Thermal Modelling and Design of On-board DC-DC Power Converter using Finite Element Method - DTU Orbit (08/11/2017)

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Power electronic converters are widely used and play a pivotal role in electronics area. The temperature causes around 54 % of all power converters failures. Thermal loads are nowadays one of the bottlenecks in the power system design and the cooling efficiency of a system is primarily determined by numerical modelling techniques. Therefore, thermal design through thermal modelling and simulation is becoming an integral part of the design process as less expensive compared to the experimental cut-and-try approach. Here the investigation is performed using finite element method-based modelling, and also the potential of such analysis was demonstrated by real-world measurements and comparison of obtained results. Thermal modelling was accomplished using finite element analysis software COMSOL and thermo-imaging camera was used to measure the thermal field distribution. Also, the improved configuration of power converter was proposed.

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Authors: Staliulionis, Z. (Intern), Zhang, Z. (Intern), Pittini, R. (Intern), Andersen, M. A. E. (Intern), Noreika, A. (Ekstern), Tarvydas, P. (Ekstern)
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