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 based on power electronics. To this end, characterization and modeling of components, which constitute the system, e.g. power semiconductor switching device, passive component, power conversion device, energy storage device, and wiring of circuit. They deploy in the system level modeling. They are integrated with the heat management system and are used for designing optimized energy system.

Research subjects.

- Characterization and modeling wide band gap power semiconductor device and passive component.
- Low parasitic inductance packaging of power module for fast switching operation of wide band gap semiconductor power device.
- Low thermal resistance packaging for high power density power module.
- Reliability assessment of packaging.
- Analysis of the switching behavior for semiconductor device in a power conversion circuit
- EMI noise generation mechanism related to the switching operation of power device.
- Optimum power conversion circuit design for loss, size, weight and EMI noise minimization

Staffs

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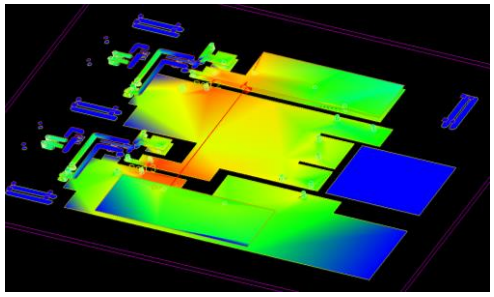
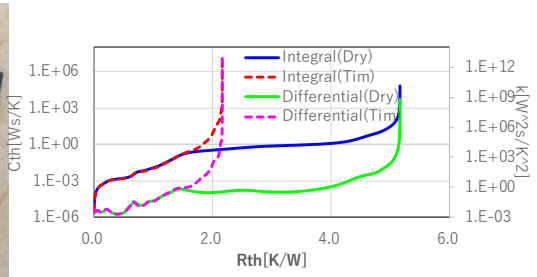
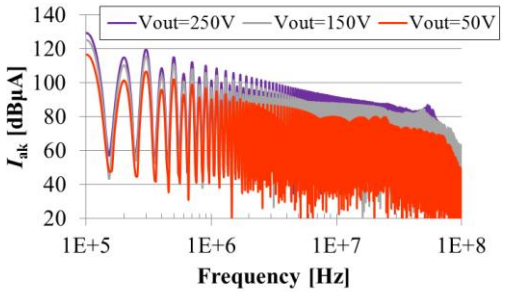


Characterization and modeling power electronics components

Low inductance package for SiC power module



Thermal management of power module



EMC of power electronics