Hitachi Metals Ltd: LTCC embedded PM (2018)

pcim Europe
Young Engineer Award

Project

Funding: direct industrial R&D project

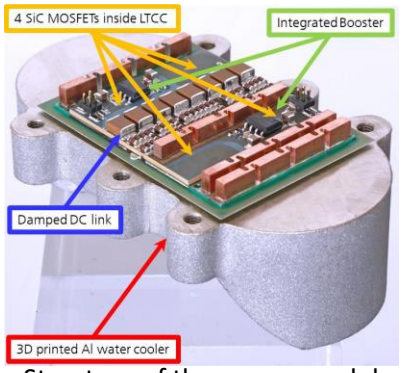
LTCC embedded SiC power module

- 2x 25mm2 SiC MOSFETs for 160A at 800V
- dies are sintered into the cavities of the LTCC substrate
- dies are soldered to SiN-AMB
- SiN AMB soldered to 3D printed Al cooler
- gate driver and cooled primary DC link are placed on the top side of the LTCC

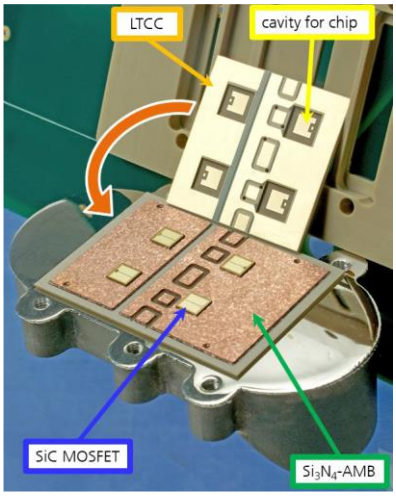
Performed tasks

- project management
- concept worked-out based on the customer requirements
- manufacturing flow design and alignment with customer and internal manufacturing team
- static thermal design for dies and RC snubber (Solidworks)
- electro-magnetic design of the power module (Altium/Solidworks, Fast Henry)
- Mechanical integration design
- Spring contact test for high current capability
- preparing files for manufacturing
- Static electrical tests (Keysight B1505A)
- EM parasitics extraction of the power module by simulation and measurement
- Design of the demonstrator (inkl. DC link and gate driver)
- Dynamic electrical tests (DPT)

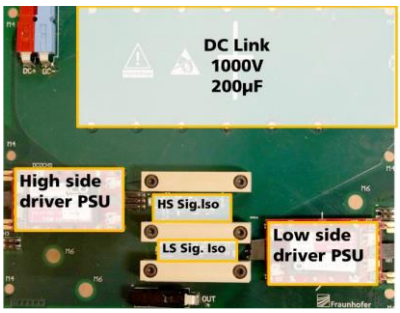
LTCC embedded power module



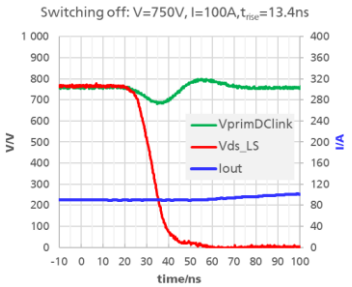
Structure of the power module

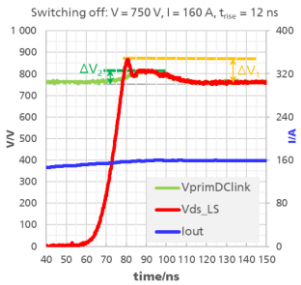


Demonstrator for DPT



Superior switching performance of 160A





Thermal path fluidic simulation

