

ECPE Integrated Power Boards Workshop a Success

Tuesday, November 27, 2012 | Joe Fjelstad, Verdant Electronics

While the U.S. was celebrating Thanksgiving last week, the European Center for Power Electronics (ECPE) hosted a workshop for 80+ participants from Europe and the U.S. on the challenges of designing and implementing high-power circuit assemblies and held in Rsjwijk (near Delft), Netherlands, November 21-22. The event was jointly chaired by Professor J.A. D Ferreira and Dr. Jelena Popovic-Gerber both of Delft University of Technology and Professor Eckart Wolfgang of ECPE.



Professor J.A. D Ferreira of Delft TU welcomes attendees.

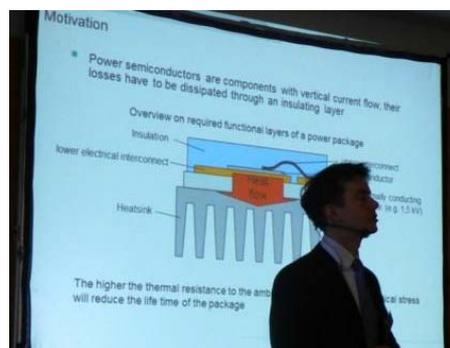
For those in the states and elsewhere unfamiliar with the ECPE, its charter is to promote research, innovation, education, and technology transfer in the field of power electronics. In broad brush strokes, power electronics covers a range of electronic applications where power is a primary concern, including the control and management of power conversion and control in the form of sensing and communication of system status.

For those involved in the manufacture and assembly of PCBs, products for power electronic applications can be recognized by the use of much thicker than usual copper power and ground planes to carry the high currents required for many of today's products, including many

automotive and aerospace applications.

As was pointed out over the course of the two-day workshop, those involved in identifying and implementing solutions are faced with significant challenges owing to the unique nature of power electronic products. The organizers stated that their objective was that those attending leave with "a much better understanding about the performance and limitations of integrated power boards" through a well-organized series of papers which covered state-of-the-art developments in the integration of functions, design, thermal management, manufacturing, and predictive software. While all of the presentations made were of high value, unfortunately this brief review of highlights cannot do them all justice; however, a full listing of the papers, the authors, and their affiliations is provided at the end of this article for the reader to get an appreciation of the workshop and its contents.

On day one, following welcoming and opening statements by Professor J.A. D Ferreira of Delft TU and Thomas Harder and Eckhart Wolfgang of ECPE, the morning session on the first day began with an interesting overview of the general subject given by Dr. Eckart Hoene of Fraunhofer IZM. His presentation was followed by of different R&D projects which have been funded within the EU. Two interesting presentations were made in this session: One looking at the industrialization of chip embedding technology and the other discussing integration of electronic components into PCBs for automotive applications. It was evident from the questions generated and its prominent position in the workshop that the subjects of the research were of high interest.



Dr. Eckart Hoene of Fraunhofer IZM.

The early afternoon session focused on converter technology and delved heavily into thermal management concerns. The late afternoon session was an exploration of the limits of PCB technologies and was prefaced by a presentation on solderless assembly for electronics (SAFE) by Verdant Electronics' Joseph Fjelstad, which led into a panel discussion on the topic, "What are the limits for PCB systems?" with perspectives on the topic provided by Koen Hollevoet of Rogers Corporation; Professor Hans-Juergen Albrecht, Siemens; Greg Caswell, DfR Solutions; Professor J.A. D Ferreira, Delft TU; Joseph Fjelstad, Verdant Electronics; Hannes Stahr, AT&S; and



Professor Eckhart
Wolfgang of ECPE.

Professor Eckart Wolfgang, ECPE. The event provided a lively examination and discussion on the topic of the challenges facing those looking to provide viable solutions for power electronics of the future.

The second day opened with a session on low-inductance EMI with three different papers examining the challenge. The second session on simulation and manufacturing was also compelling with a talk on constraint-driven PCB layout concerns for power applications given by Marcel Wezenberg of Cadence. DfR Solutions' Greg Caswell followed with a description of an impressive new software which automates lifetime simulation for power PCBs and which captured the full attention of all present. The final session for the conference covered the topic of making external connections for the power systems and included discussions on high-current PCBs, how to connect them safely, and reliably.

In spite of the poor timing, the event was a very comprehensive and rewarding one for the attendees. This event is apparently not held with regularity and, perhaps because of that, was well attended and well received. For more information, visit www.ECPE.org.

The program:

- Integrated Power Boards – Motivation, Technologies, and Trends: Dr. Eckart Hoene, Fraunhofer IZM;
- HERMES - The Industrialization of the Chip Embedding Technology: Hannes Stahr, AT&S;
- Integration of Electronic Components into PCB for Automotive Applications: Thomas Hofmann, Continental;
- High Power Inverters for Minimized Packaging Density with Minimized Parasitics and Increased Thermal Performance: Thomas Gottwald, Schweizer Elektronik;
- High Current and Thermal Management for PCBs: Stefan Hoerth;
- Thermal Management for High Current Applications: Rico Schlueter, Ruwei International GmbH;
- Low-profile Magnetics for Ultra-thin PCB Converters for Distributed PV Systems: Milos Acanski, Delft Technical University;
- Solderless Assembly for Electronics (SAFE/Occam): Joseph Fjelstad, Verdant Electronics;
- Ultra-low Inductance Packaging for SiC: Dr. Eckart Hoene, Fraunhofer IZM;
- PEEC for EMC Layout Optimisation: Jean-Luc Schanen, G2Lab Grenoble;
- Recent Developments in Integration of Hybrid EMI Filters: Professor Francois Costa, SATIE-E.N.S. de Cachan;
- Constraint Driven PCB Layout for Power Applications: Marcel Wezenberg, CB Distribution BV;
- Automating Lifetime Simulation of Power PCBs: Greg Caswell, DfR Solutions;
- PEEC-Based Parasitics Extraction of PCBs: Andreas Muesing, ETH Zurich;
- Power Sandwich Technology for SMT Automated Assembly of Power PCBs: Ivan Josifovic, Delft Technical University;
- High Current Printed Circuit Boards (PCBs) and Suitable Connection Techniques: Dr. Max Poech, Fraunhofer ISIT;
- PCB Dual-switch Fuse with Energetic Materials Embedded. Application for New Fail-safe and Fault-tolerant Converters: Dr. Frederic Richardeau, Universit e de Toulouse, LAPLACE;
- Integration of High Power Planar Transformers: Koen Hollevoet, Rogers Corporation; and
- The Connection Technology in the Electrical and Thermal System - Laboratory Tests for UL and IEC Approvals at PCB Connectors and Terminals: Stephan Ruhnau, Wiedmueller Interface GmbH.