

Andreas Munding, Liebherr Elektronik, D



Short Biography:

Andreas Munding graduated from the University of Ulm in Ulm, Germany with a German diploma degree in Electrical Engineering in 2002. He has worked as a researcher in the field of 3D chip integration at the University of Ulm and at Vestfold University College in Horten, Norway. In 2007 he received his doctoral degree in engineering from the University of Ulm. Dr. Munding is working for Liebherr-Elektronik GmbH since 2007, where he is a project leader in the department of advanced development.

Title of the Paper:

Compact PCB-packaging and water cooling of a 25-kW inverter

Summary of the Paper:

In many power electronics applications, volume and weight is a cost factor which developers seek to minimize by increasing power density. Many approaches to achieve a higher power density focus on reducing wiring and tubing expenses by integrating the system components into the electric actuator. The resulting installation areas are typically exposed to high vibrational and high temperature stresses. This work features simulation results of a sandwich PCB assembly with an electronic board and a high current board attached to either side of an aluminum heat sink. This heat sink is thermally attached to the metal housing and to a liquid cooling channel which was optimized for low pressure drop. In addition, the effect of the low pressure drop cooler structure on the IGBTs of a directly cooled pin-fin based power module was simulated and characterized. It was found that a geometry with lateral coolant impingement exhibits lowest pressure drop and allows for a large flow rate operation range in automotive applications.