

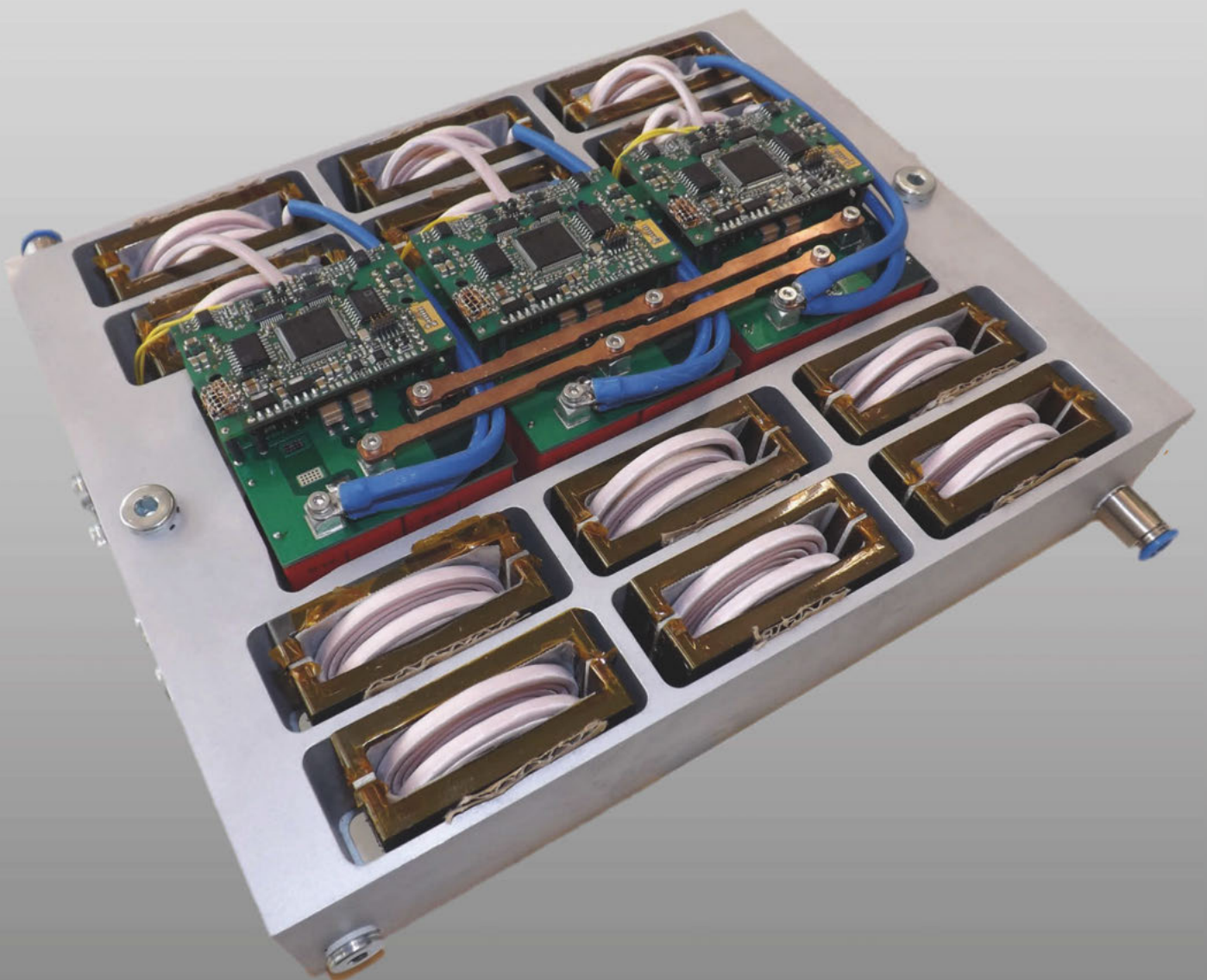


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FRAUNHOFER INSTITUTE FOR INTEGRATED SYSTEMS AND DEVICE TECHNOLOGY

Multiport DC/DC Converter for complex energy distribution





Multiport DC/DC Converter for complex energy distribution

Description

Multiport DC/DC converters are the perfect solution in all applications where complex energy distribution tasks must be solved. The presented **Multiport DC/DC Converter** is able to control six independent buck/boost DC/DC converters within a single housing at low cost (minimum ceramic capacitors, cost efficient silicon technology – IGBTs and diodes, no external current sensors) but nevertheless with a high power density what means it is ideally suited for automotive applications. Due to a novel IPU (intelligent power unit) based circuit design approach the system offers a failure tolerant decentralized control approach including a safe galvanic isolation of all high voltage ports regarding the main control unit. Each low voltage side port can be voltage, current or power controlled by an easy to use graphic user interface via CAN communication. Individual interleaved power stages for each port allow low voltage and current ripples also when only a single port is used. Moreover, a quick change of power modules (IPUs) is possible.

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Technical Data

Low voltage side range V_{LV}	0 - 440 V
High voltage side range V_{HV}	$(V_{LV}+10V)$ - 450 V
Continuous current (per LV port)	30 A
Peak current (tpd sec. per LV Port)	50 A
Continuous power @ 330 V (per port)	10 kW
Peak power @ 330 V (per port)	16 kW
Coolant temperature	tpd
Dimension	80 mm x 220 mm x 280 mm
Power Density (@ peak power)	20 kW/dm ³
Efficiency	up to 98,5%

Features

- 6 independent buck/boost DC/DC converters within a single housing
- Low voltage and current ripple by interleaving technique for each port
- Low cost design approach (minimum ceramic capacitors, cost efficient silicon technology, no external current sensors)
- Automotive qualified power modules available
- Safe galvanic isolation of main control board
- High power density
- Temperature monitoring
- Over current protection
- Easy to use graphic user interface via CAN communication
- Quick change of power modules

Circuit Topology and typical Multiport configuration with common HV port

