Program for 7th International Conference on Integrated Power Electronics Systems

Tuesday, March 6

10:30 AM - 10:50 AM
Opening

Room: Saal Kaiser Karl IV.
Chairs: Uwe Scheuermann (Semikron, Germany), Josef Lutz (Chemnitz University of Technology, Germany)

10:50 AM - 12:30 PM
Session 1: Emerging Technologies

Room: Saal Kaiser Karl IV.
Chairs: Leo Lorenz (Infineon Technologies, Germany), Eishardt Wolfgang (ECPE e. V., Germany)

10:50 Keynote: Extreme Efficiency Power Electronics - CCM vs. DCM Operation
Johann W. Kolar (ETH Zurich, Power Electronic Systems Laboratory, Switzerland)

11:30 Advanced cooling for power electronics (Invited)
Sukhindra Kang (AMD, USA)

12:00 Analysis of innovative packaging technologies and trends for power modules (Invited)
Alexandre Aeron (Yole Développement, France)

12:30 PM - 1:40 PM
Lunch (1)

1:40 PM - 3:10 PM
Session 2: Design

Room: Saal Kaiser Karl IV.
Chairs: Urs Furtner (ABB Corporate Research, Switzerland), Volker Pickert (Newcastle University, United Kingdom), Nicolas Rouger (Grenoble University & Grenoble engineering lab, France)

1:40 Electromagnetic Modeling of EMI Input Filters (Invited)
Ivan Kovacevic (ETH Zurich, Power Electronic Systems Laboratory, Switzerland), Andreas Münzing (GeckO-Research GmbH, Switzerland), Thomas Friedli (ETH Zurich, Switzerland), Johann W. Kolar (ETH Zurich, Power Electronic Systems Laboratory, Switzerland)

2:10 Calculating Transient Thermal Loads of ECUs in Engine Compartment by Applying Simplified Physical Models
Michael Decker (Continental Automotive GmbH, Germany), Thomas Reipl (Continental Automotive GmbH, Germany)

2:30 Comparative Evaluation of Individual and Coupled Inductor Arrangements for Input Filters of PV Inverter Systems
Benedetto Cusso (ETH Zurich, Switzerland), Thomas Friedli (ETH Zurich, Switzerland), David Boellard (ETH Zurich, Power Electronic Systems Laboratory, Switzerland), Johann W. Kolar (ETH Zurich, Power Electronic Systems Laboratory, Switzerland)

3:10PM - 5:00PM
Coffee break (1)

3:40 PM - 4:40 PM
Session 3: Applications

Room: Saal Kaiser Karl IV.
Chairs: Christian Conrath (Schneider-Electric, STIE & Schneider-Electric, France), Martin Mäz (FhG Erlangen, Germany)

3:40 The performance comparison of the multilevel converter topologies for PV inverter
Yugui Kashihara (Nagasaki University of Technology, Japan), Junichiro Kato (Nagasaki University of Technology, Japan)

4:00 Integrated Power Electronics Interface for Plug-In Hybrid Electric Vehicle Applications
Omar Hegazy (Vrije Universiteit Brussel, Belgium), Joeri Vanhenten (Vrije Universiteit Brussel, Belgium), Philippe Latame (Vrije Universiteit Brussel, Belgium), Mohamed El Badawy (Vrije Universiteit Brussel, Belgium)

4:40 PM - 5:00 PM
Break (1)

5:00 PM - 7:00 PM
Session 4: Reliability (1)

5:00 Keynote: Reliability of Power Electronics Under Thermal Loading
Patrick McCluskey (University of Maryland, USA)

5:40 Reliability driven virtual prototyping of power electronic equipment - a case study
Till Hueggen (ABB Corporate Research, Switzerland), Gerhard Z Freital (ABB Corporate Research, Switzerland), Uwe Drefner (ABB Corporate Research, Switzerland)

6:00 New Methods Help Better Evaluate Risks via Simulation
Angelika Schlingel (Continental Automotive GmbH, Germany), Markus Ternovostch (Continental Automotive Romania Srl, Romania), Andreas Schellin (Continental Automotive GmbH, Germany), Daniel Wol (Continental Automotive GmbH, Germany)

6:20 Separating failure modes in Power Cycling Tests
Ralf Schmidt (Semikron Elektronik GmbH, Germany), Uwe Scheuermann (Semikron, Germany)

7:00 PM - 7:20 PM
Break (2)

7:20 PM - 9:00 PM
Dialog Session

Chairs: Jean Michel Morelle (VALEO, France), Andreas Lindemann (University of Magdeburg, Germany), Nando Kamiński (University of Bremen, Germany)

P01: Control of Primary Active Rectifiers of Traction Converter with Medium-Frequency Transformer: Benefits of Control Unit Combining DSP and FPGA
Dusan Janik (University of West Bohemia, Czech Republic), Zdenek Peroutka (University of West Bohemia, Czech Republic), Jan Mohle (University of West Bohemia, Czech Republic), Tomáš Krmínský (University of West Bohemia, Czech Republic), Jan Zák (University of West Bohemia, Czech Republic)

P02: Scalable High Insulation Power Supply for Medium Voltage Power Converters
Issa Fazli (Montgomery Gok Eskiya Politeknikleri, Spain), Zineb Mchaar (Montgomery Gok Eskiya Politeknikleri & Montenegro University, Spain), Jesus Fernandez (Montgomery Gok Eskiya Politeknikleri, Spain)

P03: Amplitude Modulated Resonant Push-Pull Driver for Piezoelectric Transformers in Switching Power Applications
Holger Schützenrainer (Fraunhofer ISP, Germany), Tobias Ertzacher (Fraunhofer ISP, Germany), Ardon Bauer (Fraunhofer ISP, Germany), Heiner Rysius (Fraunhofer ISP, Germany), Lothar Frey (Fraunhofer ISP, Germany)

P04: Asymmetrical Parasitic Inductance Utilized for Switching Loss Reduction in Power Modules
Michael Frisch (Vincotech GmbH, Germany), Erno Temesi (Vincotech Kft., Hungary, Hungary)

P05: Thermal Management Concepts for Power Sandwich Industrial Drive
Ivan Jelovčič (ADZ University of Technology, The Netherlands), Janek Popovic (ADZ University of Technology, The Netherlands), Ivan Jelovčič (ADZ University of Technology, The Netherlands)

P06: Reliable Integration of Double-Sided Cool Stack Power Switches based on 70 um Thin SiC Btfs and Diodes
Alberto Causil (University of Nottingham & Power Electronics, Machines and Control Group, United Kingdom), Jian Li (University of Nottingham, United Kingdom), C. Mark Johnson (University of Nottingham, United Kingdom), Aliwae Solomon (University of Nottingham, United Kingdom)

P07: Influence of baseplate design on cooling performance and reliability
Kai Kriegel (Siemens AG, Germany), Svendran Lorchut (Siemens AG, Germany), Jörgen Otto (Siemens AG, Germany), Thomas Komma (Siemens AG, Germany), Walter Kofe (Siemens AG, Germany)

P08: Comparison between electromagnetic and thermal stress induced by Direct Current flow in IGBT bond wires
Hassan Medjahed (Université de Toulouse, France), Paul Elhamé (Université de Toulouse, France)

P09: Centrifugal Formulation of Percolating Thermal Underfill for Flip-Chip Applications
Jean-Ziöcher (IMST Research - Zurich, Switzerland), Jakub Malančič (IBM Research - Zurich, Switzerland), Karl Komma (IBM Research - Zurich, Switzerland)

P10: Development and Testing of Cold Gas Sprayed Circuit Boards for Power Electronics Applications
Eugen Raipag (University of Delft & METE, Germany), Jorgen Wilde (University of Delft, Germany)

P11: Development of high temperature packaging technologies for SiC power devices based on finite elements simulation and experiments - thermal approach
Luis Diaz (University of Bordeaux & IMB Laboratory, France), Stefano Ponzanelli (University of Bordeaux & IMB Laboratory, France), Eric Worgrard (University of Bordeaux & IMB Laboratory, France), Jean-Patrick Delage (University of Bordeaux & IMB Laboratory, France)

P12: Wire-Bond and Smart-Power Capable Hybrid Structured ASIC for Cost-Aware Single-Chip Integration of Industrial Applications
Yifan Zhang (Institute for Microelectronics Stuttgart, Germany), Cor Schwenk (Institute für Mikroelektronik Stuttgart, Germany), Joachim Burghardt (IMEC, Belgium)

P13: Design Considerations of Very Low Profile Coupled Inductors for Flexible Photovoltaic Module
Zhe Zhang (Technical University of Denmark, Denmark), Marabelle Kukosh (Technical University of Denmark, Denmark), Xi Lin (Technical University of Denmark, Denmark)

P14: Design of a PCB Regrower coil based on the PEEC Method
Thomas Guilkot (ETH Zürich, Switzerland), Dominik Gerber (ETH Zürich, Switzerland), Jürgen Biala (ETH Zürich, Switzerland), Andreas Meising (ETH Zürich, Switzerland)
P15: Wafer-level fabrication of high power density MEMS passives based on silicon molding technique
Jiping Li (University of Florida, USA); Khai D.T. Ngo (Virginia Tech, USA); Guo-Quan Lu (Virginia Tech & NBE Technologies, LLC, USA); Huikai Xie (University of Florida, USA)

P16: A Hybrid Hydraulic Piezo Actuator and its Control for Camless Internal Combustion Engines
Ashraf Lotfi (Enpirion, Inc., USA); Qiang Li (Virginia Tech, USA); Fred Lee (Virginia Tech, USA)
3:00 PM - 3:30 PM
Coffee break (3)

3:30 PM - 4:30 PM
Session 10: High and medium power modules
Room: Saal Kaiser Karl IV.
Chairs: Stefan Linder (ABB, Switzerland), Thomas Licht (FH Düsseldorf, Germany)

3:30 New assembly and interconnect technologies for power modules
Kai-Michael Gaul (Infineon Technologies AG, Germany); Nils Diezehrer (Infineon Technologies, Germany); Lars Blocher (Infineon Technologies, Germany); Roland Speck (Infineon Technologies, Germany); Guido Strothmann (Infineon Technologies, Germany); Nikolaus Heuck (Infineon Technologies, Germany); Sandra Kalz (Infineon Technologies, Germany); Alexander Öbrin (Infineon Technologies, Germany)

3:50 Direct cooled modules - integrated heat sinks
Chaf Hochfeld (Infineon Technologies AG, Germany); Alexander Herbrandt (Infineon Technologies AG, Germany)

4:10 Stacked substrates for high voltage applications
Chaf Hochfeld (Infineon Technologies AG, Germany); Reinhold Bayerer (Infineon Technologies AG, Germany); Hans Hartung (Infineon Technologies AG, Germany); Thomas Hunger (Infineon Technologies AG, Germany)

4:30 PM - 4:50 PM
Break (3)

4:50 PM - 5:30 PM
Introduction to Wide Band Gap
Room: Saal Kaiser Karl IV.
Chairs: Peter Friedrichs (Infineon, Germany), Ichiro Omura (Kyushu Institute of Technology, Japan)

4:50 SIC and GaN Devices - Competition or Coexistence? (Invited)
Nando Kamiyoshi (University of BREMEN); Oliver Heli (FBH, Germany)

7:00 PM - 10:00 PM
Conference Dinner

Thursday, March 8

9:00 AM - 10:40 AM
Session 11: Wide Band Gap
Room: Saal Kaiser Karl IV.
Chairs: Peter Friedrichs (Infineon, Germany), Ichiro Omura (Kyushu Institute of Technology, Japan)

9:00 Nontoxic Approach to Maximize Power Density in Industrial Inverter Designs
Martin Schulz (Infineon Technologies, Germany); Lukas De Lillo (University of Nottingham, United Kingdom); Lee Empringham (University of Nottingham, United Kingdom)

9:20 Integrated Anti-Short-Circuit Safety Circuit in CMOS SOI for Normally-On JFET
Khadi El Fafiati (Ampere Lab & INSA Lyon, France); Fabien Dubois (Ampere Lab, France); Damien Risalda (Laplace, France); Dominique Bargagna (Ampere Lab, France); Bruno Allot (INSA Lyon, France)

9:40 Electrical Analysis and Packaging Solutions for High-Current Fast-Switching SIC Components
Michel Mezini-Guyennet (ALSTOM Transport, France); Alberto Castellazzi (University of Nottingham & Power Electronics, Machines and Control Group, United Kingdom); Joseph Fabre (Alstom-Transport / LAPI, France); Philippe Godignon (Instituto de Microeletrônica de Barcelona, Spain); Dominique Pfannkuch (Université de Lyon Laboratoire Ampère CNRS UMR 5005 Insa de Lyon, France)

10:00 Design of an integrated power converter in Wide Band Gap for harsh environments
Jean-François Magnette (INSA de Lyon Laboratoire AMPERE, France); Dominique Trumier (INSA Lyon, France); Pascal Savignac (INSA de Lyon, France); Philippe Godignon (Instituto de Microeletrônica de Barcelona, Spain); Dominique Pfannkuch (Université de Lyon Laboratoire Ampère CNRS UMR 5005 Insa de Lyon, France)

10:20 Reducing expenditure with cooling in renewable power conversion systems with innovative SIC switches
Samuel Arauzo (Universität Kassel, Germany); Peter Zacharias (Universität Kassel, Germany)

10:40 AM - 11:10 AM
Coffee break (4)

11:10 AM - 12:50 PM
Session 12: Sinter Joinings
Room: Saal Kaiser Karl IV.
Chairs: Kai Krügel (Siemens AG, Germany), Frank Osterwald (Danfoss Silicon Power GmbH, Germany)

11:10-3-Dimensional, Solder-Free Interconnect Technology for High-Performance Power Modules
Bahram Mouawad (Université de Lyon Laboratoire Ampère CNRS UMR 5005 Insa de Lyon, France); Cyril Butey (Université de Lyon Laboratoire Ampère CNRS UMR 5005 & Insa de Lyon, France); Mehdi Boucha (Université de Lyon Laboratoire Ampère CNRS UMR 5005 Insa de Lyon, France); Herve Minel (Université de Lyon, INSA Lyon, Lab Ampère, CNRS, France); Bruno Allard (INSA Lyon, France); Damien Fabrègue (Université de Lyon MATEIS CNRS UMR 5510, France); Vincent Bley (Université de Toulouse UPS INPT LAPLACE, France)

11:30 Reliability of Silver Sintering on DBC and DBA Substrates for Power Electronic Applications
Silke Kraft (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Andreas Schütz (Fraunhofer Institute for Integrated Systems and Device Technology IIB, Germany); Martin Mielz (FHG Erlangen, Germany)

11:50 Low-pressure (< 5 MPa) Low-temperature Joining of Large-area Chips on Copper Using Nanosilver Paste
Haiqing Zheng (Virginia Tech, USA); Jesús Calata (Virginia Tech, USA); Khal D.T. Ngo (Virginia Tech, USA); Susan Luo (NBE Technologies, LLC, USA); Guo-Quan Lu (Virginia Tech & NBE Technologies, LLC, USA)

12:10 Sintered Silver Joint Strength Dependence on Substrate Topography and Attachment Pad Geometry
Andrew Wereszczak (Oak Ridge National Laboratory, USA); Daniel Ueno (Oak Ridge National Laboratory, USA); Zhenglin Liang (Oak Ridge National Laboratory, USA); Ethan Fox (Oak Ridge National Laboratory, USA)

12:30 Thermo mechanical Reliability of Low-temperature Low-pressure Die Bonding Using Thin Ag Flake Pastes
Soichi Sakamoto (Osaka University, Japan); Katsuaki Suganuma (Osaka University, Japan)

12:50 PM - 1:50 PM
Lunch (3)

1:50 PM - 3:30 PM
Session 13: Future
Room: Saal Kaiser Karl IV.
Chairs: Reinhold Bayerer (Infineon Technologies AG, Germany), Dieter Silber (Bremen University, Germany)

1:50 Planar interconnect technology for power module system integration (invited)
Karl Widder (Siemens AG, Germany); Michael Kasper (Siemens AG, Germany); Norbert Seiliger (FH Rosenheim, Germany)

2:20 Reliability of Planar SKiN interconnect Technology (invited)
Uwe Schueermann (Bermikon, Germany)

2:50 Keynote: SiC Devices and Power Module Technologies for Environmentally Friendly Vehicles
Kazumori Hamada (Toyota Motor Corporation, Japan)

3:30 PM - 3:50 PM
Closing
Room: Saal Kaiser Karl IV.