

Design of High-Efficiency EV Charger for High-Voltage and Low-Voltage Battery

Research Focus

- DC-DC Converter for two-stage on-board chargers
- Single-stage on-board chargers
- Integrated magnetic concept
- Soft-switching in DAB converter

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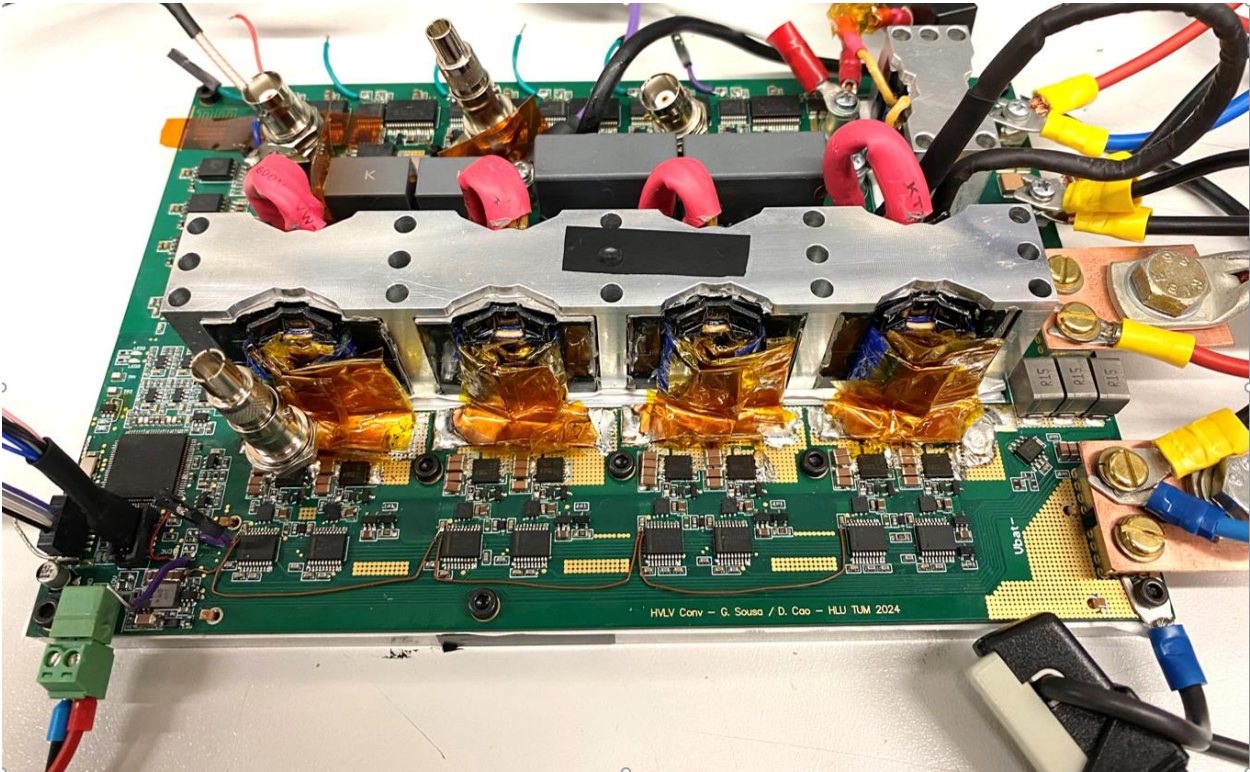
Links

Short Description

This project focuses on the development of a 22 kW single-stage on-board charger that integrates the HV–LV DC/DC converter and employs advanced magnetic integration to achieve high efficiency and high power density over a wide output voltage range for both European and North American applications. The design incorporates an integrated magnetic structure in which magnetic components from the HV charger and LV charger are constructed into a compact, thermally efficient assembly.

In parallel, the project includes in-depth investigation of DAB modulation strategies to enhance soft-switching performance. Special emphasis is placed on evaluating Zero-Voltage Switching (ZVS) behavior with consideration of parasitic capacitances, enabling more accurate prediction of switching transitions and expanded high-efficiency operating regions. Through the combination of advanced modulation, refined soft-switching analysis, and magnetic integration, the project aims to deliver a highly efficient, robust, and compact power-conversion architecture for next-generation OBC systems.

Picture(s)



Publications (if available)