



SiC Systems

For Automotive & Industrial Use

*SiC-Inverter © Anja Grabinger /
Fraunhofer IISB*

Evaluating novel SiC Devices in highly efficient Power Electronic Systems

At Fraunhofer IISB, we work on the evaluation of novel SiC devices in highly efficient power electronic systems and on benchmarking them in automotive and industrial solutions.

Advantages & benefits

- Application-oriented research
- Highly qualified teams of engineers and technicians as well as excellent technical equipment
- Comprehensive system concepts compared to a purely academic approach, based on our expertise in SiC materials, devices, modules, and systems
- All-embracing design optimization process during the development flow
- Ready to move off the beaten tracks whenever necessary
- Development of first-class customer-specific prototypes in B-sample status

Features

- Studies for power electronic systems
- Calculation and simulation
- Hardware and software development
- Prototyping of power electronic systems
- Characterization, measurements, and tests

Concept study

Evaluation of novel SiC devices, costs, converter topologies, installation space, and system design.

Design

Power electronic circuits

- Optimization of operating points of active and passive devices
- Switching characterization of SiC devices up to 2000 V, 100 A, 250 °C
- Layout optimization

Control unit

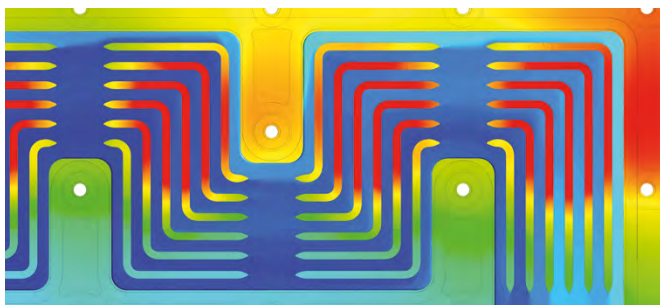
- Centralized control with FPGA, microcontrollers
- Control design and embedded software
- Documentation systems (Doxygen, Tortoise GIT)

Module assembly

- Minimization of parasitic inductances and capacitances for RF power electronics
- Custom DCBs according to requirements for novel devices

Mechanics

- CAD construction and simulation
- Thermal optimized design of housing



Thermal simulation of SiC MOSFETs on DCB with coolant and encasement. © Fraunhofer IISB

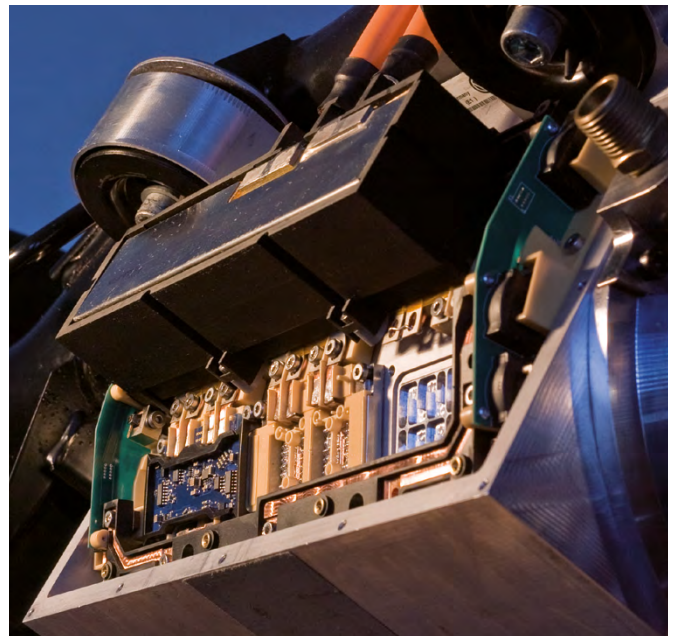
Verification

EMI and EMC

- Pre-compliance measurements for devices under tests up to mid-size cars
- Electrical supply up to 1000 V and 500 A as well as coolant
- Longtime experience and participation in national standardization committees

Test benches

- On lab bench up to 1000 V, 500 A with water cooling
- Test bench for the overall system (e.g., car, bidirectional energy management units)



Single-wheel axle drive with attached double inverter.
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