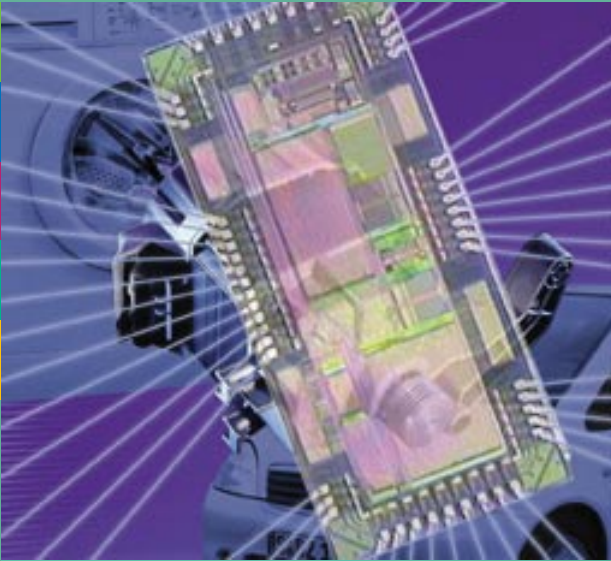


PROGRAM



CIPS 2014

8th International Conference
on Integrated
Power Electronics Systems

February, 25 - 27, 2014
Nuremberg/Germany

www.cips-conference.de



ETG



VDE

CIPS 2014 Program Overview

Tuesday, February 25, 2014

Time	Hall Kaiser Karl IV.
10:30	Opening
10:50	Session 1: Reliability (1) p. 10
12:40	Lunch
14:00	Session 2: Reliability (2) p. 11
15:40	Coffee Break
16:10	Session 3: Reliability (3) p. 12
17:30	Break
17:40	Session 4: Reliability (4) p. 13
19:10	Break
19:30	Dialog Session p. 14

Wednesday, February 26, 2014

Time	Hall Kaiser Karl IV.	Hall Kaiser Maximilian
08:50	Session 5: Inverters, Converters p. 19	Session 6: Interfaces and Substrates p. 20
10:20	Coffee Break	Coffee Break
10:50	Session 7: Inverters, Converters, Drivers p. 21	Session 8: Interconnects p. 22
12:30	Lunch	Lunch
14:00	Session 9: Overview: EMI: Renewables, Sensors p. 23	
15:50	Coffee Break	
16:20	Session 10: Lifetime and Robustness p. 24	
05:00 PM	Break	
19:15	Conference Dinner	

Thursday, February 27, 2014

Time	Hall Kaiser Karl IV.
09:00	Session 11: Power Modules p. 25
10:00	Coffee Break
10:30	Session 12: Wide Band Gap (1) p. 26
12:10	Lunch
13:30	Session 13: Wide Band Gap (2) p. 27
15:10	Closing

Organized by

The conference is organized by ETG, the Power Engineering Society within VDE, and by ECPE European Center for Power Electronics.

VDE the Association for Electrical, Electronic & Information Technologies is one of the largest technical and scientific associations in Europe with more than 32 000 members. www.vde.com



the Industrial and Research Network for Power Electronics in Europe was founded in 2003 by leading power electronics industries in order to promote research, education and public relations in this field.

Technical Co-Sponsors



IEEE Power Electronics Society (PELS) and



ZVEI – the German Electrical and Electronic Manufacturers' Association.

Chairmen's Welcome Message

We are really pleased to welcome you to the 8th International Conference on Integrated Power Electronics Systems (CIPS). This important event is held to be a technical and scientific forum for engineers and researchers engaged in all the aspects of hybrid integration and reliability of power electronics systems. We are truly delighted that you are a part of this event.

CIPS 2014 is organized by ETG, the Power Engineering Society within VDE and co-organized by ECPE, the European Center for Power Electronics.

The program for this year's conference includes 14 sessions (13 oral and one dialog session) with the presentation of 80 technical papers: Three Keynote papers, 9 Invited papers, and 68 regular papers (29 of which are presented in the dialogue/poster session).

21 of the papers come from industry, 20 are authored by industry and academia, and 39 come from research institutes.

The three keynote and 9 invited papers, authored by qualified experts coming from worldwide important industrial and academic organizations, are presenting the latest developments in various aspects of Integrated Power Electronics Systems and their reliability with particular attention to the latest results achieved in the main research centers in America, Asia, and Europe.

The Technical Programme Committee considers the dialogue Session as a very important part of the conference and a Best Poster Award will be presented in the closing session on Thursday, February 27, 2014. In addition ECPE is sponsoring the Young Engineer Award for the Best Paper which will be granted for.

It is important to mention that in contrast to the other mainstream power electronics conferences, reliability, wide band gap devices and packaging (including requirements concerning parasitics), interfaces, substrates, and interconnects are in the focus of CIPS 2014.

All papers in these proceedings have been reviewed in a two-stage review process:

- › Based on the abstract, the Technical Program Committee decided upon the acceptance of the contributions for the preliminary conference program
- › The full papers were reviewed by at least three peers who made suggestions for improving the final papers.

In addition to be printed in the CIPS proceedings by the VDE Verlag, the papers will be uploaded to the IEEE Xplore digital library and the VDE Verlag library. The papers can be applied to the IEEE Transactions on Power Electronics as well.

We hope that you are able to use this conference to advance your professional career technically, socially, and culturally. This is truly a unique opportunity and on behalf of everyone, we express our thanks to all the members of CIPS 2014 organizing committee, especially including Mr. T. Raphael and Ms. H. Altintas, all VDE, and Mr. T. Harder, Ms. I. Bollens, and Ms. S. Haberl from ECPE, for all that they have done to make this conference such a great opportunity.

L. Lorenz

General Chair

E. Wolfgang, D. Silber

Technical Chairs

Committees and Chairs

Leo Lorenz, Infineon Technologies AG (General Chair)
Eckhard Wolfgang, ECPE e.V. (Technical Chair)
Dieter Silber, University of Bremen (Technical Chair)

Steering Committee

Reinhold Bayerer, Infineon Technologies AG, DE
Dusan Boroyevich, Virginia Tech Center for Power Electronics Systems, US
Giovanni Busatto, University of Cassino and Lazio Meridionale, IT
Jaeho Choi, Chungbuk National University, KR
Rik De Doncker, RWTH Aachen University, DE
Enrique J. Dede, University of Valencia, ES
Braham Ferreira, Delft University of Technology, NL
Kimimori Hamada, Toyota Motor Corporation, JP
Reinhard Herzer, Semikron Elektronik GmbH & Co. KG, DE
Mark Johnson, University of Nottingham, GB
Steve Jones, Dynex Semikonduktor, GB
Wlodzimierz Koczara, Warsaw University of Technology, PL
Johann Walter Kolar, Eidgenössische Technische Hochschule Zürich, CH
Michel Mermet-Guyennet, ALSTOM Transport, FR
Gerhard Miller, Infineon Technologies AG, DE
Hiromichi Ohashi, AIST, JP
Cian O'Mathuna, Tyndall National Institute, IE
Ichiro Omura, Kyushu Institute of Technology, JP
Mats Reimark, Fairchild Semiconductor, SE
Jean-Luc Schanen, G2ELab, FR
Jürgen Schuderer, ABB Schweiz AG, CH
Emanuele Scrofani, STMicroelectronics, IT
Dieter Silber, Universität Bremen, DE
Eckhard Wolfgang, ECPE e.V., DE
Mark Dehong Xu, Zhejiang University, CN
Stefan Zudrell-Koch, Dialog Semiconductor GmbH, DE

Technical Program Committee

Bruno Allard, Institut National des Sciences Appliquées de Lyon, FR
Stephane Azzopardi, University of Bordeaux, FR
Christopher Bailey, University of Greenwich, GB
Mark-Matthias Bakran, Universität Bayreuth, DE
Reinhold Bayerer, Infineon Technologies AG, DE
Frede Blaabjerg, Aalborg University (AAU), DK
Dusan Boroyevich, Virginia Tech Center for Power Electronics Systems, US
Giovanni Breglio, Università di Napoli Federico II, IT
Bruno Burger, Fraunhofer ISE, DE
Giovanni Busatto, University of Cassino and Lazio Meridionale, IT
Mauro Ciappa, Swiss Federal Institute of Technology, CH
Jose A. Cobos, Universidad Politécnica de Madrid (UPM), ES
Gerard Coquery, IFSTTAR Satory, FR
Rik De Doncker, RWTH Aachen University, DE
Gerald Deboy, Infineon Technologies Austria AG, AT
Enrique J. Dede, University of Valencia, ES
Philippe Dupuy, Freescale Semiconductor Inc., FR
Hans-Günter Eckel, Universität Rostock, DE
Bernd Engel, Technische Universität Braunschweig, DE
Alfred Engler, Liebherr-Elektronik GmbH, DE
Jan-Henning Fabian, ABB Switzerland Ltd., CH
Fausto Fantini, Università degli Studi di Modena e Reggio Emilia, IT
Braham Ferreira, Delft University of Technology, NL
Hans-Peter Feustel, Conti Temic microelectronic GmbH, DE
Peter Friedrichs, Infineon Technologies AG, DE
Michael Frisch, Vincotech GmbH, DE
Niels Gade, Danfoss Drives A/S, DK
Herbert Gambach, Siemens AG, DE
Norbert Graß, Technische Hochschule Nürnberg Georg Simon Ohm, DE
Stefan Gutschling, ZVEI e.V., DE
Thomas Harder, ECPE e.V., DE
Marcel Held, Empa Swiss Federal Laboratories for Materials Testing and Research, CH
Marcel Hendrix, Philips Lighting, BE
Eckart Hoene, Fraunhofer IZM, DE
Klaus Hoffmann, Helmut-Schmidt-Universität, DE

Steve Jones, Dynex Semikonduktor, GB
Nando Kaminski, Universität Bremen, DE
Sukhvinder Kang, Aavid Thermalloy, US
Christian Keller, Converteam GmbH, DE
Ralph M. Kennel, Technische Universität München, DE
Ulrich Kirchenberger, STMicroelectronics, DE
Włodzimierz Koczara, Warsaw University of Technology, PL
Johann Walter Kolar, Eidgenössische Technische Hochschule Zürich, CH
Jochen Koszescha, ECPE e.V., DE
Kai Kriegel, Siemens AG, DE
Patrick Leteinturier, Infineon Technologies AG, DE
Romeo Letor, ST Microelectronics, IT
Dominique L'Hotellier, Renault FR, FR
Thomas Licht, Fachhochschule Düsseldorf, DE
Andreas Lindemann, Otto-von-Guericke-Universität Magdeburg, DE
Stefan Linder, ABB Switzerland Ltd, CH
Matteo Lo Presti, ST Microelectronics, IT
Robert D. Lorenz, The University of Wisconsin, US
Josef Lutz, Technische Universität Chemnitz, DE
Johann Maier, AB Mikroelektronik GmbH, AT
Regine Mallwitz, Hochschule Fulda, DE
Laura Marlino, Oak Ridge National Laboratory, US
Rainer Marquardt, Universität der Bundeswehr München, DE
Martin März, Fraunhofer IISB, DE
Phil Mawby, University of Warwick, GB
Patrick McCluskey, University of Maryland, US
Michel Mermet-Guyennet, ALSTOM Transport, FR
Axel Mertens, Gottfried Wilhelm Leibniz Universität Hannover, DE
José Millán, Centro Nacional Microelectrónica (CNM), ES
Herve Morel, CEGELY INSA, FR
Jean Michel Morelle, VALEO, FR
Mark Nils Münzer, Infineon Technology, DE
Akio Nakagawa, Toshiba Corp. Semiconductor Company, JP
Ettore Napoli, University of Naples Federico II, IT
Khai D.T. Ngo, Virginia Tech Center for Power Electronics Systems, US
Mathias Nowotnick, Universität Rostock, DE
Hiromichi Ohashi, AIST, JP
Cian O'Mathuna, Tyndall National Institute, IE

Ichiro Omura, Kyushu Institute of Technology, JP
Frank Osterwald, Danfoss Silicon Power GmbH, DE
David Perreault, Massachusetts Institute of Technology, US
Volker Pickert, Newcastle University, GB
Robert Plikat, Volkswagen AG, DE
Peter Prenninger, AVL List GmbH, AT
Derk Reefman, Philips Research, NL
Tobias Reimann, isle Steuerungstechnik und Leistungselektronik GmbH, DE
Jürgen Reinert, CG Drives & Automation, SE
Volker Rischmüller, Robert Bosch GmbH, DE
Martin Rittner, Robert Bosch GmbH, DE
Evgeny Rudnyi, CADFEM GmbH, DE
Jean-Luc Schanen, G2ELab, FR
Uwe Scheuermann, Semikron Elektronik GmbH & Co. KG, DE
Oliver Schilling, Infineon Technologies AG, DE
Andreas Schlögl, Infineon Technologies AG, DE
Roland Schmidt, Siemens AG, DE
Martin Schneider-Ramelow, Fraunhofer IZM, DE
Hans-Joachim Schulze, Infineon Technologies AG, DE
Emanuele Scrofani, STMicroelectronics, IT
Norbert Seliger, Hochschule Rosenheim, DE
Toshihisa Shimizu, Tokyo Metropolitan University, Tokyo, JP
Dieter Silber, Universität Bremen, DE
Stefan Spannhake, Robert Bosch GmbH, DE
Paolo Spirito, University of Napoli Federico II, IT
Michael Stoisiek, Universität Erlangen-Nürnberg, DE

Organizing Committee

Hatice Altintas, VDE e.V. Conference Services, DE
Thomas Harder, (ECPE e.V.), DE
Thomas Raphael, VDE e.V., DE
Dieter Silber, University of Bremen, DE
Eckhard Wolfgang, ECPE e.V., DE

Hall Kaiser Karl IV.**10:30 Welcome and Opening**

*Eckhard Wolfgang (ECPE e.V., Germany),
Dieter Silber (Bremen University, Germany)*

Session 1: Reliability (1)

*Chairs: Eckhard Wolfgang (ECPE e.V., Germany),
Martin März (Fraunhofer IISB, Germany)*

10:50 Keynote: What are the big challenges in PE
Johann. W. Kolar (ETH Zurich, Switzerland)

11:30 Packaging and Reliability of Power Modules (Invited)
Josef Lutz (Chemnitz University of Technology, Germany)

12:00 High-throughput DBC-assembled IGBT screening for power module
Masanori Tsukuda (The International Centre for the Study of East Asian Development & Kyushu Institute of Technology, Japan); Seiichi Okoda (Coper Electronics co. Ltd, Japan); Noda Ryuzo (C. D. N. Corporation, Japan); Katsuji Tashiro (HOH KOH SYA Co., Ltd., Japan); Ichiro Omura (Kyushu Institute of Technology, Japan)

12:20 Simultaneous Testing of Wirebond and Solder Fatigue in IGBT Modules
Gernot J Riedel, Maria Valov (ABB Corporate Research, Switzerland)

12:40 - 14:00 Lunch Break

Hall Kaiser Karl IV.**Session 2: Reliability (2)**

Chairs: Christian Conrath (Schneider-Electric, STIE & Schneider Electric, France), Josef Lutz (Chemnitz University of Technology, Germany)

14:00 Power cycling capability of Modules with SiC-Diodes
Christian Herold (Chemnitz University of Technology, Germany); Marc Schäfer, Frank Sauerland (Infineon AG, Germany); Tilo Poller, Josef Lutz (Chemnitz University of Technology, Germany); Oliver Schilling (Infineon AG, Germany)

14:20 A real time measurement of junction temperature variation in high power IGBT modules for wind power converter application
Pramod Ghimire, Angel Ruiz de Vega, Kristian Bonderup Pedersen (Aalborg University, Denmark); Bjørn Rannestad (kk-electronics a/s, Denmark); Stig Munk-Nielsen (Aalborg University, Denmark); Paul Bach Thøgersen (kk-elektronics a/s, Denmark)

14:40 Thermal path integrity monitoring for IGBT Power Electronics Modules
Amir Eleffendi, C. Mark Johnson (University of Nottingham, United Kingdom)

15:00 Reliability assessment of molded Smart Power Modules
Tina Thomas (TU Berlin, Germany); Karl-Friedrich Becker, Tanja Braun, Joerg Bauer (Fraunhofer IZM, Germany); Klaus-Dieter Lang (TU Berlin, Germany); Olaf Wittler, Rolf Aschenbrenner (Fraunhofer IZM, Germany)

15:20 Microstructural study of the fatigue mechanism of aluminum clad copper wires
Falk Naumann, Benjamin Maerz, Jan Schischka, Matthias Petzold (Fraunhofer IWM, Germany)

15:40 - 16:10 Coffee Break

Hall Kaiser Karl IV.**Session 3: Reliability (3)**

Chairs: Stefan Linder (ABB, Switzerland), Norbert Seliger (FH Rosenheim, Germany)

- 16:10 Aging of new Interconnect-Technologies of Power Modules during Power-Cycling**
Nicolas Heuck, Karsten Guth, Alexander Ciliox, Markus Thoben, Niels Oeschler, Sandra Krasel, Roland Speckels, Lars Böwer (Infineon Technologies AG, Germany)
- 16:30 High resolution failure analysis of silver-sintered contact interfaces for power electronics**
Bianca Böttge, Sandy Klengel, Matthias Petzold (Fraunhofer IWM, Germany)
- 16:50 An x-ray computed tomography study of crack development during thermal cycling of Al wire bonds**
Pearl A. Agyakwa, Li Yang, Martin Corfield, C. Mark Johnson (University of Nottingham, United Kingdom)
- 17:10 Probabilistic model based analysis of electrolytic capacitor ageing and failures in a single-phase power factor correction circuit**
Norbert Seliger (University of Applied Sciences Rosenheim, Germany)

17:30 - 17:40 Break

Hall Kaiser Karl IV.**Session 4: Reliability (4)**

Chairs: Dushan Boroyevich (Virginia Tech, USA), Uwe Scheuermann (Semikron, Germany)

- 17:40 Transient hygro-thermal-response of power modules in inverters-mission profiling for climate and power loading (Invited)**
Reinhold Bayerer, Matthias Lassmann, Sebastian Kremp (Infineon Technologies AG, Germany)
- 18:10 Temperature Humidity Bias (THB) Testing on IGBT Modules at High Bias Levels**
Christian Zorn (University of Bremen & IALB, Germany); Nando Kaminski (University of Bremen, Germany)
- 18:30 Keynote: Simulation and Test Vibration – Nonlinear Dynamic Effects in Vibration Durability of Electronic Systems**
Abhijit Dasgupta, Cholmin Choi (University of Maryland, USA); Ed Habtour (US Army Research Lab, USA)

19:10 - 19:30 Break

Exhibition Area**Dialog Session: Inverters, Converters, Drivers**

Chairs: Andreas Lindemann (University of Magdeburg, Germany), C. Mark Johnson (University of Nottingham, United Kingdom)

P01 Development of a New 1000V/1MVA IGBT 3L-NPC-VSC PEBB Type 2 with Independent Modulation, DC-Link Balancing and Short-Circuit Protection

Ingo Staudt (SEMIKRON Elektronik GmbH & Co. KG, Germany); Michael Sprenger (Technische Universität Dresden, Germany)

P02 Switching-Frequency Limitations of a Three-Phase PWM Inverter using Si-MOSFETs and SiC-SBDs

Keiji Wada, Kent Taguri (Tokyo Metropolitan University, Japan)

P03 A proposal of embedded SoC power supply compatible with a digital block design flow

Thomas Souvignet (STMicroelectronics, France); Bruno Allard (INSA Lyon, France); Severin Trochut, Frederic Hasbani (STMicroelectronics, France)

P04 Ultra-low Power Autonomous Power Management System with Effective Impedance Matching for RF Energy Harvesting

Salah-Eddine Adami, Christian Vollaire, Bruno Allard (Ampere Lab, France); Francois Costa (SATIE, France); Walid Haboubi, Laurent Cirio (Marne-la-Vallée University, France)

P05 GaN Power Semiconductors for PV Inverter Applications – Opportunities and Risks

Thorsten Stubbe (SMA Solar Technology AG, Germany); Regine Mallwitz (Fulda University of Applied Sciences, Germany); Mike Kunze (MicroGaN GmbH, Germany); Wolfgang Bergner, Oliver Häberlen, Gianmauro Pozzovivo (Infineon Technology AG, Austria); Roland Rupp (Infineon Technology AG, Germany)

P06 Design of Photovoltaic Microinverter for Off-Grid and Grid-Parallel Applications

Christian Felgemacher, Philipp Jäger, Ali Kobeissi, Jonas Pfeiffer, Dennis Wiegand, Wolfram Kruschel, Benjamin Dombert, Samuel Araújo, Peter Zacharias (University of Kassel, Germany)

P07 An Improved Method of Controlling IGBT Modules Using an Optimized Gate Current Waveform

Marius Cenusa, Gabriel Cretu, Martin Pfost (Reutlingen University, Germany)

P08 Impact of the control on the size of the output capacitor in the integration of Buck converters

Jorge Cortés, Vladimir Svikovic, Pedro Alou, Jesús A. Oliver, José A. Cobos (Universidad Politécnica de Madrid, Spain)

Dialog Session: Packaging

Chairs: Jelena Popovic-Gerber (Delft University of Technology, The Netherlands), Jürgen Wilde (University of Freiburg, Germany)

P09 Improving the bond strength of sinter joints by modifying the DBC without noble finishes and modified silver sinter pastes

Alexander Roth (KCC Corporation, Germany); Wolfgang Schmitt (Heraeus Materials Technology GmbH & Co. KG, Germany)

P10 Power Semiconductors Packaging in PV Inverters up to 30 kW power, a difficult choice

Juliane Hinze (University of Kassel, Germany); Jens Friebe (SMA Solar Technology AG, Germany); Peter Zacharias, Samuel Araujo (Universität Kassel, Germany); Torsten Leifert (SMA Solar Technology AG, Germany)

P11 Data-driven Modeling of the Ultrasonic Softening Effect for Robust Copper Wire Bonding

Andreas Unger, Walter Sextro, Simon Althoff, Tobias Meyer (University of Paderborn, Germany); Michael Brökelmann (Hesse GmbH, Germany); Felix Reinhart, Klaus Neumann (Bielefeld University, Germany); Karsten Guth, Daniel Bolowski (Infineon Technologies AG, Germany)

P12 Influence of nickel-phosphorus surface roughness on both wettability and pores formation in solder joints for high power electronic applications

Laurent Vivet , Ky Lim Tan (Valeo, France); Jean Michel Morelle (VALEO & GEEDS, France); A.-L. Joudrier, A. Etcheberry (Institut Lavoisier de Versailles, France); L. Chalumeau (Egide, France)

P13 Challenges on Diagnostics of Power Electronics Modules and Assemblies

Hans-Jürgen Albrecht, N. Busche, J. Strogies, K. Wilke, M. Schuster, C. Cassigniol (Siemens AG, Germany)

P14 Surface Profiles of Printed Ag Nanoparticle Paste and Their Implication on the Quality of Sintered Joints

Yun Wang, Jianfeng Li, Pearl Agyakwa, C Mark Johnson, Shuguang Li (University of Nottingham, United Kingdom)

P15 Developments for Copper-Graphite Composite Thermal Cores for PCBs for High-Reliability RF Systems

David L. Saums (DS&A LLC, USA); Robert A. Hay (MMCC LLC, USA)

P16 Robustness study of solder joints of different compositions by using Stochastic Finite Element Modeling

Younes Aoues, Abderahman Makhoulfi (INSA Rouen-LOFIMS, France); Philippe Pougnet (Reliability Expert Valeo, France); Abdelkhalak El-Hami (INSA Rouen-LOFIMS, France)

Dialog Session: Reliability, Design Tools

Chairs: Giovanni Breglio (Università di Napoli Federico II, Italy), Nando Kaminski (University of Bremen, Germany)

P17 Internal degradation monitoring of power devices during power cycling test

Akihiko Watanabe (Kyushu Institute of Technology, Japan); Masanori Tsukuda (The International Centre for the Study of East Asian Development & Kyushu Institute of Technology, Japan); Ichiro Omura (Kyushu Institute of Technology, Japan)

P18 Characterization of different wire bonding materials during passive thermal test

Fernando Cosiansi (Politecnico of Turin, Italy); Marcello Turnaturi, Emilio Mattiuzzo (Vishay Semiconductor Italiana, Italy); Steffen Koetter, Sven Thomas (Heraeus, Germany)

P19 Manufacturability and Reliability Assessment of Power Sandwich Technology

Ivan Josifovic (Delft University of Technology, The Netherlands); Till Huesgen, Elena Mengotti (ABB Corporate Research, Switzerland); Jelena Popovic-Gerber, Braham Ferreira (Delft University of Technology, The Netherlands); Uwe Drofenik (ABB Corporate Research, Switzerland)

P20 Reliability Prediction Approach of DC-DC Converter with Electrical Stress Analysis

Jemin Kim, Sungsoon Choi (Korea Electronics Technology Institute, South Korea); Kwanhun Lee (Kwangwoon University, South Korea)

P21 A Multi-Disciplinary Virtual Prototyping Design Tool for Power Electronics

Paul L Evans, Alberto Castellazzi, C. Mark Johnson (University of Nottingham, United Kingdom)

Dialog Session: Wide Band Gap and Passives Packaging

Chairs: Martin Schneider-Ramelow (Fraunhofer IZM, Germany), Thomas Harder (ECPE e.V., Germany)

P22 Evolution of Electrical Performance in New Generation of SiC MOSFET for High Temperature Applications

Remy Ouaida (Université Lyon1 & Thales TMI, France); Cyril Calvez, Anne-Sophie Podlejski, Pierre Brosselard (Laboratoire Ampère UMR CNRS 5005, France)

P23 Technology, industry and market trends in WBG power module packaging

Philippe Roussel, Jérôme Azemar (Yole Développement, France)

- P24 Novel Layout and Packaging for Lateral, Low-Resistance GaN-on-Si Power Transistors**
Richard Reiner, Patrick Waltereit, Fouad Benkhelifa, Herbert Walcher, Rüdiger Quay, Michael Schlechtweg, Oliver Ambacher (Fraunhofer IAF, Germany)
- P25 High Temperature Discrete Integrated Coreless Signal Insulator**
Dominique Bergogne (Ampere Lab, France); Khalil El Falahi (X-Rel Semiconductors, France); Hilal Ezzeddine (ST-Microelectronics, France); Christian Martin, Bruno Allard (University of Lyon, France); Gonzalo Picun (X-Rel Semiconductors, France); Cédric Pintout (ST-Microelectronics, France)
- P26 Investigation on AlCu-clad base plates and a new by-pass cooler concept for pin fin power modules**
Andre Uhlemann, Erwin Hymon, Thorsten Fath (Infineon Technologies AG, Germany)
- P27 Laminate with Thermal-Power Insert for Efficient Front-Side Heat Removal and Power Delivery**
Dominic Gschwend, Timo Tick (IBM Research Zurich, Switzerland); Stefano Oggioni (IBM ISC Eng., Italy); Stephan Paredes (IBM Research Zurich, Switzerland); Keiji Matsumoto (IBM-Japan, Japan); Manish K. Tiwari (ETH Zurich, Switzerland); Dimos Poulikakos (ETH Zurich, Switzerland); Thomas Brunschweiler (IBM Research Zurich, Switzerland)
- P28 A Simple Method to Evaluate Substrate Layout for Power Modules**
Nan Zhu, Min Chen, Dehong Xu (Zhejiang University, P.R. China)
- P29 Planar, double-layer magnetic inductors for low power, high frequency DC-DC converters**
Elias Haddad, Christian Martin, Charles Joubert (University Lyon 1, France); Bruno Allard, Cyril Buttay, Tony Abi Tannous, Pascal Bevilacqua (INSA Lyon, France)

Hall Kaiser Karl IV.

Session 5: Inverters, Converters

Chairs: Braham Ferreira (Delft University of Technology, The Netherlands), Regine Mallwitz (SMA Solar Technology AG, Germany)

- 08:50 Power Supply With Integrated PassivEs The EU FP7 Power Swipe Project (Invited)**
Cian Ó Mathúna, Ningning Wang, Santosh Kulkarni, Ricky Anthony, Nicolás Cordero (University College Cork, Ireland); Jesús Oliver, Vladimir Svikovic, José Antonio Cobos, Jorge Cortés (Universidad Politécnica de Madrid, Spain); Florian Neveu, Christian Martin, Bruno Allard (Ampere Lab-UMR CNRS, France); Frederic Voiron (IPDIA, France); Bernhard Knott (Infineon Technologies AG, Germany); Christoph Sandner, Gerhard Maderbacher, Joachim Pichler, Matteo Agostinelli, Anamaria Anca (Infineon Technologies AG, Austria); Markus Breig (Bosch Technologies, Germany)
- 09:20 Review of high frequency, highly integrated inductive DC-DC converters**
Florian Neveu, Christian Martin, Bruno Allard (INSA Lyon, France)
- 09:40 Low-inductive inverter concept by 200A/1200V half bridge in EasyPACK 2B – following strip-line design**
Christian R. Müller, Reinhold Bayerer (Infineon Technologies AG, Germany)
- 10:00 Losses Comparison of Gallium Nitride and Silicon Transistors in a High Frequency Boost Converter**
Wenbo Wang (Delft University of Technology, The Netherlands); Frans Pansier (NXP Semiconductors, The Netherlands); Sjoerd de Haan, Braham Ferreira (Delft University of Technology, The Netherlands)

Hall Kaiser Maximilian**Session 6: Interfaces and Substrates**

*Chairs: Martin Rittner (Robert Bosch GmbH, Germany),
Olaf Wittler (Fraunhofer IZM, Germany)*

08:50 Invited: Practical Aspects of Testing Methods for Thermal Interface Materials (Invited)

David Saums (DS&A LLC, USA)

09:20 High Temperature Compatibility of Interface between Al Ribbon and Au finished DBC Substrate

*Semin Park, Shijo Nagao, Katsuaki Suganuma
(Osaka University, Japan)*

09:40 Improved thermal cycling reliability of ZTA DBC substrates by manipulating metallization properties

*Junhee Park (KCC Corp., Korea); Alexander Roth
(KCC Europe GmbH, Germany)*

10:00 3D Packaging for vertical power devices

*Nicolas Rouger (Univ. Grenoble Alpes, G2Elab CNRS & Grenoble electrical engineering lab, France);
Julie Widiez, Lamine Benaissa, Bruno Imbert,
Paul Gondcharton (CEA Leti, France);
Jean-Christophe Crebier (Grenoble Université,
France)*

10:20 - 10:50 Coffee Break

Hall Kaiser Karl IV.**Session 7: Inverters, Converters, Drivers**

Chair: Rainer Marquardt (Universität der Bundeswehr München, Germany), Kai Kriegel (Siemens AG, Germany)

10:50 Scalable high frequency converters for drives based on switching cells

*Martin Schulz (Universität der Bundeswehr & ITIS GmbH - Marquardt, Germany); Florian Kapaun,
Rainer Marquardt (Universität der Bundeswehr München, Germany)*

11:10 Gate driver with adjustable gate current for flexible switching speed control to improve switching losses and EMI

*Julia Bauch, Andreas Lindemann (Otto-von-Guericke-University Magdeburg, Germany);
Andre Arens, Peter Kanschat (Infineon Technologies AG, Germany)*

11:30 Integrated gate driver circuits with an ultra-compact design and high level of galvanic isolation for power transistors

Duc To (Grenoble Electrical Engineering Laboratory, France); Nicolas Rouger (N/A & Grenoble electrical engineering lab, France); Jean-Daniel Arnould (IMEP-LAHC Laboratory, France); Yves Lembeye (Grenoble Electrical Engineering Laboratory, France)

11:50 Controlling of Power Electronic Modules by a 2-Wire-Connection with Combined Signal and Power Transfer

*Stefan Endres (LEB Uni Erlangen, Germany);
Stefan Zeltner (Fraunhofer IISB, Germany)*

12:30 - 14:00 Lunch Break

Hall Kaiser Maximilian**Session 8: Interconnects**

Chairs: Bruno Allard (INSA Lyon, France), Jürgen Schuderer (ABB, Switzerland)

10:50 Foil based transient liquid phase bonding as a die-attachment method for high temperature devices

Adeel Ahmad Bajwa, Yangyang Qin, Jürgen Wilde (University of Freiburg, Germany)

11:10 Partial transient liquid phase bonding for high-temperature power electronics using Sn/Zn/Sn sandwich structure solder

Sungwon Park, Shijo Nagao, Tohru Sugahara (Osaka University, Japan); Yoshitaka Kato, Hiroshi Ishino, Kazuhiko Sugiura (Denso Corporation, Japan); Katsuaki Sugauma (Osaka University, Japan)

11:30 Application of Silver Nano Particle to Pressureless Bonding onto a Copper Surface- Consideration of Substitute Material for Lead Solder

Satoru Kurita, Hiromasa Miyoshi, Satoru Kurita (DOWA Electronics Materials, Japan)

11:50 Reliability of Sn based LT-TLPS Joints for High Temperature Electronic Systems

Hannes Greve (University of Maryland & CALCE - Center for Advanced Life Cycle Engineering, USA); Patrick McCluskey (University of Maryland, USA)

12:10 Is Conductive Adhesive Bonding Suited for the Die-Attachment of Power Devices?

Jürgen Wilde, Johanna Ocklenburg (University of Freiburg, Germany); Eugen Rastjagaev (Infineon Technologies AG, Austria)

12:30 - 14:00 Lunch Break

Hall Kaiser Karl IV.**Session 9: Overview: EMI: Renewables, Sensors**

Chairs: Andreas Lindemann (University of Magdeburg, Germany), Jean-Luc Schanen (Grenoble Electrical Engineering Laboratory, France)

14:00 Conducted EMI and Systems Integration (Invited)

Dushan Boroyevich, Xuning Zhang (CPES, USA); Hemant Bishnoi (ABB, Switzerland); Rolando Burgos (CPES, USA); Paolo Mattavelli (DTG, Italy); Fred Wang (CURENT, USA)

14:30 Power Electronics for Renewable Energy Systems – Status and Trends (Invited)

Frede Blaabjerg, Ke Ma, Yongheng Yang (Aalborg University, Denmark)

15:00 New applications in power electronics for highly integrated high-speed magneto-resistive current sensors (Invited)

Simon Scherner, Rolf Slatter (Sensitec GmbH, Germany)

15:30 System Integration of GaN Converters – Paradigm Shift, Challenges and Opportunities

Jelena Popovic, Braham Ferreira (Delft University of Technology, The Netherlands); Jacobus Daan van Wyk (University of Johannesburg, South Africa)

15:50 - 16:20 Coffee Break

Hall Kaiser Karl IV.**Session 10: Lifetime and Robustness**

*Chairs: Frede Blaabjerg (Aalborg University, Denmark),
Giovanni Busatto (University of Cassino, Italy)*

16:20 Efficient online-algorithm for the temperature-cycle recording of an IGBT power module in a hybrid car during inverter operation

Marco Denk, Mark Bakran (University of Bayreuth, Germany)

16:40 Analyzing the state of health of diode layers by using structure functions

Martin Richter (Chemnitz University of Technology & Robert Bosch GmbH, Germany); Michael Kopp, Rüdiger Schroth (Robert Bosch GmbH, Germany); Josef Lutz (Chemnitz University of Technology, Germany)

17:00 Numerical Simulation and Experimental Results on the Surge Current Capability of 1200 V SiC MPS Diodes

Susanne Fichtner, Josef Lutz, Thomas Basler (Chemnitz University of Technology, Germany); Roland Rupp, Rolf Gerlach (Infineon Technologies AG, Germany)

17:20 A New Rainflow – free Method to Transfer Irregular Load Mission Profile Data Into appropriate Lab Test Conditions for Design Optimization

Andreas Aal (Volkswagen AG, Germany)

Hall Kaiser Karl IV.**Session 11: Power Modules**

*Chairs: Thomas Licht (FH Düsseldorf, Germany),
Jean Michel Morelle (VALEO & GEEDS, France)*

09:00 Power Modules with increased power density and reliability using Cu wire bonds on sintered metal buffer layers

Jacek Rudzki (Danfoss Silicon Power GmbH, Germany); Martin Becker, Ronald Eisele (FH Kiel, Germany); Max Poech (Fraunhofer ISIT, Germany); Frank Osterwald (Danfoss Silicon Power GmbH, Germany)

09:20 New power-module structures consisting of both copper and aluminium bonded on aluminium nitride substrates with an aluminium base plate

Nobuyuki Terasaki, Yoshiyuki Nagatomo, Toshiyuki Nagase, Yoshiro Kuromitsu (Mitsubishi Materials Corporation, Japan)

09:40 Breakthrough into the third dimension – Sintered multi layer flex for ultra low inductance power modules

Peter Beckedahl, Matthias Spang, Oliver Tamm (Semikron Elektronik GmbH & Co. KG, Germany)

Hall Kaiser Karl IV.**Session 12: Wide Band Gap (1)**

Chairs: Kimimori Hamada (Toyota Motor Corporation, Japan), Nando Kaminski (University of Bremen, Germany)

10:30 Influence of Cu/Ni(P) Metallized Si₃N₄ Ceramic Substrate in Bond Reliability of Power Components at 250 °C

Fengqun Lang, Hiroshi Yamaguchi, Hiroshi Nakagawa, Hiroshi Sato (R & D Partnership for Future Power Electronics Technology, Japan)

10:50 DCB-based low-inductive SiC modules for high frequency operation

Michael Meisser (Karlsruhe Institute of Technology & Institute for Data Processing and Electronics, Germany); Dean Hamilton, Philip Mawby (University of Warwick, United Kingdom)

11:10 1200 V-360 A SiC Power Module with Phase Leg Clustering Concept for Low Parasitic Inductance and High Speed Switching

Kazuto Takao, Takashi Shinohe, Takashi Yamamoto, Kohei Hasegawa, Masaaki Ishida (Toshiba Corporation, Japan)

11:30 Comparison of thermo-mechanical reliability of high-temperature bonding materials for attachment of SiC devices

Jianfeng Li, Imran Yaqub, Martin Corfield, Pearl A Agyakwa, C Mark Johnson (University of Nottingham, United Kingdom)

11:50 Robust Top Side Contact Technology on Power Semiconductors – Results from the Public Funded Project ‘Pro Power’

Martin Rittner, David Gross, Michael Guyenot, Michael Günther, Sabine Haag, Thomas Kaden, Manfred Reinhold (Robert Bosch GmbH, Germany); Markus Thoben (Infineon Technologies AG, Germany); Stefan Stegmeier, Karl Weidner (Siemens AG, Germany); Mathias Kock (Danfoss Silicon Power GmbH, Germany)

12:10 - 13:30 Lunch Break

Hall Kaiser Karl IV.**Session 13: Wide Band Gap (2)**

Chairs: Gerhard Miller (Infineon Technologies AG, Germany), Dieter Silber (Bremen University, Germany)

13:30 Invited: Packaging Very Fast Switching Semiconductors (Invited)

Eckart Hoene, Andreas Ostmann, Christoph Marczok (Fraunhofer IZM, Germany)

14:00 Multi-chip circuit design for silicon carbide power electronics (Invited)

Hans-Peter Nee (KTH Royal Institute of Technology, Sweden); Jacek Rabkowski (Warsaw University of Technology, Poland); Dimosthenis Peftitsis (KTH Royal Institute of Technology, Sweden)

14:30 Keynote: Present and Future of GaN Power Devices

Daisuke Ueda, Takeshi Fukuda, Shuichi Nagai, Hiroyuki Sakai, Nobuyuki Otsuka, Tatsuo Morita, Noboru Negoro, Tetsuzo Ueda, Tsuyoshi Tanaka (Panasonic, Japan)

Thursday, February 27, 2014

15:10 - 15:30

Hall Kaiser Karl IV.**Awards and Closing Ceremony**

Chair: Dieter Silber (Bremen University, Germany), Eckhard Wolfgang (ECPE e.V., Germany)

15:10 - 15:30 Closing

GENERAL INFORMATION

Secretariat

For detailed Information please contact:

VDE-Conference Services

Ms Hatice Altintas
Stresemannallee 15
60596 Frankfurt
Germany

Phone: +49-(0)69-6308-477
Fax: +49-(0)69-6308-144
E-mail: Hatice.Altintas@vde.com
URL: www.vde.com

Registration hours on-site

The registration desk on-site will be available at the foyer of the Maritim Hotel Nürnberg

Tuesday, February 25, 2014	08:00 h to 19:00 h
Wednesday, February 26, 2014	07:30 h to 18:00 h
Thursday, February 27, 2014	07.30 h to 15:00 h

Availability by phone or e-mail on-site

Registration counter:
Phone/Fax: +49-(0)911 23 63 895
E-mail: vde-conferences@vde.com

Website

Visit the CIPS 2014 Homepage for getting the latest information related to the conference:

www.cips-conference.de

Registration

To register for CIPS 2014 please fill in the registration form attached to this program and return it to VDE Conference Services. Full payment or credit card information must accompany all registrations in order to be accepted.

Please visit <http://www.cips-conference.de> if you prefer online registration.

Registration fees

	From January 24, 2014
Presenting Author	€ 610,--
Member (VDE/IEEE/ECPE)*	€ 610,--
Non-member	€ 675,--
Student*	€ 520,--
Additional tickets for conference dinner	€ 60,--
Additional proceedings	€ 40,--

* Participants applying for the membership fee must include a copy of their membership card to the registration form. A photocopy of the student card must be included.

The conference fee includes admission to all sessions as well as to the daily coffee-breaks and lunches, one copy of the proceedings including a CD-ROM, the welcome reception on Tuesday, February 25 and the conference dinner on Wednesday, February 26, 2014 and the table top exhibition.

Payment

Payment for registration, including bank charges and processing fees, must be made in Euro.

The conference fee has to be fully paid in advance.
Confirmation of registration will be sent after full payment has been received at the VDE-Conference Services.

The following methods of payment are accepted:

- By credit card authorisation as per registration form. The 16 digit card number, expiry date, security No. (last 3 digits on rear side of credit card) and holder's name must be indicated on the registration form. Signature of the card holder is mandatory.
- Cheque in EURO (€) payable to VDE and sent together with the registration form by mail.

Cancellation

In case of cancellation, provided that written notice is received at the VDE-Conference Services **before January 24, 2014**, the registration fee will be fully refunded less a handling fee of EURO 60,00. After January 24, 2014 no refund will be made. Proceedings and CD-ROM will then be sent to the registrant after the conference.

Proceedings

All papers accepted for presentation at the conference will be published in the proceedings and a CD-ROM. The proceedings will be handed on-site to all delegates attending the event.

The proceedings will be published by VDE Verlag and will also be available in IEEE Xplore® and the VDE-Verlag digital Library.

Additional proceedings and CD-ROM are on sale during the conference (upon availability) at Euro 40,-

Table Top Exhibition

Following Companies will present their products during the Table Top Exhibition:

Boschman Technologies BV, Duiven, NL
www.boschman.nl

Dowa HD Europe GmbH, Nürnberg, DE
www.dowa-europe.com

DuPont (UK) Ltd, Bristol, UK
www.dupont.com

ECPE e.V., Nürnberg, DE
www.ecpe.org

Fraunhofer Institute for Mechanics of Materials IWM, Halle (Saale), DE
www.en.iwm.fraunhofer.de

Gecko-Simulations AG, Zurich, CH
www.gecko-simulations.com

Hoffmann & Co Elektrokohle AG, Bad Goisern, AT
www.hoffmann.at

Ingenieurbüro Billmann, Emskirchen, DE
www.ib-billmann.de

Kyushu Institute of Technology Kitakyushu, Fukuoka, JP
www.kyutech.ac.jp

Plexim GmbH, Zürich, CH
www.plexim.com

Uptime Engineering, Graz, AT
www.uptime-engineering.com

Conference Venue

Nuremberg is a lively city of about half a million inhabitants, with a visible history of almost one thousand years. It is also a city "of wit", where inventiveness and the researchers' curiosity have found a home. In the region Nuremberg-Erlangen many power electronics companies, research institutes and universities are located.

The CIPS 2014 will take place in the Maritim Hotel Nürnberg which offers a wide range of well equipped rooms and foyers. It is located 5 min. off the main railway station where there is also a 10 min. connection from the airport by Subway U 2 direction „Röthenbach”.

Maritim Hotel Nürnberg
Frauentorgraben 11
90443 Nürnberg
Phone: +49 (0) 911 2363-0
Fax: +49 (0) 911 2363-823
E-mail: info.nur@maritim.de

Official Language

All sessions will be held in English, only.

Social Program

- The conference dinner will take place on February 26, 2014 in the City Hall Nuremberg
- During the „Dialog Session – Posters” on February 25, 2014 at the Foyer of the Maritim Hotel Nürnberg, typical Franconian snacks and Beverages will be served.

The attendance is included in the full conference fee. Additional tickets may be ordered with the registration form within the given deadline.

Awards

During the Closing Ceremony on February 27, 2014, the Best Poster Award as well as the Young Engineer Award for the Best Paper will be granted.

Insurance

The organisers may not be held responsible for any injury to participants or damage, theft and loss of personal belongings. Participants should therefore make their own insurance arrangements.



Direction to the Conference Dinner

**Historical City Hall Nuremberg
(1332 - 1340)
Rathausplatz 2
90403 Nürnberg**