



1 *Electric vehicle test platform for novel power electronic system approaches.*

Image: Fraunhofer IISB

SiC SYSTEMS

OPTIMIZED FOR AUTOMOTIVE AND INDUSTRIAL USE

Our objectives

- Evaluation of novel SiC devices in highly efficient power electronic systems
- Benchmark automotive and industrial solutions

Features

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

Advantages

- Application-oriented research institute
- Highly qualified teams of engineers and technicians and excellent technical equipment
- Comprehensive system concepts compared to pure academic approach of competitors by 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

Benefits

- We are ready to deliver first-class customer-specific prototypes in B-sample status.

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FRAUNHOFER IISB OFFERS R&D SERVICES ON SiC FROM MATERIALS DEVELOPMENT AND PROTOTYPE DEVICES TO MODULE ASSEMBLY AND MECHATRONIC SYSTEMS.

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

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 overall system (e.g., car, bidirectional energy management units)

2 *Single-wheel axle drive with attached double inverter.*

Image: Fraunhofer IISB

3 *Thermal simulation of SiC MOSFETs on DCB with coolant and encasement.*

Image: Fraunhofer IISB

