

Graduate School of Engineering, Osaka University.

Division of Electrical, Electronic and Information Engineering,

FUNAKI Laboratory, Power Device Area.

Brief overview of laboratory's research work.

The energy and power device consists the basis for power electronics system. We are researching and developing of power and energy conversion element to apply system application with bottom up way. The education and research works in the laboratory focus on the fusion of renewable energy and conventional electric power system with maximizing the feature of natural energy resources. To this end, the modeling of elements, which constitute the system, e.g. power conversion device, energy storage device, and power semiconductor switching device, are working out at first. Then, they deploy in the system level modeling. Finally, they are integrated with the heat management system and are used for designing optimized energy system. These research works are aiming at settling the global themes of energy and environment problem.

Research subjects.

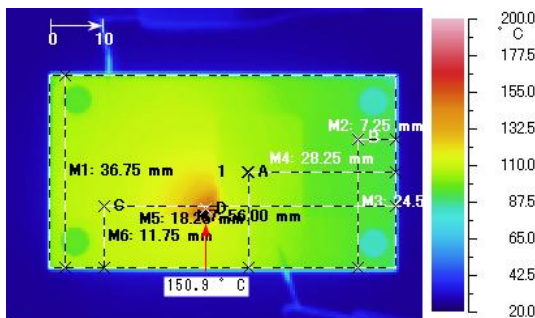
- High efficient and multifunction energy utilization based on the energy conversion with the use of power semiconductor device.
- Packaging for high voltage and high temperature operation of wide band gap semiconductor power device.
- Modeling and control of electric energy storage element, e.g. secondary batteries, EDLCs,.
- Analysis of the switching behavior for semiconductor device in a power conversion circuit, and EMC issues related to the switching phenomenon.
- Analysis and optimization of the dynamics in an electric energy system.
- Interconnection of power conditioner for PV system.
- Energy harvesting system.
- LED lighting system for energy saving and functionality.

Staffs

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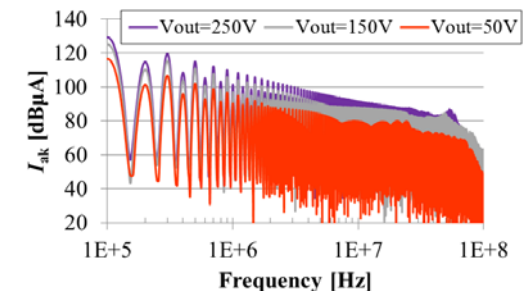
SiC device high temp operation] and thermal response analysis



High temp packaging for SiC power devices.



Modeling of EDLC and battery.



EMC of power electronics