



Power Electronics for Energy Efficiency

The Fraunhofer Institute for Integrated Systems and Device Technology IISB performs applied R&D on power electronic systems for all fields of application, like industry, household, and consumer appliances, electric mobility, energy supply, and power grid technology. The ambition of the institute is to make power electronics more energy and cost efficient, reliable, robust, and compact. The strength of IISB is based on its competencies in power electronics and mechatronic system integration in conjunction with its wide experience in materials research and semiconductor technology for microelectronics. This includes smart power ASIC design, innovative circuit topologies and control algorithms, embedded soft-

ware, system simulation, thermal management, energy management, new materials, and interconnect technologies, active and passive devices, EMC, reliability, and failure analysis.

With its power converters, IISB regularly sets international benchmarks, e.g., in terms of efficiency or power density. The institute closely collaborates with its industrial partners, e.g., from automotive, energy system, or semiconductor industry.

Power electronic systems for hybrid and electric vehicles

For already ten years, IISB has been working on power electronics for electric mobility. In its laboratories in Erlangen and Nuremberg, innovative components and systems for the electric powertrain, for

electrical energy storages and charging infrastructure are developed. This also comprises complete electric powertrain modeling and concept engineering. IISB has an extensive test center for electric cars. It is Competence Center Automotive in the ECPE and active member in the Forum Elektromobilität e.V., the Bavarian Power Electronics Cluster, and the National Electric Mobility Platform. Together with the Federal Ministry of Education and Research, IISB is the initiator and organizer of the DRIVE-E student promotion program in electric mobility.

Power electronics for smart grids

Power electronics is getting increasingly important for future electric energy supply. IISB develops essential components of smart and high-performance power grids, e.g., high power switches for HVDC. The institute works on new micro grid concepts based on local DC networks and operates an application platform for energy efficient power supply in a home, office, and lab environment.

