CIPS 2020

11th International Conference on Integrated Power Electronics Systems

March, 24 – 26, 2020, Berlin, Germany

VDE ETG

Program

Tuesday, March 24

10:00-10:20		***Introduction***		
10:20-11:00		***Keynote***		
11:00-12:00		***Session Power Packages and Modules (1)***	***Session Components to be integrated (1)***	
12:00-13:20	***Lunch Break***			
13:20-14:40		***Session Power Packages and Modules (2)***	***Session Components to be integrated (2)***	
14:40-15:10	***Tea Break***			
15:10-16:30		***Session Power Packages and Modules (3)***	***Session Components to be integrated (3)***	
16:30-17:00	***Break***			
17:00-18:20		***Session Power Packages and Modules (4)***	***Session Components to be integrated (4)***	
18:20-18:30				
19:00-21:30	***Get Together***			

Wednesday, March 25

08:30-09:10		***Keynote***		
09:10-10:10		***Session Power Packages and Modules/Mechatronic Systems (1)***	***Session General Aspects of Packaging (1)***	
10:10-10:40	***Tea Break***			
10:40-12:20		***Session Power Packages and Modules/Reliability(2)***	***Session Clean Switching, EMC (1)***	
12:20-13:50	***Lunch Break***			
13:50-16:30	***Poster Session + Tea Break***			***Poster Session Clean Switching, EMC***, ***Poster Session Components to be Integrated***, ***Poster Session General Aspects of Packaging***, ***Poster Session Mechatronic Systems and their Applications***, ***Poster Session Power Packages and Modules***, ***Poster Session Reliability***
16:30-18:00		***Session Reliability (1)***	***Session Clean Switching, EMC (2)***	
19:00-22:00				***Conference Dinner (Departure from the Venue by Bus)***

Thursday, March 26

08:30-09:10		***Keynote***		
09:10-10:10		***Session Reliability (2)***	***Session General Aspects of Packaging (2)***	
10:10-10:40	***Tea Break***			
10:40-12:00		***Session Reliability (3)***	***Session General Aspects of Packaging (3)***	
12:00-13:20	***Lunch Break***			
13:20-14:10		***Keynote***		
14:10-14:20		***Closing Remarks***		
14:20-14:35		***Ceremony: ECPE Young Engineer Award, CIPS Best***		
14:35-15:00		***Ceremony: Semikron Innovation and Young Engineer***		

Tuesday, March 24

Tuesday, March 24 10:00 - 10:20

Introduction

Room: MOA 3-5

Chairs: Leo Lorenz (ECPE, Germany), Thomas Harder (European Center for Power Electronics (ECPE e.V.), Germany), Nando Kaminski (University of Bremen, Germany), Andreas Lindemann (University of Magdeburg, Germany)

Tuesday, March 24 10:20 - 11:00

Keynote

Room: MOA 3-5

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

10:20 ***Wide-Bandgap Semiconductor Power Electronics: Overcoming Barriers in Materials to Circuits for a more Electrified Future***

Isik C. Kizilyalli (Advanced Research Projects Agency – Energy (ARPA-E), USA); Eric Carlson (Booz Allen Hamilton, USA); Daniel Cunningham (Advanced Research Projects Agency - Energy (ARPA-E), USA)

Tuesday, March 24 11:00 - 12:00

Session Power Packages and Modules (1)

Room: MOA 3-5

Chairs: Martin Rittner (Robert Bosch GmbH, Germany), Katsuaki Suganuma (Osaka University, Japan)

11:00 ***Design innovations and performance of GaN Power Modules and MCMs***

Charles Bailey (GaN Systems Inc., USA)

11:20 ***Evaluation of a GaN HEMT half-bridge embedded to a Multilayer Aluminum Nitride Substrate***

Carsten Kuring (Technische Universität Berlin, Germany); Mihaela Wolf (Ferdinand-Braun-Institut Leibniz-Institut für Höchstfrequenztechnik, Germany); Xiaomeng Geng (Technische Universität Berlin, Germany); Oliver Hilt (FBH, Germany); Jan Böcker and Nick Wieczorek (Technische Universität Berlin, Germany); Joachim. Wuerfl (Ferdinand-Braun-Institut, Germany); Sibylle Dieckerhoff (TU Berlin, Germany)

11:40 ***Surface-Mount Package IPM with Highly Reliable Transfer Molding Resin***

Hodaka Rokubuichi (Mitsubishi Electric Corporation, Japan)

Session Components to be integrated (1)

Room: MOA 8

Chair: Fang Luo (University of Arkansas, USA)

11:00 ***Simple and Precise Calorimetry Method for Evaluation of Losses in Power Electronic Converters***

Nicolas Mary (Mitsubishi Electric R&D Centre Europe, Laboratoire Ampère, France); Rémi Perrin and Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France); Cyril Buttay (Université de Lyon Laboratoire Ampere CNRS UMR 5005 & Insa de Lyon, France)

11:20 ***Experimental Study of the Coss-Losses Occurring During ZVS Transitions - Emphasis on Low and High Voltage GaN-HEMTs***

Benedikt Kohlhepp, Daniel Kübrich and Thomas Dürbaum (Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany)

11:40 ***Implementation and validation of a dynamic calorimetric method to evaluate the losses in switching discrete power MOSFETs***

Do Phuong Uyen Tran (G2Elab, France); Stephane Lefebvre (SATIE, ENS-CACHAN, France); Yvan Avenas (Grenoble Université, France)

Tuesday, March 24 12:00 - 13:20

Lunch Break TOP

Room: Atrium

Tuesday, March 24 13:20 - 14:40

Session Power Packages and Modules (2) TOP

Room: MOA 3-5

13:20 ***Is Pressureless Sintering Ready for Power Electronic Modules?***
Thomas Blank, Marc Weber, Helge Wurst, Bao Ngoc An, Benjamin Leyrer and Torsten Scherer (Karlsruhe Institute of Technology, Germany); Vanessa Trouillet and Stephan Pochert (KIT, Germany); Dai Isikawa (Karlsruhe Institute of Technology (KIT), Germany)

13:40 ***Comparison of Silver Sintered Assemblies on Non-DCB Substrates***
Nilavazhagan Subbiah (University of Freiburg & IMTEK, Germany); Alexander Schiffmacher (University of Freiburg - IMTEK, Germany); Jürgen H. Wilde (Universität Freiburg - IMTEK & Microsystems Engineering, Germany); Xiayingfang Song (University of Freiburg, Germany)

14:00 ***Sintered-copper Die-attach: Processing, Properties, and Reliability***
Meiyu Wang, Yanliang Shan, Yun-Hui Mei and Xin Li (Tianjin University, China); Guo-Quan Lu (Virginia Tech, USA)

14:20 ***Thick film paste systems for multifunctional copper power modules***
Kathrin Reinhardt and Stefan Körner (Fraunhofer Institute of Ceramic Technologies and Systems, Germany); Uwe Partsch (Fraunhofer Institute Ceramic Technologies and Systems, Germany)

Session Components to be integrated (2) TOP

Room: MOA 8

Chairs: Sibylle Dieckerhoff (TU Berlin, Germany), Oliver Hilt (FBH, Germany)

13:20 ***Monolithic Integration of Inductive Components in a GaN-on-Si Technology***
Michael Basler (Fraunhofer Institute for Applied Solid State Physics, Germany); Stefan Moench (Fraunhofer IAF, Germany); Richard Reiner (IAF Fraunhofer, Germany); Patrick Waltereit and Rüdiger Quay (Fraunhofer IAF, Germany); Ingmar Kallfass (University of Stuttgart, Germany); Oliver Ambacher (Fraunhofer IAF & IMTEK, University Freiburg, Germany)

13:40 ***A 600 V GaN-on-Si Power IC with Integrated Gate Driver, Freewheeling Diode, Temperature and Current Sensors and Auxiliary Devices***
Stefan Moench (Fraunhofer IAF, Germany); Richard Reiner (IAF Fraunhofer, Germany); Patrick Waltereit (Fraunhofer IAF, Germany); Jan Hückelheim (University of Stuttgart, Germany); Dirk Meder and Rüdiger Quay (Fraunhofer IAF, Germany); Oliver Ambacher (Fraunhofer IAF & IMTEK, University Freiburg, Germany); Ingmar Kallfass (University of Stuttgart, Germany)

14:00 ***Novel back-end-of-line compatible method for integration of inductances with magnetic core on silicon***
Malte Paesler, Thomas Lisec and Holger Kapels (Fraunhofer Institute for Silicon Technology, Germany)

14:20 ***Ultra-low loss integrated magnetics platform for high frequency power delivery networks***
Pranay Podder (Tyndall National Institute, University College Cork, Ireland); Zoran Pavlovic, Ansar Masood, Guannan Wei, Daniel Lordan and Seamus O'Driscoll (Tyndall National Institute, Ireland); Lulu Peng, Zishan Ali, Lawrence Selvaraj and Chor Shu Cheng (GlobalFoundries Corporation, Singapore); Cian Ó Mathúna and Paul McCloskey (Tyndall National Institute, Ireland)

Tuesday, March 24 14:40 - 15:10

Tea Break TOP

Room: Atrium

Tuesday, March 24 15:10 - 16:30

Session Power Packages and Modules (3) TOP

Room: MOA 3-5

15:10 ***Thermal analysis of power module with double sided direct cooling using ceramic heat sinks***
Nicolas Botter (University of Grenoble & Safran Tech, France); Yvan Avenas, Jean-Michel Missiaen and Didier Bouvard (Grenoble Université, France); Rabih Khazaka (Safran SA, Safran Tech, France)

15:30 ***High Performance Power module with double side cooling for automotive***
Junhee Park (Hyundai Motors, Korea (South))

15:50 ***Low voltage switching cell for high density and modular 3D power module with integrated air cooling***
Wendpanga Fadel Bikinga, Walid Deffous, Bachir Mezrag, Alexis Derbey, Florian Dumas and Benoit Sarrazin (G2Elab, France); Yvan Avenas (Grenoble Université, France)

16:10 ***Direct heat sink printing on metallized ceramic substrate for power electronics applications: heat treatment identification and its im-pacts***
Rabih Khazaka (Safran SA, Safran Tech, France); Elodie Martin and Joel Alexis (LGP, INP-ENIT, France); Donatien Martineau (Safran, France); Stephane Azzopardi (Safran SA, France)

Session Components to be integrated (3) TOP

Room: MOA 8

Chair: Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France)

15:10 ***Dynamic Current Balancing of Parallel Connected IGBT Devices using PCB Sensors for Integration in Power Modules***

Ravi Nath Tripathi (Kyushu Institute of Technology, Japan); Masanori Tsukuda (Kyushu Institute of Technology & Green Electronics Research Institute, Kitakyushu, Japan); Ichiro Omura (Kyushu Institute of Technology, Japan)

15:30 ***Detecting Three-Phase Power Inverter Output Currents By A Single PCB Current Sensor***
Bat-Otgon Bat-Ochir and Ichiro Omura (Kyushu Institute of Technology, Japan); Masanori Tsukuda (Kyushu Institute of Technology & Green Electronics Research Institute, Kitakyushu, Japan)

15:50 ***Three-State Output Gate Driver for IGBTs***
Paula Diaz Reigosa (University of Applied Sciences, Windisch, Switzerland); Bogdan Marian Urcan (Aalborg Universtiy, Denmark); Martin Iriondo Gascue (Alaborg University, Denmark); Francesco Iannuzzo (Aalborg University, Denmark)

16:10 ***Optimisation and Application Studies for the M-Shunt Structure applied to Printed Circuit Boards***
Hauke Lutzen (University of Bremen, Germany); Koji Mitsui (Tokyo Metropolitan University, Japan); Dieter Silber (Bremen University, Germany); Keiji Wada (Tokyo Metropolitan University, Japan); Nando Kaminski (University of Bremen, Germany)

Tuesday, March 24 16:30 - 17:00

Break
Room: Atrium

Tuesday, March 24 17:00 - 18:30

Session Power Packages and Modules (4)
Room: MOA 3-5
Chair: Jürgen H. Wilde (Universität Freiburg - IMTEK & Microsystems Engineering, Germany)

17:00 ***The Opportunities of Integration Technologies for Active and Passive Components (Invited)***
Andreas Ostmann (Fraunhofer IZM, Germany)

17:30 ***System integration and analysis of SiC-based high power inverter with up to 250 kW and switching slopes of up to 50 kV/µs for novel powertrain concepts***
Christian Meyne (Infineon Technologies AG, Germany); Alexander Otto and Sven Rzepka (Fraunhofer ENAS, Germany); Omar Vanegas and Lea Fuchs (Infineon Technologies AG, Germany); Christoph Luedecke (ISEA RWTH-Aachen, Germany); De Doncker Rik W. (RWTH Aachen University, Germany); Christian Strenger (Infineon Technologies AG, Germany); Thomas Reum (CE-LAB GmbH, Germany); Alexander Nisch, Maximilian Hepp and Wolfgang Wondrak (Daimler AG, Germany); Andre Uhlemann (Infineon Technologies AG, Germany)

17:50 ***Thermally Integrated 3D Package for SiC Based DC-DC Full Bridge Converter***
Patrick McCluskey, He Yun, Clifton Buxbaum, Sevket Yuruker, Raphael Mandel, Michael Ohadi, Yongwan Park, Shiladri Chakraborty and Alireza Khaligh (University of Maryland, USA)

18:10 ***A low inductive PSiP packaging technology with multilayer ceramic substrate and integrated active cooling (Invited)***
Karsten Schmidt, Olivier Mathieu, Tilo Welker and Andreas Meyer (Rogers Germany GmbH, Germany)

Tuesday, March 24 17:00 - 18:20

Session Components to be integrated (4)
Room: MOA 8
Chairs: Cyril Buttay (Université de Lyon Laboratoire Ampere CNRS UMR 5005 & Insa de Lyon, France), Kaspars Kroics (Riga Technical University, Latvia)

17:00 ***Challenges and opportunities for magnetic components in the low to medium power applications (Invited)***
Marek S. Rylko (SMA Magnetics Sp. z o. o., Germany)

17:30 ***PCB Embedded dies for low thickness Wireless rotary transformer***
Rémi Perrin (Mitsubishi Electric R&D Centre Europe, France); Julien Morand (Mitsubishi Electric Research, France); Guilherme Bueno Mariani and Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France)

17:50 ***Integration of Printed Electronics in Potted Power Electronic Modules***
Victoria Zimmermann (Fraunhofer Institute for Integrated Systems and Device Technology, Germany); Alicia Zoerner (Fraunhofer IISB, Germany); Zechun Yu (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Michael Jank (Friedrich-Alexander Universität Erlangen-Nürnberg, Germany); Christoph Friedrich Bayer (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)

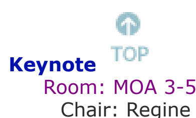
18:10 ***SiC Power Module with integrated RC-Snubber Design for Voltage Overshoot and Power Loss Reduction***
Cornelius Rettner and Maximilian Schiedermeier (Friedrich-Alexander-University Erlangen-Nürnberg, Germany); Andreas Apelsmeier (Friedrich-Alexander-University Erlangen-Nuremberg, Germany); Thomas Heckel (Friedrich-Alexander University Erlangen-Nürnberg (FAU), Germany); Antonia Diepgen (Fraunhofer Institute for Integrated Systems and Device Technology, Germany); Alexander Klische (Fraunhofer Institute of Integrated Systems and Device Technology, Germany); Daniel Dirksen (Fraunhofer Institute for Integrated Systems and Device Technology, Germany); Martin März (FhG Erlangen, Germany)

Tuesday, March 24 19:00 - 21:30

Get Together
Room: Atrium

Wednesday, March 25

Wednesday, March 25 8:30 - 9:10

Keynote 
Room: MOA 3-5
Chair: Regine Mallwitz (Technische Universität Braunschweig, Germany)

8:30 ***Capacitor-Based Power Converters for High Power Density and Efficiency - the Theoretical Promises and Practical Challenges***
Robert Pilawa (University of California Berkeley, USA)

Wednesday, March 25 9:10 - 10:10

Session Power Packages and Modules/Mechatronic Systems (1)

Room: MOA 3-5
Chairs: Bruno Allard (INSA Lyon, France), Regine Mallwitz (Technische Universität Braunschweig, Germany)

9:10 ***Full-SiC Integrated Power Module based on Planar Packaging Technology for High Efficiency Power Converters in Aircraft Applications***
Oliver Raab (Siemens AG, Germany); Mattia Guacci (ETH Zurich, Switzerland); Antonio Griffo (The University of Sheffield, Great Britain); Kai Kriegel (Siemens AG, Germany); Morris Heller (ETH Zurich, Switzerland); Jiabin Wang (The University of Sheffield, Great Britain); Dominik Bortis (ETH Zurich, Switzerland); Martin Schulz (Siemens AG, Germany); Johann. W. Kolar (ETH Zurich, Switzerland)
9:30 ***Cooling Jacket Design for High Power Electric Smart Motor***
Zhaoxi Yao, Yonatan Saadon, Raphael Mandel and Patrick McCluskey (University of Maryland, USA)
9:50 ***Multi-chip Medium Voltage SiC MOSFET Power Module with Focus on Low Parasitic Capacitance***
Jannick K. Jørgensen, Dipen N. Dalal, Szymon Beczkowski, Stig Munk-Nielsen and Christian Uhrenfeldt (Aalborg University, Denmark)

Session General Aspects of Packaging (1)

Room: MOA 8
Chair: Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany)

9:10 ***Ultra-high power density server supplies employing GaN power semiconductors and PCB-integrated Magnetics (Invited)***
Matthias J Kasper (Infineon Technologies Austria AG & Power Electronic Systems Laboratory, Austria); Luca Peluso and Gerald Deboy (Infineon Technologies Austria AG, Austria); Gustavo Knabben (ETH Zurich, Switzerland); Guillod Thomas (Swiss Fed Inst Technol, Switzerland); Johann. W. Kolar (ETH Zurich, Switzerland)
9:40 ***WBG power semiconductor packaging with advanced interconnection technologies (Invited)***
Katsuaki Suganuma (Osaka University, Japan)

Wednesday, March 25 10:10 - 10:40

Tea Break

Room: Atrium

Wednesday, March 25 10:40 - 12:20

Session Power Packages and Modules/Reliability(2)

Room: MOA 3-5

10:40 ***Improvement of High-temperature Reliability of Power Modules by Multi-step Temperature Bonding Process of Zn-Al Solder***
Hiroshi Hozoji, Fumiki Kato, Hiroshi Sato, Shinji Sato and Hiroshi Yamaguchi (National Institute of Advanced Industrial Science and Technology, Japan)
11:00 ***SiCmodul - Modular high-temperature SiC power electronics for fail-safe power control in electrical drive engineering***
Christoph Marczok (Fraunhofer IZM, Germany); Manuel Martina (Schweizer Electronic AG, Germany); Michael Laumen (RWTH Aachen University, Germany); Sebastian Richter (AixControl GmbH, Germany); Andreas Birkhold (Robert Bosch GmbH, Germany); Björn Flieger and Oliver Wendt (TLK Thermo GmbH, Germany); Thomas Päsler (Vitesco Technologies Germany GmbH, Germany)
11:20 ***End-of-life mechanism due to cyclic thermomechanical loading of power modules with .XT joining technology***
Torsten Methfessel and Hendrik Jähme (Infineon Technologies AG, Germany)
11:40 ***Power Cycling Reliability and Failure Modes in Power Modules with Novel Emitter Contact and Sintering Technologies***
Harald Beyer (ABB Switzerland Ltd., Switzerland); Milad Maleki (ABB Semiconductors Ltd., Switzerland); Martin Bayer (ABB Switzerland Ltd., Switzerland); Swen König and Fabian Fischer (ABB Semiconductors Ltd., Switzerland); Gontran Paques (ABB Switzerland Ltd., Switzerland)
12:00 ***Power Cycle Testing at Low Temperature Swings - Evaluating the Stability of SAC- and SnSb-based Chip Solder Layers***
Ralf Schmidt, Michael Kaesbauer, Marcel Sippel and Patrick Dreher (Siemens AG, Germany)

Session Clean Switching, EMC (1)

Room: MOA 8
Chairs: Reinhold Bayerer (Germany), Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany)

10:40 ***High Power Density EMI Mitigation in Power Electronics Converters: Active and Integrated Solutions (Invited)***
Fang Luo (University of Arkansas, U.S.)
11:10 ***Reduction of Common Mode EMI noise in microstrip line based commutation paths designed for sub-nH loop inductance***
Norbert Seliger and Eduard Dechant (Technische Hochschule Rosenheim, Germany); Christian Brendel (Dr Johannes Heidenhain GmbH, Germany); Ralph Kennel (Technical University of Munich, Germany)
11:30 ***Impact of multilevel converters on EMC filter weight of a 70 kVA power drive system for More Electrical Aircraft***
Hans Hoffmann Sathler (IRT Saint-Exupery, France); Bernardo Cougo and Lucas Nagano (IRT Saint Exupery, France); Francois Costa and Denis Labrousse (SATIE, France)

11:50 ***Control scheme for EMI reduction via spread spectrum modulation for triangular current mode (TCM) DC/DC converters***
Burkhard Ulrich (University of Cooperate Education Baden-Wuerttemberg (DHBW) Stuttgart Campus Horb, Germany)

Wednesday, March 25 12:20 - 13:50

Lunch Break
Room: Atrium

Wednesday, March 25 13:50 - 16:30

Poster Session Clean Switching, EMC
Chairs: Reinhold Bayerer (Germany), Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany)

Analysis of the gate driver stray inductance in a Vienna rectifier through parametric Electromagnetic simulations
Francesco Palomba (Keysight Technologies Italy, Italy); Francesco Gennaro, Mario Pavone and Giuseppe Aiello (STMicroelectronics, Italy); Mario Cacciato (Università degli Studi di Catania, Italy); Simon Muff (Keysight Technologies, Germany); Ludwig Eichinger (Keysight Technologies Deutschland GmbH, Germany)
Investigation of the Current Ripple caused by the Main Inverter in the High Voltage DC Bus of Electric Vehicles
Marius Gentejohann and Michael Schlüter (Technische Universität Berlin, Germany); Sibylle Dieckerhoff (TU Berlin, Germany)
Low-Inductance DC-link Design dedicated to SiC-based Highly Integrated Inverters
Jasper Schnack, Jan Philipp Gördes and Victor Golev (University of Applied Sciences Kiel, Germany); Ulf Schümann (Fachhochschule Kiel, Germany); Stefan Stahl and Herwig Süncksen (FTCap GmbH, Germany); Regine Mallwitz (Technische Universität Braunschweig, Germany)
Operating a du/dt Filter with a SiC Halfbridge Module and Integrated Active Snubber
Michael Schlüter (Max-Planck-Strasse 5 & Infineon Technologies AG, Germany); Martin Pfost (TU Dortmund, Germany)
Switching speed evaluation of e-mode GaN HEMTs in ultra-low inductive switching cell designs
Raffael Risch, Anliang Hu and Jürgen Biela (ETH Zurich, Switzerland)
Wideband Macro-Modeling of Power Modules for Transient Electro-magnetic Analysis
Arne Schröder (ABB Switzerland); Bernhard Wunsch (ABB Switzerland Ltd, Switzerland); Slavo Kicin (ABB Corporate Research Centre, Switzerland)

Poster Session Components to be Integrated
Chair: Radoslava Mitova (Schneider Electric, France)

Thin-film magnetics-on-silicon integrated transformer for isolated power conversion applications
Zoran Pavlovic (Tyndall National Institute, Ireland); Pranay Podder (University College Cork & Tyndall National Institute, Ireland); Dermot Dobbyn, Ansar Masood, Guannan Wei, Daniel Lordan, Paul McCloskey, Cian Ó Mathúna and Seamus O'Driscoll (Tyndall National Institute, Ireland)
Digital Gate Drive Control Method for Active Voltage Balancing of Series-connected IGBT Devices
Ravi Nath Tripathi and Takaaki Arimoto (Kyushu Institute of Technology, Japan); Masanori Tsukuda (Kyushu Institute of Technology & Green Electronics Research Institute, Kitakyushu, Japan); Ichiro Omura (Kyushu Institute of Technology, Japan)
Ultra-Compact Combined Common Mode (CM)- and Differential Mode (DM)-Inductors
Patrick Deck, Martin Nießen and Christian Dick (TH Köln, Germany)
PCB Embedded Toroidal Inductor for 2MHz Point-of-Load Converter
Ruaidhrí E Murphy (University College Cork & Tyndall National Institute, Ireland); Paul McCloskey, Seamus O'Driscoll and Cian Ó Mathúna (Tyndall National Institute, Ireland); Gerald Weidinger (AT&S, Austria); Zoran Pavlovic (Tyndall National Institute, Ireland)
Design of Interleaved GaN transistor based Buck Converter with Directly Coupled Foil Winding Inductor
Kaspars Kroics (Riga Technical University, Latvia)
Investigation on static and dynamic behavior of integrated current sensor in Automotive IGBT module with SPICE based model
Shinichiro Adachi (Fuji Electric.,co Ltd); De Doncker Rik W. (RWTH Aachen University, Germany); Masahito Otsuki (Fuji Electric.,co Ltd); Nurhan Averous (RWTH Aachen University, Germany)
Improved Performances of 6,5kV IGBT Module by using Current Source Gate Driver
Vincent Escrouzailles (ALSTOM SA, France); Eric Rabasse and Jean-Yves Coiret (Alstom, France)
A General Model Translation Approach for Vertical Power MOSFETs Based on BSIM3 Model
Lixi Yan and Ingmar Kallfass (University of Stuttgart, Germany)
Study and Design of an Integrated CMOS Laser Diode Driver for an iToF-based 3D Image Sensor
Romain David (University of Lyon & STMicroelectronics, France); Xavier Branca (STMicroelectronics, France); Bruno Allard (INSA Lyon, France); Charles Joubert (Academia, France)

Poster Session General Aspects of Packaging

Application of Neural Networks to Accelerate Thermomechanical Simulations of Power Modules
Javier Acuna and Ingmar Kallfass (University of Stuttgart, Germany); Thomas Rupp, Marcus Sonner and Markus Klingler (Robert Bosch GmbH, Germany); Valentyna Afanasenko (University of Stuttgart, Germany)
Deformation Measurements during Active Operation of Power Modules with Novel Assembly and Packaging Technology
Alexander Schiffmacher and Arben Qelibari (University of Freiburg - IMTEK, Germany); Jacek Rudzki and Frank Osterwald (Danfoss Silicon Power GmbH, Germany); Jürgen H. Wilde (Universität Freiburg - IMTEK & Microsystems Engineering, Germany)
Paste Processing and Structural Properties of Copper Metal-Matrix Composites Containing Short Carbon Fibers
Helge Wurst, Thomas Blank, Benjamin Leyrer and Marc Weber (Karlsruhe Institute of Technology, Germany); Dai Isikawa (Karlsruhe Institute of Technology (KIT), Germany)
Thermal simulation for power density optimization of SiC-MOSFET drive train inverters
Nathalie Becker (Ilmenau University of Technology, Germany); Reinhard Herzer, Roland Bittner and Sandro Bulovic (SEMIKRON Elektronik GmbH & Co. KG, Germany)
Experimental Analysis and Modeling of Bond Formation in Ultrasonic Thick Wire Bonding
Reinhard Schemmel (University of Paderborn, Germany); Claus Scheidemann (Universität Paderborn, Germany); Tobias Hemsel (Paderborn University, Germany); Walter Sextro (Universität Paderborn, Germany); Olaf Kirsch

(Infineon Technologies AG Warstein, Germany)

Influence of process and stress conditions on microstructure and failure mechanisms of 2nd level sintered Ag joints

Constanze Weber and Matthias Hutter (Fraunhofer IZM, Germany); Martin Schneider-Ramelow (Fraunhofer IZM & TU Berlin, Germany)

Copper wire bonding process characterization and simulation

Alberto AM Mancaleoni (STMicroelectronics); Alessandro Sitta (STMicroelectronics & Universita' degli Studi di Catania, Italy); Alexandra Colombo and Riccardo Villa (STMicroelectronics, Italy); Giuseppe Mirone (University of Catania, Italy); Marco Renna and Michele Calabretta (STMicroelectronics, Italy)

PCB layout tool integrated loss and inductance estimation

Stefan Hoffmann (Fraunhofer IZM, Germany); Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany); Bernd Schroeder, Bernd Stube and Akram Alraai (TU Berlin, Germany); Oliver Moritz (Enasys GmbH, Germany); Olaf Müller (AEconversion GmbH & Co. KG, Germany)

TOP

Poster Session Mechatronic Systems and their Applications

Chairs: Klaus Hoffmann (Helmut-Schmidt-Universität, Germany), Kai Kriegel (Siemens AG, Germany)

Design and integration of inductive components for a high-frequency 11 kW / 800 V off-board charger for electric vehicles

Michael Schmidhuber and Christoph Drexler (SUMIDA Components & Modules GmbH, Germany); Christopher Joffe (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Stefan Ditze and Stefan Ehrlich (Fraunhofer Institute for Integrated Systems and Device Technology, Germany); Bastian Arndt, Peter Olbrich and Hartwig Reindl (AVL Software and Functions GmbH, Germany)

Low-inductive SiC H-Bridge for Direct-Inverter-Single-Tooth-Integration (German BMBF Public Funded Research Project 'VERSE')

Gerhard Reber, Martin Rittner, Michael Guyenot, Alexander Klemm, Rainer Holz, Ulrich Kessler and Manfred Reinold (Robert Bosch GmbH, Germany)

High Frequency DC-DC Converter for an Integrated Electrical Excitation of an Axial Flux Machine with Fiber-composite Rotor: a Multidisciplinary Approach

Philipp Schneider, Tobias Reimann and Benedikt Neitzel (Technische Universität Ilmenau, Germany); Andreas Moeckel (Ilmenau University of Technology, Germany); Tobias Heidrich (Technische Universität Ilmenau, Germany)

TOP

Poster Session Power Packages and Modules

Half-bridge Concepts for High Blocking Voltage GaN HEMTs

Martin Rittner, Ulrich Kessler and Tine Konjedic (Robert Bosch GmbH, Germany); Joerg Naundorf, Kai Kriegel and Martin Schulz (Siemens AG, Germany); Gaudenzio Meneghesso (University of Padova, Italy)

Two-layered planar SiC power module for industrial applications

Oliver Raab, Kai Kriegel and Pol Ghesquiere (Siemens AG, Germany)

Characterization of the Junction Temperature of SiC Power Devices via Quasi-Threshold Voltage as Temperature Sensitive Electrical Parameter

Kanuj Sharma, Kevin Muñoz Barón, Johannes Ruthardt, Jan Hückelheim, Dominik Koch, Florian Münzenmayer and Ingmar Kallfass (University of Stuttgart, Germany)

Design, Manufacturing and Evaluation of a Highly Integrated Low Voltage High Current Inverter

Johan Le Leslé, Vincent Quemener, Julien Morrand, Rémi Perrin, Roberto Mrad and Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France)

Highly Integrated Switching Cell Design based on Copper Diamond Heat Spreader, 3D Printed Heat Sink and HTCC Logic Board

Alexander Sewergin (RWTH Aachen University, Germany); Martin Rittner and Andreas Burghardt (Robert Bosch GmbH, Germany); Kai Kriegel (Siemens AG, Germany); Gerhard Mitic (Siemens, Germany); Thomas Zetterer (Schott AG, Germany); Thomas Hutsch (Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Germany); Albert Neumann (Austerlitz Electronic GmbH, Germany); Flaviu Simon (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Rik De Doncker (RWTH Aachen University & Institute for Power Generation and Storage Systems, Germany)

PCB Embedded Transformer for Isolated DC-DC Power Supplies

Gerald Weis and Ivan Salkovic (AT & S Austria Technologie & Systemtechnik Aktiengesellschaft, Austria)

Improved Stress Distribution in Railway Traction Converters Using New High Power Half-Bridge Modules

Michel Piton (Alstom, France); Emmanuel Batista (ALSTOM, France); Vincent Escrouzailles (ALSTOM SA, France)

Double pulse vs. indirect measurement: Characterizing switching losses of integrated power modules with wide bandgap semiconductors

Adam Kuczmik (Ingenieurbüro Kuczmik, Germany); Stefan Hoffmann (Fraunhofer IZM, Germany); Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany)

Electrical characteristics of double-sided cooling SiC power module using Ni micro plating bonding

Tomoya Itose, Akihiro Kawagoe and Akihiro Imakiire (Kyushu Institute of Technology, Japan); Masahiro Kozako and Masayuki Hikita (Kyusyu Institute of Technology, Japan); Kohei Tatsumi, Tomonori Iizuka and Isamu Morisako (Waseda University, Japan); Nobuaki Sato, Koji Shimizu and Kazutoshi Ueda (Mitsui High-tec Inc., Japan)

Application considerations for Double Sided Cooled Modules in Automotive Environment

Sebastian Möller (Virtual Vehicle Research Center, Austria); Danial Karimi (Vrije Universiteit Brussel & Flanders Make, Belgium); Omar Vanegas (Infineon Technologies AG, Germany); Mohamed El Baghdadi (Vrije Universiteit Brussels, Belgium); Alexander Kospach (Virtual Vehicle Research Center, Austria); Adrian Lis (Infineon Technologies AG, Germany); Benedikt Rabl (Virtual Vehicle Research GmbH, Austria); Omar Hegazy (Vrije Universiteit Brussels, Austria); Christoph Abart (AVL List GmbH, Austria)

Smart Ultrasonic Welding in Power Electronics Packaging

Matthias Hunstig, Waldemar Schaermann, Michael Brökelmann, Sebastian Holtkämper, Dirk Siepe and Hans J. Hesse (Hesse GmbH, Germany)

TOP

Poster Session Reliability

A Review on the Application of On-Line Von (On-State Voltage) Sensing for Junction Temperature Estimation of Power Semiconductor Modules

Nicolas Degrenne, Julio Brandelero, Chihiro Kawahara and Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France)

Mechanical and microstructural characterization of LTCC and HTCC ceramics for high temperature and harsh environment application

Falk Naumann, Georg Lorenz, Michael Bernasch, Bianca Boettge and Jan Schischka (Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Germany); Steffen Ziesche (Fraunhofer IKTS, Germany); Hans-Fridtjof Pernau and Martin Jaegle (Fraunhofer Institute for Physical Measurement Techniques IPM, Germany); Sandy Klengel

(Fraunhofer Institute for Microstructure of Materials and System, Germany); Holger Kappert (Fraunhofer institute of Microelectronic Circuits and Systems, Germany)

Introducing the LEGO Mission Profile Analysis Methodology
Martin Bendix Fogsgaard and Francesco Iannuzzo (Aalborg University, Denmark)

Microstructure And Shear Strength Correlation After Reliability Testing Of Bond Contacts Using Alternative Al Heavy Wire Materials
Robert Klengel, Jan Schischka and Tino Stephan (Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Germany); Sandy Klengel (Fraunhofer Institute for Microstructure of Materials and System, Germany); Martin Hempel (Fraunhofer Institute for Reliability and Microintegration IZM, Germany); Martin Schneider-Ramelow (Fraunhofer IZM & TU Berlin, Germany); Anne Groth (Technische Universität Berlin, Germany)

Loop formation effects on the lifetime of wire bonds for power electronics
Hans-Georg von Ribbeck (F & K DELVOTEC Bondtechnik GmbH, Germany); Torsten Döhler (TH Wildau, Germany); Bernhard Czerny and Golta Khatibi (TU Wien, Austria); Ute Geißler (TH Wildau, Germany)

Thermo-mechanical reliability of nanosilver sintered joints for large-area substrate bonding
Jingru Dai, Pearl A Agyakwa, Christopher Johnson, Abubakar Bello and Martin Cofield (University of Nottingham, United Kingdom (Great Britain))

Poster Session + Tea Break
Room: Atrium

Wednesday, March 25 16:30 - 18:00

Session Reliability (1)
Room: MOA 3-5
Chairs: Guo-Quan Lu (Virginia Tech, USA), Josef Lutz (Chemnitz University of Technology, Germany)

16:30 ***Reliability of Capacitors and Magnetic Components in Power Electronic Applications (Invited)***
Huai Wang, Haoran Wang and Zhan Shen (Aalborg University, Denmark)

17:00 ***H3TRB Test on 6.5 kV SiC-JBS Diodes***
Felix Hoffmann (University of Bremen, Germany); Andrei Mihaila (ABB Switzerland Ltd., Germany); Victor Soler (Centre Nacional de Microelectrònica, Spain); Nando Kaminski (University of Bremen, Germany)

17:20 ***A Method for the Characterization of Adhesion Strength Degradation of Thin Films on Si-Substrate under thermal cycling test***
Dawei Zhao (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Sebastian Letz and Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Martin März (FhG Erlangen, Germany)

17:40 ***Survey on Generative and Discriminative Approaches with Focus on SiC***
Afshin Loghmani Moghaddam Toussi, Amir Sajjad Bahman and Frede Blaabjerg (Aalborg University, Denmark)

Session Clean Switching, EMC (2)
Room: MOA 8
Chairs: Reinhold Bayerer (Germany), Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany)

16:30 ***EMI Imaging System Using Double-pulse-compose-method***
Kota Matsuo (Kyushu Institute of Technology & Omura Laboratory, Japan); Masanori Tsukuda (Kyushu Institute of Technology & Green Electronics Research Institute, Kitakyushu, Japan); Ichiro Omura (Kyushu Institute of Technology, Japan)

16:50 ***Gallium Nitride in Automotive High-Speed Drive Applications***
Benjamin Antensteiner (Magna Powertrain, Austria); Patrick Lamplmayr (MAGNA ECS, Austria); Michael Moerwald (Magna Powertrain, Austria); Martin Reisinger (Linz Center of Mechatronics GmbH, Austria); Wolfgang Gruber (Johannes Kepler University Linz & Institute for Electrical Drives and Power Electronics, Austria); Lukas Haeusler (Magna Powertrain Engineering Center Steyr GMBH & CO KG, Austria)

Wednesday, March 25 19:00 - 22:00

Conference Dinner (Departure from the Venue by Bus)

Thursday, March 26

Thursday, March 26 8:30 - 9:10

Keynote
Room: MOA 3-5

8:30 ***Power cycling - methods, measurement accuracy, comparability***
Josef Lutz (Chemnitz University of Technology, Germany)

Thursday, March 26 9:10 - 10:10

Session Reliability (2)
Room: MOA 3-5
Chair: Norbert Seliger (Technische Hochschule Rosenheim, Germany)

9:10 ***Comparative study of determining junction temperature of SiC MOSFETs during power cycling tests by a Tj sensor and the VSD(T)-method***
Carsten Kempiak (Otto-von-Guericke-Universtität Magdeburg, Germany); Andreas Lindemann (University of Magdeburg, Germany); Shiori Idaka and Eckhard Thal (Mitsubishi Electric Europe B. V., Germany)

9:30 ***Power Cycling of SiC MOSFET Single-Chip Modules with Additional Measurement Cycles for Life End Determination***

Felix Wagner, Gerhard Reber, Martin Rittner and Michael Guyenot (Robert Bosch GmbH, Germany); Maximilian Nitzsche (University of Stuttgart, Germany); Bernhard Wunderle (Technische Universität Chemnitz, Germany)

9:50 ***Impact of load-pulse duration on power-cycling capability of SiC devices***
Paul Salmen (Infineon Technologies AG, Germany); Oliver Schilling (Infineon AG, Germany); Torsten Methfessel (Infineon Technologies AG, Germany); Cesare Künzel (TU Chemnitz, Germany)

Session General Aspects of Packaging (2)
Room: MOA 8

9:10 ***PCB Embedding using Single-Switch-Pre-Packages as Modular Building Blocks***
Ankit Bhushan Sharma, Johann Schnur and Niko Haag (Hochschule Kempten - University of Applied Science, Germany); Vladimir Polezhaev (Hochschule Kempten, Germany); Till Huesgen (Hochschule Kempten - University of Applied Science, Germany)

9:30 ***Generic thermal cooling design for multicell converters***
Jean-Christophe Crebier and Yvan Avenas (Grenoble Université, France); Yves Lembeye (Grenoble Electrical Engineering Laboratory, France); André Andreta (Universite Grenoble Alpes, France)

9:50 ***Electromagnetic switching cell design and characterization for WBG power semiconductors***
Kirill Klein (Technical University Berlin, Germany); Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany); Klaus-Dieter Lang (Technische Universität Berlin, Germany)

Thursday, March 26 10:10 - 10:40

Tea Break
Room: Atrium

Thursday, March 26 10:40 - 12:00

Session Reliability (3)
Room: MOA 3-5
Chairs: Huai Wang (Aalborg University, Denmark), Eckhard Wolfgang (ECPE e. V., Germany)

10:40 ***IGBT current filamentation observation by segmented collector sensing under UIS condition***
Seiya Matsuura (Kyusyu Institute of Technology, Japan); Masanori Tsukuda (Kyushu Institute of Technology & Green Electronics Research Institute, Kitakyushu, Japan); Ichiro Omura (Kyushu Institute of Technology, Japan)

11:00 ***Simultaneous Imaging of Strain and Temperature using Single IR Camera***
Yoshiki Masuda (Kyusyu Institute of Technology, Japan); Akihiko Watanabe and Ichiro Omura (Kyushu Institute of Technology, Japan)

11:20 ***Power cycling close to 50 Hz load, low temperature swings combined with an adjustable part of switching losses***
Peter Seidel, Christian Schwabe and Josef Lutz (Chemnitz University of Technology, Germany)

11:40 ***Dynamic AC Power Cycling with Coupled Inverters Operating Under Application-Oriented Conditions***
Maximilian Nitzsche, Kevin Muñoz Barón and Philipp Ziegler (University of Stuttgart, Germany); Felix Wagner (Robert Bosch GmbH, Germany); Jörg Roth-Stielow (University of Stuttgart, Germany)

Session General Aspects of Packaging (3)
Room: MOA 8

10:40 ***Development of sinter paste with surface modified copper alloy particles for die-attach bonding***
Gordon Elger (Technische Hochschule Ingolstadt & Institut für Innovative Mobilität, Germany); Sri Krishna Bhogaraju (Institute of Innovative Mobility (IIMo), Technische Hochschule Ingolstadt, Germany); Markus R. Meier (Zestron Europe, Germany); Maximilian Schmid (Technische Hochschule Ingolstadt, Germany); Fosca Conti (University of Padova, Italy); Helmut Schweigart (ZESTRON Europe, Germany)

11:00 ***Application of Response Surface Methodology for Optimization of Ag-Ag Direct Bonding for Wafer-Level Power Electronics Packaging***
Zechun Yu and Weijian Zeng (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Christoph Friedrich Bayer (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)

11:20 ***A new development of micro-copper sinter material for high power electronics application***
Christian Schwarzer (Aschaffenburg University of Applied Sciences & Heraeus Deutschland GmbH & Co KG, Germany); Ly May Chew (Heraeus Deutschland GmbH & Co. KG, Germany); Thomas Stoll (Friedrich-Alexander-Universität Erlangen-Nürnberg & Lehrstuhl für Fertigungsautomatisierung und Produktionssystematik (FAPS), Germany); Jörg Franke (FAU Erlangen-Nuremberg, Germany); Michael Kaloudis (Aschaffenburg University of Applied Sciences, Germany)

11:40 ***Numerical material design for reliable power electronics with cement-based encapsulation***
Falk Naumann and Bianca Boettge (Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Germany); Stefan Behrendt (FuE-Zentrum FH Kiel GmbH, Germany); Ronald Eisele (FH Kiel, Germany); Sandy Klengel (Fraunhofer Institute for Microstructure of Materials and System, Germany)

Thursday, March 26 12:00 - 13:20

Lunch Break
Room: Atrium

Thursday, March 26 13:20 - 14:10

Keynote
Room: MOA 3-5
Chair: Eckhard Wolfgang (ECPE e. V., Germany)

13:20 ***Present and Future of Fault Tolerant Drives applied to Transport Applications***
Xu Deng, Haimeng Wu, Bowen Gu, Glynn Atkinson, Barrie Mecrow and Volker Pickert (Newcastle University, United Kingdom (Great Britain))

Thursday, March 26 14:10 - 14:20

Closing Remarks
Room: MOA 3-5
Chairs: Thomas Harder (European Center for Power Electronics (ECPE e.V.), Germany), Nando Kaminski (University of Bremen, Germany), Andreas Lindemann (University of Magdeburg, Germany), Leo Lorenz (ECPE, Germany)

Thursday, March 26 14:20 - 14:35

Ceremony: ECPE Young Engineer Award, CIPS Best
Room: MOA 3-5
Chairs: Chris R Gould (ECPE European Center for Power Electronics e. V, Germany), Regine Mallwitz (Technische Universität Braunschweig, Germany)

Thursday, March 26 14:35 - 15:00

Ceremony: Semikron Innovation and Young Engineer
Room: MOA 3-5
Chair: Leo Lorenz (ECPE, Germany)

Prepared by EDAS Conference Services.
Contact © Copyright 2020 IEEE - All Rights Reserved.