



Final Program

CIPS 2008

5th International Conference
on Integrated Power
Electronics Systems

- March, 11-13, 2008
- Nuremberg / Germany

<http://www.cips-conference.de>



Organized by

- The Power Engineering Society within VDE (ETG)
- The European Center for Power Electronics e. V. (ECPE)

Supported by:

- ZVEI Trade Association Electronic Components and Systems

General Chairs

- J. Daan van Wyk, South Africa
- Leo Lorenz, Infineon Technologies, China

Technical Chairs

- Eckhard Wolfgang, Munich, Germany
- Dieter Silber, University of Bremen, Germany

Conference Venue

Georg-Simon-Ohm Fachhochschule
Bahnhofstrasse 87
90489 Nürnberg

Program Overview

Tuesday, March 11, 2008		Wednesday, March 12, 2008			Thursday, March 13, 2008	
Time	Audimax	Time	Audimax	Room T01	Time	Audimax
09:30	Welcome Coffee	08:30	Session 4: Packaging (Part 1)			
10:30	Opening	10:00	Session 4: Packaging (Part 2)	Session 5: Gate Drive and Control	08:30	Session 9: System Integration (Part 1)
10:50	Session 1: Robustness Validation	11:00	Coffee Break		10:30	Coffee Break
12:10	Lunch Break	11:30	Session 6: Passives	Session 7: Power Electronics (Part 1)	11:00	Session 9: System Integration (Part 2)
13:30	Session 2: Power Module Reliability	12:50	Lunch Break		12:20	Lunch Break
15:50	Coffee Break	14:00	Session 8: SiC and Silicon Integrated Power (Part 1)			
16:20	Session 3: EMC and Thermal Management	15:20	Coffee Break		13:40	Session 10: ECPE Roadmap
20:00	Conference Dinner	15:50	Session 8: SiC and Silicon Integrated Power (Part 2)	Session 7: Power Electronics (Part 2)		
-22:30		17:40	Panel Discussion		15:20	Closing - Best Poster Paper Award
		19:00	Dialog Session - Poster		-15:40	

Tuesday, March 11, 2008

(10:30) Opening (Audimax)

J. D. van Wyk, South Africa
L. Lorenz, Infineon Technologies, China
E. Wolfgang, ECPE, Munich, Germany

(Audimax) Session 1: Robustness Validation

Chairmen: E. Wolfgang, ECPE, Germany; H.-P. Feustel, Continental Automotive, Germany

(10:50) 1.1 Robustness Validation – An Improved Qualification Method for Semiconductor Devices in Automotive (Invited paper)

H. Keller, ZVEI, Frankfurt/Main, International Work Group Robustness Validation, SAE-ZVEI-JSAE-AEC, Detroit, Frankfurt/Main

(11:30) 1.2 Predictive Reliability, Prognostics and Risk Assessment for Power Modules (Invited paper)

C. Bailey, H. Lu, C. Yin, S. Ridout, University of Greenwich, London, United Kingdom

12:10-13:30 Lunch Break

(Audimax) Session 2: Power Module Reliability

Chairmen: M. Mermet-Guyennet, Alstom, France; J. Lutz, Chemnitz University of Technology, Germany

(13:30) 2.1 Lifetime Modeling and Prediction of Power Devices (Invited paper)

M. Ciappa, ETH Zürich, Switzerland

(14:10) 2.2 Model for Power Cycling lifetime of IGBT Modules – various factors influencing lifetime

R. Bayerer, T. Licht, Infineon Technologies, Warstein; T. Herrmann, J. Lutz, M. Feller, Chemnitz University of Technology, Germany

(14:30) 2.3 Proposition of IGBT modules assembling technologies for aeronautical applications

A. Zéanh, A. Bouzourene, J. Casutt, ThalesAvionics Electrical Systems, Chatou; O. Dalverny, M. Karama, ENI de Tarbes – (LGP), Tarbes; S. Azzopardi, E. Woïrgard,

Université Bordeaux, Talence, M. Mermet-Guyennet, PEARL, Alstom Transport Tarbes, Séméac, France

(14:50) 2.4 Test System for Reliability Management of Power Modules

T. Wernicke, A. Middendorf, S. Dieckerhoff, H.Reichl, Technical University of Berlin, S. Guttowski, Fraunhofer Institute for Reliability and Microintegration, Berlin, Germany

(15:10) 2.5 Power cycling induced failure mechanisms in the viewpoint of rough temperature environment

J. Lutz, T. Herrmann, M. Feller, Chemnitz University of Technology; R. Bayerer, T. Licht, Infineon Technologies, Germany; R. Amro, Palestine Polytechnic University, Hebron, Palestine

(15:30) 2.6 DBC substrate based EMC Transfer Molded Power Module

K. H. Lee, O.-S. Jeon, S.-W. Lim, S.-M. Park, B.-Ok Lee, T.-K. Lee, Fairchild Semiconductor, Bucheon, Korea

15:50-16:20 Coffee Break

(Audimax) Session 3: EMC and Thermal Management

Chairmen: K. Ngo, CPES, U.S.A.M. Stoisiek, University Erlangen, Germany

(16:20) 3.1 Built-in EMC for Integrated Power Electronics Systems (Invited paper)

J.-L. Schanen, J. Roudet, Institut National Polytechnique de Grenoble, St Martin d'Herès, France

(17:00) 3.2 EMC in Power Electronics (Invited paper)

E. Hoene, Fraunhofer IZM, Berlin, Germany

(17:40) 3.3 Design and Assembly of Power semiconductors with double-sided water cooling

M. Schneider-Ramelow, T. Baumann, E. Hoene, Fraunhofer IZM, Berlin, Germany

(18:00) 3.4 Compact thermal model for the analysis of power devices thermal interactions

B. Allard, S. M'Rad, INSA-Lyon, Villeurbanne, France; X.

Jordà, X. Perpinya, Centre Nacional de Microelectrònica, Barcelona, Spain

(18:20) 3.5 Thermal Power Density Barriers of Converter Systems

U. Drofenik, J. W. Kolar, ETH Zurich, Switzerland

(18:40) End

(20:00-22:00) Conference Dinner (City Hall Nuremberg)

Wednesday, March 12, 2008

(Audimax) Session 4: Packaging (Part 1)

Chairmen: J. Daan van Wyk, South Africa; A. Hamidi, ABB, Switzerland

(08:30) 4.1 Review on Highly Integrated Solutions for Power Electronic Devices (Invited paper)

J. Schulz-Harder, Electrovac Curamik GmbH, Regensburg, Germany

(09:10) 4.2 The Road to the Next Generation Power Module – 100% Solder free Design (Invited paper)

U. Scheuermann, P. Beckedahl, SEMIKRON Elektronik GmbH & Co. KG, Nürnberg, Germany

(Audimax) Session 4: Packaging (Part 2)

(10:00) 4.3 Low-Temperature Sintering of Nanoscale Silver Paste for High-Temperature Power Chip Attachment

G.-Q. Lu, J. N. Calata, T. G. Lei, Virginia Polytechnic Institute and State University, Blacksburg, USA

(10:20) 4.4 3D Integration of Power Semiconductor Devices based on Surface Bump Technology

M. Mermet-Guyennet, P. Lasserre, J. Saiz, ALSTOM Transport (PEARL), Semeac, France; A. Castellazzi, Swiss Federal Institute of Technology (ETH Zurich), Switzerland

(10:40) 4.5 A Study of Pressed Contact Technology on IGBT Devices between –40 °C and +200 °C

G. Banckaert, M. Mermet-Guyennet, ALSTOM- Transport, Power Electronics Associated Research Laboratory (PEARL), France; A. Castellazzi, Swiss Federal Institute of

Technology (ETH Zurich), Switzerland

11:00-11:30 Coffee Break

(Room T01) Session 5: Gate Drive and Control

Chairmen: D. Bergogne, INSA Lyon, France, M. Arpilliere, Schneider-Electric, France

(10:00) 5.1 An Investigation of Gate Drive Circuits and Losses in Power Devices of Multilevel Converters for Circuit Integration to Realize High Output Power Density

M. Kamaga, Y. Sato, Chiba University; K. Sung, Y. Hayaishi, National Institute of Advanced Industrial Science and Technology, H. Ohashi, Y. Hayashi, Ibaraki National College of Technology, Ibaraki, Japan

(10:20) 5.2 High Efficiency Isolated Half-Bridge Gate Driver with PCB Integrated Transformer

S. Zeltner, Fraunhofer Institute of Integrated Systems and Device Technology, Erlangen, Germany

(10:40) 5.3 Low-cost Digital Control for SMPS Integration

X. Lin-Shi, B. Allard, INSA-Lyon; France; S. Guo, Y. Gao, Shanghai University, Shanghai, China

11:00-13:30 Coffee Break

(Audimax) Session 6: Passives

Chairmen: J.-P. Sommer, Fraunhofer IZM, Germany; J.D. van Wyk, South Africa

(11:30) 6.1 Optimisation of DC-link capacitors

K. Kriegel, J. Otto, Siemens AG; J. Rackles, Munich University of Applied Sciences, Germany

(11:50) 6.2 Duplex pulse controlled inverter with a film capacitor DC-link

A. Kleimaier, B. Hoffmann, A. Scherer, Compact Dynamics GmbH, Starnberg, Germany

(12:10) 6.3 Polymer bonded soft magnetic particles for planar inductive devices

S. Egelkraut, H. Ryssel, University of Erlangen-Nuremberg, M. März, Fraunhofer Institute for Integrated Systems and Device Technology (IISB), Erlangen, Germany

(12:30) 6.4 Printed circuit board integrated multi-output transformer

E. Waffenschmidt, Philips Research, Aachen, Germany

(Room T01) Session 7: Power Electronics (Part 1)

Chairmen: H.-G. Eckel, Siemens, Germany; G. Busatto, University Cassino, Italy

(11:30) 7.1 DCDC Converter for Hybrid Vehicle

W. Schmidt, Continental Automotive Systems Division, Nürnberg, Germany

(11:50) 7.2 Modularity bridging future Power Electronics in automotive volume applications – speeding up HEV applications

A. Rekofsky, R. Brey, Siemens VDO Automotive AG, Regensburg, Germany; M. Thoben, Infineon Technologies AG, Germany; C. Mertens, Volkswagen AG, Germany; G. Löcher, EPCOS AG, Germany

(12:10) 7.3 Automotive DC-DC Converter Designed for High Power-Density and High Efficiency

M. Pavlovsky, Y. Tsuruta, A. Kawamura, Yokohama National University, Yokohama, Japan

(12:30) 7.4 Influence of Parasitic Elements on the Commutation of a Resonant Matrix Converter

S. Schulz, A. Ecklebe, A. Lindemann, Otto-von-Guericke University, Magdeburg, Germany

12:50-14:00 Lunch Break

(Audimax) Session 8: SiC and Silicon Integrated Power (Part 1)

Chairmen: H. Ohashi, A.I.S.T., Japan; D. Silber, University Bremen, Germany

(14:00) 8.1 Compact Power Electronics due to SiC Devices (Invited paper)

P. Friedrichs, SiCED Electronics Development GmbH & Co.

KG, a Siemens Company, Erlangen, Germany

(14:40) 8.2 Normally-On devices and circuits, SiC and high temperature: using SiC JFETs in power converters (Invited Paper)

D. Bergogne, H. Morel, D. Tournier, B. Allard, D. Planson, C. Raynaud, M. Lazar, AMPERE INSA de Lyon, Villeurbanne, France

15:20-15:50 Coffee Break

(Audimax) Session 8: SiC and Silicon Integrated Power (Part 2)

(15:50) 8.3 Issues and Options for Planar Packaging of High-Voltage SiC Diodes

J. Xu, K.D.T. Ngo, Center for Power Electronics System (CPES), Virginia Polytechnic Institute and State University Blacksburg, USA; J. D. van Wyk, University of Johannesburg, South Africa

(16:10) 8.4 SiC JFET for high temperature power switches

D. Bergogne, D. Tournier, R. Mousa, M. Shafiee Koor, D. Planson, H. Morel, B. Allard, INSA-Lyon, France

(16:30) 8.5 Current limiting with SiC JFET structures

D. Tournier, D. Bergogne, A. Hamoud, D. Planson, R. Mousa, H. Morel, B. Allard, O. Brevet, INSA-Lyon, France

(16:50) 8.6 600V Converter/Inverter/Brake (CIB) Module with Integrated SOI Gate Driver IC for Medium Power Applications .

B. Vogler, TU Ilmenau; M. Roßberg, R. Herzer, L. Reußner, T. Wurm, SEMIKRON Elektronik GmbH & Co. KG, Nürnberg, Germany

(17:10) 8.7 Life Time Prediction and Design for Reliability of Smart Power Devices for Automotive Exterior Lighting

R. Letor, S. Russo, R. Crisafulli, STMicroelectronics, Catania, Italy

17:40-19:00 Panel Discussion (Audimax)

(Room T01) Session 7: Power Electronics (Part 2)

Chairmen: T. Salzmann, Siemens, Germany; G. Busatto, University Cassino, Italy

(15:50) 7.5 System Design of Compact Low-Power Inverters for the Application in Photovoltaic AC-Modules

B. Sahan, N. Henze, A. Engler, P. Zacharias, Institut für Solare Energieversorgungstechnik, ISET e.V., Kassel; T. Licht, Infineon Technologies AG, Warstein, Germany

(16:10) 7.6 Cost Reduction of PV-Inverters with SiCD-MOSFETs

B. Burger, D. Kranzer, O. Stalter, Fraunhofer Institute for Solar Energy Systems (ISE), Freiburg, Germany

(16:30) 7.7 Two-Stage Power Architecture for Voltage Regulator Application based on Coupled Magnetic Structure

M. C. Gonzalez, P. Alou, O. García, J. A. Cobos, Universidad Politécnica de Madrid, Spain; H. Visairo, Systems Research Center, México, Intel Corporation, Mexico

(16:50) 7.8 VHDL-AMS simulation of integrated power systems: a unified solution for multi-domain multi-level abstraction analysis

A. Castellazzi, M. Ciappa, W. Fichtner, Swiss Federal Institute of Technology (ETH Zurich), Switzerland; M. Mermet-Guyennet, ALSTOM Transport (PEARL), France

17:40-19:00 Panel Discussion: (Audimax)

Intelligent Power Electronics for Energy Efficiency – Research Needs and Opportunities

Chairman: Thomas Harder, ECPE e.V.

M. Sanchez-Jimenez, European Commission, ICT for Sustainable Growth

D. Boroyevich, CPES/Virginia Tech (the Power Electronics Network in the US)

H. Ohashi, AIST/PERC (the Power Electronics Network in Japan)

B. Rauscher, STMicroelectronics

J. A. Cobos, Universidad Politécnica de Madrid

B. Ferreira, TU Delft

L. Lorenz, Infineon Technologies

Foyer Session 11: Dialog Session – Posters

19:00-21:30 Franconian snacks and beverages will be Served

Best Poster Paper Award Committee

H.-J. Schulze, Infineon Technologies, Germany; S. Azzopardi, University Bordeaux, France; A. Consoli, University Catania, Italy; S. Jun, Siemens, China; F. Osterwald, Danfoss, Germany

P2.7 Base Plate Shape Optimisation for High-Power IGBT Modules

J.-P. Sommer, B. Michel, Fraunhofer Institute for Reliability and Micro Integration (IZM), Berlin; R. Bayerer, R. Tschirbs, Infineon Technologies AG, Warstein, Germany

P2.8 Non-Destructive Experimental Investigation about RBSOA in High Power IGBT Modules

G. Busatto, C. Abbate, B. Abbate, F. Iannuzzo, University of Cassino, Italy

P3.6 Extraction of Efficient Thermal Models for Life Limiting Interfaces in Power Modules

M. Musallam, C. M. Johnson, University of Nottingham, United Kingdom

P3.7 Direct Substrate Cooling of Power Electronics

R. Skuriat, C. M. Johnson, The University of Nottingham, United Kingdom

P3.8 Cooling of Insulated Assemblies

S. Förster, A. Lindemann, Otto-von-Guericke University Magdeburg, Germany

P5.4 A digital control technique for high-performances DC-DC converters

V. Boscaïno, G. Capponi, G. M. Di Blasi, P. Livreri, Università degli Studi di Palermo; F. Marino, STMicroelectronics, Catania, Italy

P6.5 Comparative study of three transformer concepts for high current dual active bridge converters

Y. Wang, B. Roodenburg, S.W H. de Haan, Technical University Delft, The Netherlands

P6.9 Adjustable speed generation system with axial flux permanent magnet generator

W. Koczara, Warsaw University of Technology, Poland; Neil L. Brown, J. Al-Tayie, N. Al Khayat, R. Seliga, E. Ernest, A. Krasnodebski, Cummins Generator Technologies, Stamford, United Kingdom

P6.10 EMS Analysis on Digital Pulse Width Modulators

E. Orietto, G. Spiazzi, P. Mattavelli, Università di Padova; S. Saggini, Università di Udine, Italy

P6.11 Robustness Analysis of DC Distributed Power Systems by Means of Behavioral DC-DC Converter Models

J. A. Oliver, R. Prieto, L. Laguna, J. A. Cobos, Universidad Politécnica de Madrid (UPM), Spain

P8.8 The ESBT® (Emitter-Switched Bipolar Transistor): a new monolithic power actuator technology devoted to high voltage and high frequency applications

C. Ronsisvalle, V. Enea, STMicroelectronics, Catania, Italy

P8.9 Trade-off between Energy Savings and Execution Time Applying DVS to a Microprocessor

M. Vasić, O. García, P. Alou, J. A. Oliver, J. A. Cobos, Universidad de Politécnica en Madrid, Spain

P8.10 Analysis of STI Thin-SOI LDMOS transistors for Smart Power and high frequency applications

I. Cortes, P. Fernandez-Martinez, D. Flores, S. Hidalgo, J. Rebollo, Centro Nacional de Microelectrónica, Barcelona, Spain

P9.8 Performance Comparison of a Buck Converter Using Shielded-Substrate and Co-Packaged Planar Inductors

M. H. F. Lim, D. Gilham, F. C. Lee, K. D. T. Ngo, Virginia Polytechnic Institute and State University, J. D. van Wyk, University of Johannesburg, South Africa

P9.9 PEEC-Based Numerical Optimization of Compact Radial Position Sensors for Active Magnetic Bearings

A. Müsing, C. Zingerli, P. Imoberdorf, J. W. Kolar, ETH Zürich, Switzerland

P10.6 High Temperature and Power Electronics Systems in Automotive Applications –The Approach of the ZVEI Working Group ‘High Temperature Electronics’
M. Rittner, Robert Bosch GmbH, Schwieberdingen, Germany

Thursday, March 13, 2008

(Audimax) Session 9: System Integration (Part 1)

Chairmen: D. Boroyevich, CPES, U.S.A.G. Wachutka, TU Munich, Germany

(08:30) 9.1 System Integration Using Advanced Power Semiconductors (Invited paper)

G. Deboy, Infineon Technologies Austria AG, Villach, Austria

(09:10) 9.2 A High Number of Phases Enables High Frequency Techniques and a better Thermal Management in Medium Power Converters

O. Garcia, P. Alou, J. A. Oliver, J. A. Cobos, Universidad Politécnica de Madrid (UPM); P. Zumel, Universidad Carlos III de Madrid, Spain

(09:30) 9.3 System Integration Approach for High Power Density Drives

J. Popović Gerber, European Centre for Power Electronics (ECPE), Nuremberg; M. Gerber, J. A. Ferreira, Delft University of Technology, Delft, The Netherlands

(09:50) 9.4 An Integrated Electronic Ballast for High Intensity Discharge (HID) Lamps

Y. Jiang, F. C. Lee, Y. Liang, Virginia Polytechnic Institute and State University, USA; J. D. van Wyk, University of Johannesburg, South Africa; W. Liu, International Rectifier, El Segundo, USA

(10:10) 9.5 Current Sensor Dedicated for High Temperature Integrated Power Electronics

F. Grecki, W. Koczara, G. Iwanski, J. Lastowiecki, Warsaw University of Technology, Poland

10:30-11:00 Coffee Break

(Audimax) Session 9: System Integration (Part 2)

(11:00) 9.6 Advanced Power Electronics Systems (Invited paper)

H. Ohashi, Tokyo Institute of Technology, Japan

(11:40) 9.7 IPEM-Based Power Electronics System Integration (Invited paper)

D. Boroyevich, F. C. Lee, J. D. Van Wyk, G.-Q. Lu, E. P. Scott, M. Xu, R. Burgos, F. Wang, CPES, Virginia Tech, Blacksburg, VA, USA; T. M. Jahns, T. A. Lipo, R. D. Lorenz, University of Wisconsin-Madison, WI, USA; T. P. Chow, Rensselaer Polytechnic Institute, Troy, NY, USA

12:20-13:40 Lunch Break

(Audimax) Session 10: ECPE Roadmap

Chairmen: L. Lorenz, Infineon Technologies, China, T. Harder, ECPE, Germany

(13:40) 10.1 The ECPE Roadmap Initiative

T. Harder, L. Lorenz, ECPE European Center for Power Electronics e.V., Nuremberg, Germany

(14:00) 10.2 Power Electronics Technology Roadmaps – a Bottom-up Approach

E. Wolfgang, T. Harder, ECPE, Nürnberg, Germany

(14:20) 10.3 Automotive Power Electronics Roadmap

J. Kolar, ETH Zurich, Switzerland; M. März, Fraunhofer IISB, Germany, E. Wolfgang, Germany

(14:40) 10.4 Power Electronics Technology Roadmap: High Frequency Power Supplies (P<1kW)

José A. Cobos, UPM, Spain, Cian O’Mathuna, Tyndall, Ireland

(15:00) 10.5 ECPE Power Electronics Research and Technology Roadmaps: Team No. 5: High Frequency Power Conversion > 1kW

T. Reimann, ISLE GmbH, Ilmenau, Germany

(15:20) Closing - Best Poster Paper Award

J. Daan van Wyk, South Africa; E. Wolfgang, Munich, Germany

(15:40) End of CIPS 2008