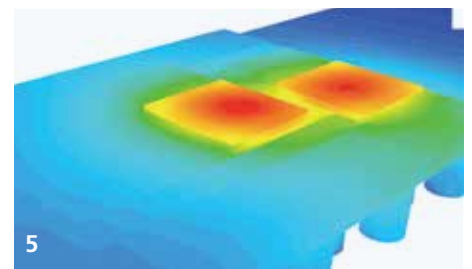
- Foster/Cauer network calculation
- Thermal management consulting
- FEM-simulations
- Statistical analysis



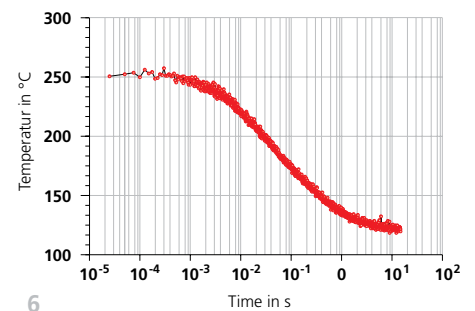
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2 Power module during thermal impedance measurement

3 Device under test

4 Thermography

5 FEM Simulation

6 Example of thermal impedance measurement