

General Information

The University of Applied Sciences in Kempten is located in the south of Germany, close to the Bavarian Alps. The institution was founded in 1977 to establish a regional center for academic education in the Allgäu area. Today, the University of Applied Sciences Kempten has roughly 6000 students, of whom 1000 are enrolled at the department of Electrical Engineering in different Bachelor and Master programs.

Laboratory for Electronics Integration

The Laboratory of Electronics Integration (EI-Lab) was founded in 2015 to promote applied research and education in the field of electronics packaging, micro-integration, and thermal management. Currently, the lab comprises an interdisciplinary team of seven scientists, engineers, and technicians. The team is supported by numerous students, who perform their student or thesis project within the lab. Both, public and industry funded research projects are carried out by the staff and concern the following topics:

1. PCB embedding of power semiconductors: Ongoing research projects focus on embedding of 1200V IGBT and diode chips in printed circuit boards. Reference applications are motor drives with nominal output powers in the range of 5 to 50 kW.



Demonstrator of PCB-based piezoelectric vibration energy harvester

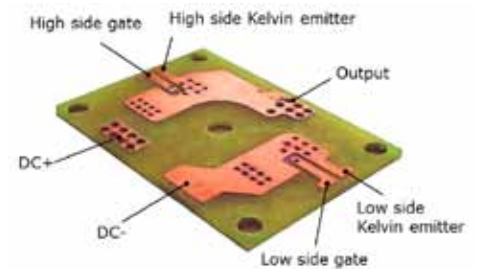
2. Design and fabrication of PCB

based microsystems: Embedding of piezoelectric materials in printed circuit boards opens up the potential for many new, highly integrated, mini-/micro-electromechanical systems. A piezoelectric vibration energy harvester has been designed, fabricated, and tested as first proof-of-concept.

3. Thermal management of (power)

electronic systems: The lab offers its expertise in heat transfer and CFD simulations for development and consulting activities for industry partners.

For these activities, the lab provides an extensive infrastructure. Core of the lab equipment is a prototyping line for printed circuit boards that comprises a circuit board plotter, spray etcher, via plater, and multilayer press. For semiconductor packaging the lab is equipped with a clean bench, sinter press, wire bonder,



1200V/25A PCB embedded IGBT half bridge fabricated at EI-Lab.

vacuum evaporation machine, and equipment for polymer casting. To characterize samples fabricated in the lab several optical microscopes, a scanning electron microscope and a test setup for power semiconductor characterization (static, dynamic, thermal) are available. State-of-the-art software tools for CAD, FEM/CFD, circuit design and analysis are used for designing lab-scale demonstrators.