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## Program

Time	Kaiser Karl IV	Kaiser Maximilian	Session
<b>Tuesday, March 8</b>			
10:30-10:50	<b>Opening</b>		
10:50-12:10	S01: <b>System Integration</b>		
12:10-13:20			<b>Lunch Break</b>
13:20-15:00	S02: <b>Converter</b>	S03: <b>Silver Sintering</b>	
15:00-15:30			<b>Coffee Break</b>
15:30-17:30	S04: <b>Control</b>	S05: <b>Die attach and wire bonds</b>	
17:50-21:30			<b>Break,</b> DS: <b>Dialog Session Little Box Challenge,</b> DS: <b>Dialog Session: Analytics,</b> DS02: <b>Dialog Session: Converter,</b> DS03: <b>Dialog Session: Silver Sintering,</b> DS04: <b>Dialog Session: Control,</b> DS05: <b>Dialog Session: Die attach,</b> DS06: <b>Dialog Session: Thermal Cycling,</b> DS08: <b>Dialog Session: Power Cycling,</b> DS09: <b>Dialog Session: Substrates,</b> DS10: <b>Dialog Session: Power Modules,</b> DS11: <b>Dialog Session: Temperature Measurements,</b> DS12: <b>Dialog Session: Lifetime,</b> DS14: <b>Dialog Session: Passives,</b> DS15: <b>Dialog Session: Parasitics, Clean Switching, EMC</b>
<b>Wednesday, March 9</b>			
09:00-10:20	S06: <b>Thermal Cycling</b>	S07: <b>Thermal Management</b>	
10:20-10:50			<b>Coffee Break</b>
10:50-12:30	S08: <b>Power Cycling</b>	S09: <b>Substrates</b>	
12:30-13:40			<b>Lunch Break</b>
13:40-15:00	S10: <b>Power Modules</b>	S11: <b>Temperature Measurements</b>	
15:00-15:30			<b>Coffee Break</b>
15:30-17:20	S12: <b>SiC Power Modules</b>	S13: <b>Lifetime</b>	
19:00-22:00			<b>Conference Dinner</b>
<b>Thursday, March 10</b>			
08:30-10:20	S14: <b>Passives</b>		
10:20-10:50			<b>Coffee Break</b>
10:50-12:00	S15: <b>Clean Switching, EMC</b>		
12:00-13:00	S16: <b>Integrated Power Electronics</b>		
13:00-14:00			<b>Lunch Break</b>
14:00-15:40	S17: <b>Wide-band-gap Applications</b>		
15:40-16:10	<b>Closing</b>		

## Tuesday, March 8

**Tuesday, March 8, 10:30 - 10:50**

**Opening**

Rooms: Kaiser Karl IV, Kaiser Maximilian

Chairs: Leo Lorenz (ECPE, Germany), Eckhard Wolfgang (ECPE e. V., Germany)

**Tuesday, March 8, 10:50 - 12:10**

**S01: System Integration**

Rooms: Kaiser Karl IV, Kaiser Maximilian

Chairs: Leo Lorenz (ECPE, Germany), Eckhard Wolfgang (ECPE e. V., Germany)

**10:50 Keynote: Little Box Challenge**

Johann. W. Kolar (ETH Zurich, Switzerland); Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany)

**11:30 Keynote: Review of Integration Trends in Power Electronics Systems and Devices**

Gourab Majumdar (Mitsubishi Electric Corporation, Japan)

**Tuesday, March 8, 12:10 - 13:20**

**Lunch Break**

**Tuesday, March 8, 13:20 - 15:00**

**S02: Converter**

Room: Kaiser Karl IV

Chair: Regine Mallwitz (Technische Universität Braunschweig, Germany)

**13:20 Design and Development of LLC DC/DC Converter for Fuel Cell Range Extender Application**

Akshay Mahajan (Fraunhofer-Institut für Solare Energiesysteme ISE, Germany); Stefan Reichert (Fraunhofer Institute for Solar Energy Systems, Germany)

**13:40 Integrated converter network for active balancing structure of battery**

Thanh Hai Phung (Freemans, France); Jean-Christophe Crebier (Grenoble Université, France)

**14:00 Loss evaluation of GaN GIT in a high frequency boost converter in different operation modes**

Wenbo Wang, Frans Pansier, Jelena Popovic and Braham Ferreira (Delft University of Technology, The Netherlands)

**14:20 Optimization of a Gallium Nitride HEMT design for a high frequency DC-DC converter application**

Dejana Cucak (Universidad Politécnica, Spain); Miroslav Vasic (Universidad Politécnica de Madrid, Spain); Oscar Suarez (Universidad Politécnica de Madrid, Spain); Jesus Oliver and Pedro Alou (Universidad Politécnica de Madrid, Spain); Jose A. Cobos (Universidad Politécnica de Madrid (UPM), Spain)

**14:40 Capacitive Coupling for High Voltage Ratio Power Transfer in Multi-Cell Converters Based on GaN HFETs**

Farshid Sarrafin (University of Grenoble (des Alpes) & G2Elab, France); Bruno Allard (INSA Lyon, France); Jean-Christophe Crebier (Grenoble Université, France)

**S03: Silver Sintering**

Room: Kaiser Maximilian

Chair: Thomas Licht (Hochschule Düsseldorf, Germany)

**13:20 Processing and Properties of Chip-bonding on Copper Surface by Low-temperature Sintering a Nanosilver Paste**

Hanguang Zheng, Gao Shan and Khai D.T. Ngo (Virginia Tech, USA); Guo-Quan Lu (Virginia Tech & NBE Technologies, LLC, USA)

**13:40 Mechanical properties of silver-sintering bond lines**

Sebastian Letz and Aaron Hutzler (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Uwe Waltrich (Fraunhofer Institute for Integrated Systems and Device Technology, Germany); Andreas Schletz and Sigrid Zischler (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany)

**14:00 Rapid Sintering of Nanosilver Paste Using Current for attaching IGBT Chips**

Shuang-Tao Feng, Yun-Hui Mei and Xin Li (Tianjin University, P.R. China); Guo-Quan Lu (Virginia Tech & NBE Technologies, LLC, USA)

**14:20 Low Temperature Silver Sinter Processes on ENIG-Surfaces**

Thomas Blank, Michael Bruns, Christian Kübel, Benjamin Leyrer, Michael Meisser and Marc Weber (Karlsruhe Institute of Technology, Germany); Jacek Rudzki and Frank Osterwald (Danfoss Silicon Power GmbH, Germany); Klaus Wilke and Nora Busche (Siemens AG, Germany); Ronald Eisele (FH Kiel, Germany)

**Tuesday, March 8, 15:00 - 15:30**

**Coffee Break**

**Tuesday, March 8, 15:30 - 17:30**

**S04: Control**

Room: Kaiser Karl IV

Chair: Volker Pickert (Newcastle University, United Kingdom)

**15:30 Adaptive, Iterative Closed-Loop Control for the Turn-on of IGBTs with Improved Efficiency**

Marius Cenusca and Gabriel Cretu (Reutlingen University, Germany); Martin Pfost (University of Innsbruck, Germany)

**15:50 Optimal double sided gate control of IGBT for lower turn-off loss and surge voltage suppression**

Shohei Harada (Kyushu Institute of Technology, Japan); Masanori Tsukuda (City of Kitakyushu, Japan); Ichiro Omura (Kyushu Institute of Technology, Japan)

**16:10 Study on Packaging and Driver Integration of GaN Switches for Fast Switching**

Kirill Klein (Fraunhofer Institut für Reliabilität und Mikrointegration IZM, Germany); Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany); Richard Reiner (IAF Fraunhofer, Germany); Rüdiger Quay (Fraunhofer IAF, Germany)

**16:30 Characterization and analysis of an innovative gate driver and power supplies architecture for HF power devices in harsh environment**

Van Sang Nguyen (Grenoble Institute of Technology, France); Lyubomir Kerachev (Grenoble Electrical Engineering Laboratory, Germany); Pierre Lefranc (University of Grenoble Alpes, France); Jean-Christophe Crebier (Grenoble Université, France)

**16:50 Invited: New Gate Driver Solutions for modern Power Devices and Topologies**

Reinhard Herzer (SEMIKRON Elektronik GmbH & Co. KG, Germany)

**S05: Die attach and wire bonds**

Room: Kaiser Maximilian

Chairs: Martin Rittner (Robert Bosch GmbH, Germany), Martin Schneider-Ramelow (Fraunhofer IZM, Germany)

**15:30 Process Optimization in Transient Liquid Phase Soldering (TLPS) for an Efficient and Economical Production of High Temperature Power electronics**

Aarief Syed-Khaja (Friedrich-Alexander University Erlangen-Nürnberg & Institute for Factory Automation and Production Systems, Germany); Stefan Scherzer (Powersem GmbH, Walperdorfer Str. 53, Schwabach, Germany); Haneen Daoud, Julia Pfarr and Angela Loidolt (Pfarr Stanztechnik GmbH, Am Kleinen Sand 1, Buttlar, Germany); Ashok Chadda (Powersem GmbH, Walperdorfer Str. 53, Schwabach, Germany); Jörg Franke (FAU Erlangen-Nuremberg, Germany)

**15:50 Thermal performance of high-temperature stable die-attachments for GaN HEMTs**

Adeel Ahmad Bajwa (University of California Los Angeles, USA); Jürgen Wilde (Universität Freiburg - IMTEK, Germany); Richard Reiner (IAF Fraunhofer, Germany); Rüdiger Quay (Fraunhofer IAF, Germany)

**16:10 Low Temperature Bonding Technology for 250°C-Operating SiC Power Modules using Nano-Composite Cu/Sn Paste**

Fengqun Lang (National Institute of Advanced Industrial Science and Technology (AIST), Japan)

**16:30 Metallurgical structure of lead free solder alloy to improve the reliability of power module**

Ky Lim Tan (Valeo, France); Jean Michel Morelle (VALEO & GEEDS, France); Laurent Vivet and Serge Lavrentieff (Valeo, France)

**16:50 Wear optimized consumables for copper wire bonding in industrial mass production**

Michael Brökelmann, Dirk Siepe and Matthias Hunstig (Hesse GmbH, Germany); Karsten Guth and Mark Schnietz (Infineon Technologies AG, Germany)

**17:10 Influence of wire material and diameter on the reliability of Al-H11, Al-CR, Al-R and AlX heavy wire bonds during power cycling**

Christian Ehrhardt and Jan Höfer (Fraunhofer IZM, Germany); Ute Geißler (Berlin University of Technology, Germany); Marian Broll (Technical University of Berlin, Germany); Martin Schneider-Ramelow (Fraunhofer IZM, Germany); Klaus-Dieter Lang (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration, Germany); Stefan Schmitz (Bond-IQ, Germany)

**Tuesday, March 8, 17:50 - 18:00**

**Break**

**Tuesday, March 8, 17:50 - 21:30**

**DS: Dialog Session Little Box Challenge**

***A cost-controlled, 4.3kW/l 1- $\phi$  Inverter with a 97.2% CEC efficiency***

Guillaume Lefèvre, Jeffrey Ewanchuk and Nicolas Degrenne (FraCa team, France)

***Integrated, Intelligent modular power electronic converter***

Bruno Allard (INSA Lyon, France)

**DS: Dialog Session: Analytics**

***Probabilistic Strength Characterization of thin Semiconductor Devices for Power Electronic Applications***

Falk Naumann, Marcel Mittag, Michael Bernasch and Matthias Petzold (Fraunhofer-Institut für Werkstoffmechanik, Germany)

***Non-Destructive Assessment of Reliability and Quality related Properties of Power Electronic Devices for the In-Line***

***Application of Scanning Acoustic Microscopy***

Sebastian Brand (Fraunhofer Institute for Mechanics of Materials IWM, Germany); Falk Naumann (Fraunhofer-Institut für Werkstoffmechanik, Germany); Sebastian Tismer (Fraunhofer Institute for Mechanics of Materials IWM, Germany); Bianca Böttge (Fraunhofer Institute for Mechanics of Materials, Germany); Jacek Rudzki and Frank Osterwald (Danfoss Silicon Power GmbH, Germany); Matthias Petzold (Fraunhofer-Institut für Werkstoffmechanik, Germany)

***Microstructure and thermo-physical characterization of innovative plastic materials for power electronics***

Sandy Klengel (Fraunhofer Institute for Microstructure of Materials and System, Germany); Bianca Böttge (Fraunhofer Institute for Mechanics of Materials, Germany); Falk Naumann and Marcel Mittag (Fraunhofer-Institut für Werkstoffmechanik, Germany); Ulrike Hirsch (Fraunhofer Institute for Microstructure of Materials and System, Germany)

***Potential failure risks causing delamination of sinter joints***

Bianca Böttge, Stephan Reißaus and Sandy Klengel (Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Germany)

**DS02: Dialog Session: Converter**

***Switching performance of GaN-HEMT compared to Si-devices in new converters based on scalable converter cell structures***

Florian Kapaun, Christian Rolf and Rainer Marquardt (Universität der Bundeswehr München, Germany)

***Effect of CMOS Technology Scaling on Fully Integrated Power Supply***

Gael Pillonnet and Nicolas Jeannot (CEA-LETI, France)

***Design of a highly integrated, high frequency, low power DC-DC converter with cascode power stage with a 2.5D approach***

Florian Neveu and Bruno Allard (INSA Lyon, France); Christian Martin (University Lyon 1, France); Pascal Bevilacqua (INSA de Lyon, France); Frédéric Voiron (IPDiA, France)

**DS03: Dialog Session: Silver Sintering**

***Silver sintering at low temperatures without using pressure: An approach for joining large area copper-to-copper interconnects***

Annerose Oestreicher, Martin Lerch, Battist Rabay and Tobias Röhrich (Technische Universität Berlin, Germany)

***Evaluation of silver migration presences internally to an isolated sintered power module***

Fernando Cosiansi (Politecnico di Turin, Italy); Emilio Mattiuzzo and Marcello Turnaturi (Vishay Semiconductor Italiana, Italy); Fabrizio Pirri (Istituto Italiano di Tecnologia, Italy)

***Comparison of different technologies for the die attach of power semiconductor devices concuting active power cycling***

Matthias Hutter, Constanze Weber and Christian Ehrhardt (Fraunhofer IZM, Germany); Klaus-Dieter Lang (Berlin University of Technology, Germany)

***Adjust the mechanical properties of sintered silver layers using additives***

Wolfgang Schmitt and Thomas Krebs (Heraeus Deutschland GmbH & Co. KG, Germany)

**DS04: Dialog Session: Control**

***Wide Band Gap Power Transistors Gate Driver Cutting Edge Bloc Functions***

Romain Grézaud, Francois Ayel, Antoine Chapel and Dominique Bergogne (CEA Leti University of Grenoble, France)

***A Virtual Prototyping Tool of a Power Transmission Function for IGBT Gate Drivers with High Insulated Voltage Capabilities***

Sokchea Am (University of Grenoble Alpes & Grenoble Electrical Engineering Laboratory (G2ELab), France); Pierre Lefranc and David Frey (University of Grenoble Alpes, France)

**DS05: Dialog Session: Die attach**

***Investigations of Power Semiconductor Modules using Conductive Adhesive for Chip Assembly***

Folkhart Grieger (Otto-von-Guericke Universität Magdeburg, Germany); Andreas Lindemann (University of Magdeburg, Germany); Lars Middelstädt (Otto-von-Guericke-Universität, Germany); Eike Möller (Albert-Ludwigs-Universität Freiburg & Institut für Mikrosystemtechnik-IMTEK, Germany); Jürgen Wilde (Universität Freiburg - IMTEK, Germany)

**DS06: Dialog Session: Thermal Cycling**

***Evaluation of Cycling Stress Imposed on IGBT Modules in PV Central Inverters in Sunbelt Regions***

Christian Felgemacher (University of Kassel, Germany); Samuel Araujo (Universität Kassel, Germany); Christian Nöding (University of Kassel, Germany); Peter Zacharias (Universität Kassel, Germany); Alexander Ehrlich and Martin Schidleja (SMA Solar Technology AG, Germany)

**DS08: Dialog Session: Power Cycling**

***Electrothermal Considerations for Power Cycling in SiC Technologies***

Jose A Ortiz Gonzalez, Olayiwola Alatise, Nadeesh Nobeen and Ji Hu (University of Warwick, United Kingdom); Li Ran (The University of Warwick, United Kingdom); Phil Mawby (University of Warwick, United Kingdom)

**DS09: Dialog Session: Substrates**

***Enhancement of the partial discharge inception voltage of DBCs by adjusting the permittivity of the encapsulation***

Christoph Friedrich Bayer, Uwe Waltrich, Amal Soueidan, Richard Schneider and Eberhard Baer (Fraunhofer Institute for Integrated Systems and Device Technology, Germany); Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany)

**DS10: Dialog Session: Power Modules**

***Empirical study on humidity conditions inside power modules under varying external conditions***

Sebastian Kremp (Infineon Technologies AG, Germany); Oliver Schilling (Infineon AG, Germany); Verena Müller (Infineon Technologies AG, Germany)

***Advanced Power Semiconductor Packaging for Automotive System***

Yangang Wang (Dynex Semiconductor Ltd, United Kingdom)

***Damage protection of power modules***

Olaf Hohlfeld (Infineon Technologies AG, Germany)

***HEV power modules robust against thermo-mechanical stress***

Markus Leicht (Conti Temic microelectronic GmbH, Germany)

**DS11: Dialog Session: Temperature Measurements**

**Requirements of short-circuit detection methods and turn off for wide band gap semiconductors**

Andreas Maerz, Teresa Bertelshofer, Roman Horff and Mark Bakran (University of Bayreuth, Germany)

**Application-specific micro Rogowski coil for power modules - Design tool, novel coil pattern and demonstration -**

Masahiro Koga (Kyushu Institute of Technology, Japan); Masanori Tsukuda (City of Kitakyushu, Japan); Kenta Nakashima and Ichiro Omura (Kyushu Institute of Technology, Japan)

**Magneto-resistive current sensors as an enabling technology for ultra-high power density electric drives**

Rolf Slatter, Matthias Brusius and Heiko Knoll (Sensitec GmbH, Germany)

**Transient Thermal Impedance Model based on Online-Measurement of the On-State Voltage in IGBT Converters**

Dennis Wagenitz (TU Berlin, Germany); Reno Klitzke and Stephan Lehmann (Beuth Hochschule für Technik Berlin, Germany); Andreas Hambrecht (Beuth Hochschule für Technik, Germany); Sibylle Dieckerhoff (TU Berlin, Germany)

**DS12: Dialog Session: Lifetime****Lifetime Analysis of IGBTs in Periodic Surge Current Operation**

Johannes Kemper (Helmut Schmidt University, Germany); Julia Nevoigt (Post Graduate, Germany); Herbert Hübner (Research Assistant, Germany); Klaus Hoffmann (Helmut-Schmidt-Universität, Germany)

**Robustness validation of power electronic systems**

Thomas Schriefer (University of Erlangen-Nuremberg & Chair of Electron Devices, Germany); Maximilian Hofmann (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany)

**DS14: Dialog Session: Passives****Integrated High-Temperature Isolation Barrier with Coreless Transformer**

Remi Perrin (INSA Lyon AMPERE Lab, France); Christian Martin (University Lyon 1, France); Bruno Allard (INSA Lyon, France); Cyril Buttay (Université de Lyon Laboratoire Ampere CNRS UMR 5005 & Insa de Lyon, France)

**DS15: Dialog Session: Parasitics, Clean Switching, EMC****Innovative monolithic RC-snubber for fast switching power modules**

Florian Krach and Thomas Heckel (Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany); Anton Bauer, Tobias Erlbacher and Martin März (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Lothar Frey (Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany)

**A Parametric Layout Study of Radiated Emission from High-Frequency Half-Bridge Switching Cells**

Norbert Seliger and Franz Johann Stubenrauch (FH Rosenheim, Germany); Doris Schmitt-Landsiedel (Technische Universität München, Germany)

**A Simplified SPICE model for fast parametric optimization of hybrid power electronic circuits in the megahertz (MHz) range**

Franz Johann Stubenrauch and Norbert Seliger (FH Rosenheim, Germany); Doris Schmitt-Landsiedel (Technische Universität München, Germany)

**Considerations on the influence of the current ripple and switching frequency towards the differential mode EMI filter**

Andressa Schittler, Thiemo Kleeb and Mehmet Kazanbas (University of Kassel, Germany); Samuel Araujo and Peter Zacharias (Universität Kassel, Germany)

**Wednesday, March 9****Wednesday, March 9, 09:00 - 10:20****S06: Thermal Cycling**

Room: Kaiser Karl IV

Chairs: Markus Thoben (Infineon Technologies AG, Germany), Olaf Wittler (Fraunhofer IZM, Germany)

**09:00 Passive thermal cycling of power diodes under controlled atmospheric conditions - effects on metallization degradation**

Mads Brincker, Kristian B Pedersen, Peter Kristensen and Vladimir Popok (Aalborg University, Denmark)

**09:20 High temperature thermal cycling reliability of silver sintered and electroplated tin based transient liquid phase joints**

Dean Hamilton (University of Warwick, United Kingdom); Aarief Syed-Khaja (Friedrich-Alexander University Erlangen-Nürnberg & Institute for Factory Automation and Production Systems, Germany); Joerg Franke (FAPS, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany); Phil Mawby (University of Warwick, United Kingdom)

**09:40 High temperature thermal cycling performance of DBA, AMB and thick film power module substrates**

Dean Hamilton (University of Warwick, United Kingdom); Steve Riches (GE Aviation Systems, United Kingdom); Michael Meisser (Karlsruhe Institute of Technology, Germany); Liam Mills (Semelab TT Electronics, United Kingdom); Phil Mawby (University of Warwick, United Kingdom)

**10:00 Thermal Performance and Reliability of Copper Thick Film Substrates**

Paul Gundel, Melanie Bawohl, Mark Challingsworth, Christoph Czwickla, Virginia Garcia, Ilias Nikolaidis, Christina Modes, Ryan Persons, Jessica Reitz and Caitlin Shahbazi (Heraeus Deutschland GmbH & Co. KG, Germany)

**S07: Thermal Management**

Room: Kaiser Maximilian

Chairs: Giovanni Breglio (University Naples, Italy), Hans-Peter Feustel (Conti Temic Microelectronic GmbH, Germany)

**09:00 Comparison of Thermal Measurement Methods and Determination of Thermal Resistance of Die Attach Materials used in Power Electronic Modules**

Thomas Krebs (Heraeus Materials Technology GmbH & Co KG, Germany); Susanne Duch (Heraeus Materials Technology GmbH & Co. KG, Germany); Wolfgang Schmitt (Heraeus Materials Technology GmbH & Co. KG, Germany)

**09:20 Assessment of the Thermal Conductivity of Transient Liquid Phase Sintered Interconnects**

Hannes Greve (University of Maryland & CALCE - Center for Advanced Life Cycle Engineering, USA); Patrick McCluskey and Seyed Moeini (University of Maryland, USA); Shailesh Joshi (Toyota Research Institute of North America, USA)

**09:40 Thermal Impedance Identification of a SiC JFET module**

Arvid Merkert, Simon Weber and Axel Mertens (Leibniz Universität Hannover, Germany)

**Wednesday, March 9, 10:20 - 10:50****Coffee Break****Wednesday, March 9, 10:50 - 12:30****S08: Power Cycling**

Room: Kaiser Karl IV

Chair: Uwe Scheuermann (Semikron, Germany)

**10:50 Reliability study of SiC-JFET including new copper, planar and silver based interconnection and joining technologies**

Andre Uhlemann (Infineon Technologies AG, Germany)

**11:10 Power Cycling Tests in High Temperature Conditions of SiC-MOSFET Power Modules and Ageing Assessment**

Ali Ibrahim (IFSTTAR & SATIE, France); Jean-Pierre Ousten, Richard Lallemand and Zoubir Khatir (IFSTTAR, France)

**11:30 Reliability of Ag-Sintering and Sn-Ag TLP - Bonding for Mounting of SiC and GaN Devices**

Adeel Ahmad Bajwa (University of California Los Angeles, USA); Jürgen Wilde (Universität Freiburg - IMTEK, Germany)

**11:50 Coupled Electro-Thermo-Mechanical Analyses on Power Cycling Induced Loadings in Silver Sintered IGBT-Modules with and without Overmolding**

Rainer Dudek (Fraunhofer Institute for Electronic Nano Systems, Germany); Ralf Doering and Sven Rzepka (Fraunhofer ENAS, Germany); Stefan Stegmeier (Siemens AG, Germany); Christian Ehrhardt (Fraunhofer IZM, Germany); Martin Rittner (Robert Bosch GmbH, Germany); Jacek Rudzki (Danfoss Silicon Power GmbH, Germany)

**12:10 Reliability of Lead-free Large Area Solder Joints in IGBT Modules with Respect to Passive and Active Thermal Cycling**

Harald Bever, Venkatesh Sivasubramanian, Samuel Hartmann and Martin Bayer (ABB Switzerland Ltd., Switzerland)

**Wednesday, March 9, 10:50 - 12:20****S09: Substrates**

Room: Kaiser Maximilian

Chairs: Jean Michel Morelle (VALEO &amp; GEEDS, France), Jelena Popovic (Delft University of Technology, The Netherlands)

**10:50 Thermal conductivity of Al<sub>2</sub>O<sub>3</sub> substrates and precise 3D layer reconstruction - key parameters for matching FEM simulations with thermal measurements**

Tony Amende, Matthias Friedrich, Michael Endres, Sven Pihale and Ralf Schmidt (Siemens AG, Germany)

**11:10 Enhancing partial discharge inception voltage of DBCs by geometrical variations based on simulations of the electric field strength**

Christoph Friedrich Bayer, Uwe Waltrich, Richard Schneider, Amal Soueidan and Eberhard Baer (Fraunhofer Institute for Integrated Systems and Device Technology, Germany); Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany)

**11:30 PCB Embedded Power Electronics for Low Voltage Applications**

Daniel Kearney (ABB Corporate Research Centre &amp; ABB Schweiz AG, Switzerland); Slavo Kicin and Enea Bianda (ABB Corporate Research Centre, Switzerland); Andrej Krivda (ABB Switzerland Ltd, Switzerland); David Bauman (ABB Corporate Research Centre, Switzerland)

**11:50 Invited: Investigation of a power module with double sided cooling using a new concept for chip embedding**

Hannes Stahr (AT&amp;S AG, Germany)

**Wednesday, March 9, 12:30 - 13:40****Lunch Break****Wednesday, March 9, 13:40 - 15:00****S10: Power Modules**

Room: Kaiser Karl IV

Chairs: Peter Beckedahl (SEMIKRON International GmbH, Germany), Frank Osterwald (Danfoss Silicon Power GmbH, Germany)

**13:40 Dimensioning of a Novel Design Concept for MMC submodules**

Uwe Waltrich, Benjamin Ruccius and Dirk Malipaard (Fraunhofer Institute for Integrated Systems and Device Technology, Germany); Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Martin März (FhG Erlangen, Germany)

**14:00 Power modules for automotive application with pin-fin substrates fabricated with a special arc welding technology**

Andre Uhlemann and Marco Sobkowiak (Infineon Technologies AG, Germany)

**14:20 High heat dissipation and high heat durability technologies for transfer-molded power modules with insulating sheets**

Takashi Nishimura, Kenji Mimura, Kei Yamamoto, Shiori Idaka and Toshiaki Shinohara (Mitsubishi Electric Corporation, Japan)

**14:40 400A SiC Power Module with 1nH Commutation Inductance**

Peter Beckedahl (SEMIKRON International GmbH, Germany); Sven Buetow, Andreas Maul, Martin Roeblitz and Matthias Spang (Semikron Elektronik GmbH &amp; Co. KG, Germany)

**S11: Temperature Measurements**

Room: Kaiser Maximilian

Chair: Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany)

**13:40 Experimental Evaluation of IGBT Junction Temperature Measurement via a Modified VCE Method with Series Resistance Removal**

Nick Baker (Aalborg University, Denmark); Laurent Dupont (IFSTTAR, France); Yvan Avenas (Grenoble Université, France); Francesco Iannuzzo (Aalborg University, Italy); Stig Munk-Nielsen (Aalborg University, Denmark)

**14:00 IGBT Online-Temperature Monitoring using Turn-Off Delay as a Temperature Sensitive Electrical Parameter**

Christian Felgelmacher (University of Kassel, Germany); Benjamin Dombert (Universität Kassel, Germany); Christian Nöding (University of Kassel, Germany); Peter Zacharias (Universität Kassel, Germany)

**14:20 Monitoring of IGBT modules - temperature and degradation simulation**

Kristian B Pedersen, Mads Brincker, Pramod Ghimire and Kjeld Pedersen (Aalborg University, Denmark)

**14:40 Magnetic flux signal simulation with 16-channel sensor array to specify accurate IGBT current distribution**

Masanori Tsukuda (City of Kitakyushu, Japan); Kazuaki Matsuo (CDN, Japan); Hiroki Tomonaga (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)

**Wednesday, March 9, 15:00 - 15:30****Coffee Break****Wednesday, March 9, 15:30 - 17:20****S12: SiC Power Modules**

Room: Kaiser Karl IV

Chairs: Bruno Allard (INSA Lyon, France), Peter Friedrichs (Infineon, Germany)

**15:30 Highly integrated SiC module with thick-film dielectric allows for high frequency operation**

Michael Meisser, Max Schmenger, Martin Bernd, Benjamin Leyrer and Horst Demattio (Karlsruhe Institute of Technology, Germany); Dean Hamilton and Phil Mawby (University of Warwick, United Kingdom); Thomas Blank (Karlsruhe Institute of Technology, Germany)

**15:50 Dual-Side Ceramic Power Module for Fast Switching Silicon Carbide Transistors**

Ulf Mütter (Helmut Schmidt University, Germany); Peter Lürkens and Albert Garcia i Tormo (Philips Group Innovation - Research Europe, The Netherlands); Markus Bast (University of Applied Science Kiel, Germany); Klaus Hoffmann (Helmut-Schmidt-Universität, Germany); Ronald Eisele (FH Kiel, Germany)

**16:10 Full SiC power module with substrate integrated liquid cooling for battery electric vehicles**

Bao Ngoc An, Martin Bernd, Benjamin Leyrer and Thomas Blank (Karlsruhe Institute of Technology, Germany); Johannes Kolb (SHARE am KIT, Germany); André Loges, Marc Weber and Thomas Wetzel (Karlsruhe Institute of Technology, Germany)

**16:30 Low inductance 2.5kV Packaging technology for SiC switches**

Bassem Mouawad and Jianfeng Li (University of Nottingham, United Kingdom); Alberto Castellazzi (University of Nottingham &amp; Power Electronics, Machines and Control Group, United Kingdom); C Mark Johnson (University of Nottingham, United Kingdom); Tobias Erlbacher (Fraunhofer IISB, Germany); Peter Friedrichs (Infineon, Germany)

**16:50 Invited: SiC Power devices complementing the silicon world - status and outlook**

Peter Friedrichs (Infineon, Germany)

**Wednesday, March 9, 15:30 - 16:50****S13: Lifetime**

Room: Kaiser Maximilian

Chairs: Phil Mawby (University of Warwick, United Kingdom), Mark Niels Münzer (Infineon Technology, Germany)

**15:30 Simulation of the Lifetime of Wire Bonds Modified by Wedge Trenches for Higher Reliability**

Arian Grams (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration, Germany); Christian Ehrhardt, Johannes Jaeschke, Andreas Middendorf and Olaf Wittler (Fraunhofer IZM, Germany); Klaus-Dieter Lang (Berlin University of Technology, Germany)

**15:50 A Health Monitoring Framework for IGBT Power Modules**

Amir Eleffendi and C Mark Johnson (University of Nottingham, United Kingdom)

**16:10 Life-time modeling of DBC-based MOSFET-power modules**

Carmen Faust-Ellsäßer, Johannes Dürr, Thomas Pröpper and Konrad Riester (Robert Bosch GmbH, Germany)

**16:30 Case sensitive condition monitoring of an IGBT inverter in a hybrid car**

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

**Wednesday, March 9, 19:00 - 22:00**

**Conference Dinner**

**Thursday, March 10**

**Thursday, March 10, 08:30 - 10:20**

**S14: Passives**

Rooms: Kaiser Karl IV, Kaiser Maximilian

Chair: Kai Kriegel (Siemens AG, Germany)

**08:30 *Towards Highly Integrated, Automotive Power SoCs Using 3D TSV-based Capacitors Operating at 100 V***

Saeideh Gruenler (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Gudrun Rattmann (Fraunhofer Institute of Integrated Systems and Device Technology, Germany); Tobias Erlbacher and Anton Bauer (Fraunhofer IISB, Germany); Florian Krach (Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany); Lothar Frey (FAU-Erlangen-Nuremberg, Germany)

**08:50 *Invited: Design and Materials of Antiferroelectric Capacitors for High Density Power Electronic Applications***

Guenter Engel (CeraCap Technology & Innovation Consulting & FH Joanneum, Fraunhofer IKTS, Austria)

**09:20 *Keynote: Prospects for advances in power magnetics***

Charles Sullivan (Thayer School of Engineering at Dartmouth, USA)

**10:00 *An Investigation into High Frequency High Voltage Planar Transformer for High Voltage Generator Applications***

Saijun Mao (GE, P.R. China); Jelena Popovic and Braham Ferreira (Delft University of Technology, The Netherlands)

**Thursday, March 10, 10:20 - 10:50**

**Coffee Break**

**Thursday, March 10, 10:50 - 12:00**

**S15: Clean Switching, EMC**

Rooms: Kaiser Karl IV, Kaiser Maximilian

Chairs: Reinhold Bayerer (Infineon Technologies AG, Germany), Norbert Seliger (FH Rosenheim, Germany)

**10:50 *Invited: Parasitic inductance hindering utilization of power devices***

Reinhold Bayerer (Infineon Technologies AG, Germany)

**11:20 *Influence of the Magnetics' Parasitic Capacitance in the switching of High-Voltage Cascode GaN HEMT***

Nikolas Galanos and Jelena Popovic (Delft University of Technology, The Netherlands); Mark Gerber (Aeronamic, The Netherlands); Braham Ferreira (Delft University of Technology, The Netherlands)

**11:40 *Comparison of EMI behavior in inverter and buck-converter operation of power modules by considering the diode reverse recovery effects***

Yu Liu (Infineon AG, Germany); Andreas Lindemann (University of Magdeburg, Germany); Markus Thoben (Infineon Technologies AG, Germany); Stephan Cordes, Thomas Geinzer and Jörg Thiele (Infineon AG, Germany)

**Thursday, March 10, 12:00 - 13:00**

**S16: Integrated Power Electronics**

Rooms: Kaiser Karl IV, Kaiser Maximilian

Chairs: Reinhold Bayerer (Infineon Technologies AG, Germany), Norbert Seliger (FH Rosenheim, Germany)

**12:00 *Invited: Challenges in low-voltage high-current applications - fathom the limits in system design***

Ulf Schwalbe, Marco Schilling, Benjamin Köhnlechner and Tobias Reimann (Technische Universität Ilmenau, Germany)

**12:30 *Invited: Photovoltaic Inverters in  $\mu$ -Scale***

Regine Mallwitz (Technische Universität Braunschweig, Germany)

**Thursday, March 10, 13:00 - 14:00**

**Lunch Break**

**Thursday, March 10, 14:00 - 15:40**

**S17: Wide-band-gap Applications**

Rooms: Kaiser Karl IV, Kaiser Maximilian

Chairs: Nando Kaminski (University of Bremen, Germany), Andreas Lindemann (University of Magdeburg, Germany)

**14:00 *Invited: 1-MW Solar Power Conditioning System with Boost Converter using all-SiC Power Module***

Yasuaki Furusho and Kansuke Fujii (Fuji Electric Co., Ltd., Japan)

**14:30 *Invited: Current Trends for GaN on Si Power Devices for Industrial Applications***

Radoslava Mitova (Schneider Electric, France)

**15:00 *Keynote: 100 MHz GaN power conversion***

Dragan Maksimovic (University of Colorado Boulder, USA)

**Thursday, March 10, 15:40 - 16:10**

**Closing**

Rooms: Kaiser Karl IV, Kaiser Maximilian

Chairs: Andreas Lindemann (University of Magdeburg, Germany), Leo Lorenz (ECPE, Germany), Dieter Silber (Bremen University, Germany)