

Master's Thesis

Isolating DC-DC Converter with SiC Devices

Motivation

Bidirectional electronic DC supplies have been based on line side, isolating transformers, a line PWM inverter and an output interleaved buck converter stage. The line side (line frequency transformer) thereby identifies as one of the main contributors on volume and weight (and cost).

Introducing modern semiconductor devices, based on Silicon Carbide, allows to move the isolation barrier from the line side to the DC-link, involving high frequency transformers of lower volume and weight. This thesis focusses on different possible topologies for these bidirectional isolating DC-DC-converters, possible optimum module sizes and potential prototype setup for one of these modules.

Research Questions

- What are the topologies, proposed in literature?
- How can optimum frequencies and module sizes be derived?
- Which advantages can be gained by combining several modules?



Tasks

- Literature survey on isolated bidirectional DC-DC-converters.
- Selection of a small number of possible solutions for further investigation.
- Simulation of circuit behavior for the selected topologies.
- Selection of one topology for prototype setup.
- Verification of the prototype module.

Contact

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