

CIPS 2018

Session 1: Clean switching, electromagnetic compatibility (EMC)

Chairs: Andreas Lindemann (University of Magdeburg, Germany), Regis Meuret (Safran Electrical & Power, France)

Integration solutions for clean and safe switching of high speed devices

Jean-Luc Schanen (Grenoble Electrical Engineering Laboratory, France); Pierre-Olivier Jeannin (Grenoble Université, France)

Review of Parasitic Minimization Techniques for High Frequency Power Conversion

David Reusch, Alex Lidow, (Efficient Power Conversion (EPC), El Segundo, California, USA)

A Fully-Isolated Robust Common-Mode Hybrid Filter

Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France); Luc Rambaud (MERCÉ, France)

Session 2: EMC, Components to be integrated

Chairs: Leo Lorenz (ECPE, Germany), David Reusch (Efficient Power Conversion (EPC), USA)

Electromagnetic noise induced by novel high voltage fast switching device

Tsuyoshi Funaki (Osaka University, Japan)

The Promise of GaN in Light of Future Requirements for Power Electronics

Gerald Deboy, Matthias Kasper (Infineon Technologies Austria AG, Villach, Austria); Alfredo Medina Garcia, Manfred Schlenk (Infineon Technologies AG, Neubiberg, Germany)

Frequency Optimum of Semiconductor Technologies and State-of-the-Art Magnetic Components in SMPS

Tobias Reimann (Technische Universität Ilmenau, Germany); Marko Scherf (ISLE Steuerungstechnik und Leistungselektronik GmbH, Ilmenau, Germany)

Session 3: Reliability (1)

Chairs: Uwe Scheuermann (Semikron Elektronik GmbH & Co. KG, Germany), Katsuaki Suganuma (Osaka University, Japan)

Test Strategy in Industrial Product Development

Chief Engineer, Lars Rimestad (Grundfos Holding, Denmark)

Automotive Qualification Routines for Power Electronics Components in Electrified Powertrains

Martin Rittner (Robert Bosch GmbH, Germany); Markus Thoben (Infineon Technologies AG, Germany); Kai Kriegel (Siemens AG, Germany)

Condition and Health Monitoring in Power Electronics

Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France); Frede Blaabjerg (Aalborg University, Denmark)

Session 4: Reliability (2)

Chairs: Lars Rimestad (Grundfos, Denmark), Eckhard Wolfgang (ECPE e. V., Germany)

Analytics for Power Electronic Components - Methods to figure out root causes of failures

Sandy Klengel, Bianca Boettge, Matthias Petzold (Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Germany)

Limitation of Power Module Lifetime Derived from Active Power Cycling Tests

Uwe Scheuermann, Marion Junghänel (Semikron Elektronik GmbH & Co. KG, Germany)

Get Together + Poster Session

P1: Components to be integrated

Optimizing integrated common and differential mode chokes with the PermeabilityLink method

Jörn Schlieuwe, Matthias Koeppen, August Gauss, Detlef Lange, Stefan Weber (EPCOS AG, Germany)

Thermistor Die for Power Module Applications

Sophie Schuurman, Erik Mattens, Bruno Van Beneden (Vishay Resistors Belgium, Belgium); Emilio Mattiuzzo, Marcello Turnaturi (Vishay Semiconductor Italiana, Italy)

Benchmarks of the gate driver supplies' architectures for the power devices in series connection

Van Sang Nguyen (Grenoble Institute of Technology & G2ELab, France); Pierre Lefranc (University of Grenoble Alpes, France); Jean-Christophe Crebier (Grenoble Université, France)

SMPS electromagnetic noise in System-on-Chip: Resonant frequency and amplitude dependencies

Eric Feltrin (Ecole Centrale de Lyon & STMicroelectronics, France); David Chesneau (STMicroelectronics, France); Christian Vollaire (Ampere Lab, France); Bruno Allard (INSA Lyon, France)

C-V Characterization Technique for Four-Terminal GaN-on-Si HEMTs Based on 3-Port S-Parameter Measurements

Cristino Salcines (University of Stuttgart); Stefan Moench (Institute of Robust Power Semiconductor Systems, University of Stuttgart, Germany); Ingmar Kallfass (University of Stuttgart, Germany); Boris Spudic (Institute of Robust Power Semiconductor Systems (ILH), University of Stuttgart, Germany)

Ferrite embedding for Power SiPs – a packaging view

Tina Thomas (Technische Universität Berlin, Germany); Stefan Hoffmann, Karl-Friedrich Becker, Hans Walter, Volker Bader, Tanja Braun, Eckart Hoene (Fraunhofer IZM, Germany); Martin Schneider-Ramelow (Fraunhofer IZM & Technische Universität Berlin, Germany)

Power Loss Analysis of 60 V Trench Field-Plate MOSFETs utilizing Structure Based Capacitance Model for Automotive Application

Kenya Kobayashi, Masaki Sudo, Ichiro Omura (Kyushu Institute of Technology, Japan)

P2: General aspects of packaging

A SiC MOSFET power module with integrated gate drive for 2.5 MHz Class E resonant converters

Asger Jørgensen (Aalborg University, Denmark); Unnikrishnan Nair (Universitat Politecnica de Catalunya, Denmark); Stig Munk-Nielsen, Christian Uhrenfeldt (Aalborg University, Denmark)

Pressure less sintering of large dies by infrared radiation

Wolfgang Schmitt (Heraeus Deutschland GmbH & Co. KG & Heraeus Electronics, Germany); Ly May Chew (Heraeus Deutschland GmbH & Co. KG, Germany); Robert Miller (Hochschule Aschaffenburg, University of Applied Sciences, Germany)

Simulation of the Thermal Transient Behaviour of Silicon Carbide Modules Using Liquid Convection Cooling

Ulf Müter (Helmut Schmidt University, Germany); Jens Radvan (Philips Medical Systems, Germany); Stefan Richter (Philips Medical Systems, United Kingdom, Great Britain); Klaus Hoffmann (Helmut-Schmidt-Universität, Germany)

Vias in DBC Substrates for Embedded Power Modules

Hoang Linh Bach, Zechun Yu, Sebastian Letz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Christoph Friedrich Bayer, Uwe Waltrich, Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Martin März (FhG Erlangen, Germany)

Fabrication of PCB embedded 1200V/50A power module and benchmarking with commercial DBC based package

Ankit Bhushan Sharma, Johann Schnur, Niko Haag, Thomas Kuwan, Armin Stogel, Till Huesgen (Hochschule Kempten – University of Applied Science, Germany)

Influence of Dielectric Constant on Partial Discharge Inception Voltage of Ceramic Insulating Substrate under High Temperature

Tsuyoshi Abe, Michiya Suenaga, Akihiro Imakiire, Masahiro Kozako, Masayuki Hikita (Kyusyu Institute of Technology, Japan); Takashi Nishimura, Hiroki Shiota, Hirotaka Muto (Mitsubishi Electric Corporation, Japan)

Electrochemical Corrosion on Ceramic Substrates for Power Electronics - Causes, Phenomenological Description, and Outlook

Christoph Friedrich Bayer, Antonia Dieppen, Thomas Filippi, Carmen Fuchs, Sophie Wüstefeld, Simon Kellner, Uwe Waltrich, Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany)

On the reliability of stacked metallized ceramic substrates under thermal cycling

Bassem Mouawad (University of Nottingham, United Kingdom, Great Britain); Jianfeng Li (The University of Nottingham, United Kingdom, Great Britain); Alberto Castellazzi (University of Nottingham & Power Electronics, Machines and Control Group, United Kingdom, Great Britain); C. Mark Johnson (University of Nottingham, United Kingdom, Great Britain)

Thermal Characteristic Evaluation and Transient Thermal Analysis of Next-generation SiC Power Module at 250 °C

Akihiro Imakiire, Masahiro Kozako, Masayuki Hikita (Kyusyu Institute of Technology, Japan); Kohei Tatsumi, Masakazu Inagaki, Tomonori Iizuka (Waseda University, Japan); Hiroaki Narimatsu, Nobuaki Sato, Koji Shimizu, Kazutoshi Ueda (Mitsui High-tec Inc., Japan); Kazuhiko Sugiura (Denso Corporation, Japan); Kazuhiro Tsuruta, Makio Iida (DENSO Corporation, Japan); Keiji Toda (TOYOTA MOTOR Corporation, Japan)

Die-bonding performance of micron Ag particle paste for high power devices

Tetsu Takemasa (Osaka University, Japan); Minoru Ueshima (Senju Metal Industry, Japan); Jiu Jinting, Junko Seino (Senju Metal Industry Co., Ltd., Japan); Katsuaki Suganuma (Osaka University, Japan)

Integrated LED Driver based on 800V Si L-IGBTs

Attahir Murtala Aliyu (University of Nottingham, United Kingdom, Great Britain); Alwyn Elliott (Imperial College, United Kingdom, Great Britain); Vasantha Pathirana, Nishad Udugampola (University of Cambridge, United Kingdom, Great Britain); Pushparajah Rajaguru (University of Greenwich, United Kingdom, Great Britain); Alberto Castellazzi (University of Nottingham & Power Electronics, Machines and Control Group, United Kingdom, Great Britain); Paul Mitcheson (Imperial College London, United Kingdom, Great Britain); Tanya Trajkovic (Camutronics, United Kingdom, Great Britain); Florin Udrea (University of Cambridge, United Kingdom, Great Britain); Christopher Bailey (University of Greenwich, United Kingdom, Great Britain)

Novel PD Location Algorithm for Next Generation Power Module using Small Loop Sensors

Jyunya Maki, Yuya Akinaga, Masahiro Kozako, Masayuki Hikita (Kyusyu Institute of Technology, Japan); Yoko Nakamura, Yoshinari Ikeda, Katsumi Taniguchi, Kenji Okamoto (Fuji Electric Co., Ltd, Japan)
(Paper was not available)

P3: Power packages and modules

Surge Current Capability of IGBTs Used in Low Voltage DC/AC Hybrid Circuit Breaker

Kenan Askan, Michael Bartonek (Eaton Industries GmbH, Austria); Klaus Sobe (Infineon Technologies Austria AG, Austria)

Direct Copper Bonding (DCB) alumina substrates with pre-applied solder pads for simplified die soldering and improved manufacturing yield

Hans-Jürgen Richter, Pan Liu, Michael Schaefer (Heraeus Electronics, Germany); Dieter Watzal (Heraeus Deutschland, Germany); Sebastian Fritzsche (Heraeus Materials Technology GmbH & Co. KG, Germany); Christophe Féry (Heraeus Electronics, Germany); Aarief Syed-Khaja (Heraeus Deutschland GmbH & Co. KG & Heraeus Electronics, Germany)

A High Efficiency and Power Density, High Step-Up, Non-isolated DC-DC Converter Based on Multi-cell Approach

André Andreta (Universite Grenoble Alpes, France); Yves Lembeye (Grenoble Electrical Engineering Laboratory, France); Lyubomir Kerachev (Universite Grenoble Alpes, France); Farshid Sarrafin (University of Grenoble des Alpes & G2Elab, France); Luiz Fernando Villa (Universite de Toulouse, France); Jean Christophe Crebier (Université Grenoble Alpes, France)

Comparison of thermal and reliability performance between a SiC MOSFET module with embedded decoupling capacitors and commercial Si IGBT power modules

Li Yang, Pearl A. Agyakwa, Martin Corfield, C. Mark Johnson (University of Nottingham, United Kingdom, Great Britain); Anne Harris, Matthew Packwood (Dynex Semiconductor Ltd, United Kingdom, Great Britain); Krzysztof Paciura (Cummins Inc, United Kingdom, Great Britain)

Reliability Design of Dual Sided Cooled Power Semiconductor Module for Hybrid and Electric Vehicles

Yangang Wang (Dynex Semiconductor Ltd, United Kingdom, Great Britain); Yun Li (Dynex Semiconductor, United Kingdom, Great Britain); Xiaoping Dai, Yibo Wu, Guoyou Liu (CRRC, P.R. China); Xuyu Liu (The University of Manchester, United Kingdom, Great Britain)

A High Performance 1200V/120A SiC Power Module Based On a Novel Multi-DBC's Hybrid Packaging Structure

Yuxiong Li, Cai Chen, Zhizhao Huang, Lichuan Chen (Huazhong University of Science and Technology, P.R. China); Kaifeng Zou (Naval Aeronautical Engineering University Qingdao Branch, P.R. China); Yong Kang (Huazhong University of Science and Technology, P.R. China); Fang Luo (University of Arkansas, P.R. China); Sichao Li (Huazhong University of Science and Technology, P.R. China)

A Novel Double Sided Cooled Leadframe Power Module for Automotive Application based on ceramic-free Substrates

Bao Ngoc An (Karlsruhe Institute of Technology, Germany); Johannes Kolb (SHARE at KIT, Germany); Thomas Blank, Benjamin Leyrer, Marc Weber, Dorit Nötzel, Thomas Hanemann, Horst Demattio, Peter Kästner, Michael Meisser, Torsten Scherer, Matthias Mail (Karlsruhe Institute of Technology (KIT), Germany)

How asymmetric busbar design causes symmetric switching behavior of paralleled IGBT modules

Matthias Wissen (Infineon Technologies AG, Germany); Daniel Domes (Infineon Technologies AG & Warstein, Germany); Waleri Brekel, Koray Yilmaz (Infineon Technologies AG, Germany)

Effects of different working frequencies on the joint formation in copper wire bonding

Reinhard Schemmel, Simon Althoff (University of Paderborn, Germany); Michael Brökelmann, Andreas Unger, Matthias Hunstig (Hesse GmbH, Germany); Walter Sextro (Universität Paderborn, Germany)

P5: Reliability

Vibrational resistance investigation of an IGBT gate driver utilizing frequency response analysis and highly accelerated life test (HALT)

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

FEM based enhancement of system lifetime by improvement of the die top connection of power electronic semiconductors

Andreas Klein (Heraeus Deutschland GmbH & Co. KG, Germany); Martin Becker (Danfoss Silicon Power GmbH, Germany); Anton Miric, Benjamin Fabian, Andreas Hinrich, Marko Kalajica (Heraeus Deutschland GmbH & Co. KG, Germany); Wolfgang Schmitt (Heraeus Deutschland GmbH & Co. KG & Heraeus Electronics, Germany)

In-situ condition monitoring system to study the ageing of power semi-conductor devices in photovoltaic inverters

Mouhannad Dbeiss (CEA-INES, France); Yvan Avenas (Grenoble Université, France); Henri Zara (CEA-INES, France); Laurent Dupont (IFSTTAR, France)

Investigations on the evolution of dynamic Ron of GaN power transistors during switching cycles

Malika Elharizi (IFSTTAR); Richard Lallemand, Zoubir Khatir and Jean-Pierre Ousten (IFSTTAR, France)

An Investigation of Frequency Response Analysis Method for Junction Temperature Estimation of SiCs Power Device

Xiang Lu, Cuili Chen (Newcastle University, United Kingdom, Great Britain); Maher Al-Greer (Teesside University, United Kingdom, Great Britain); Volker Pickert, Charalampos C. Tsimenidis (Newcastle University, United Kingdom, Great Britain)

Lifetime Testing Method for Ceramic Capacitors for Power Electronics Applications

Fabian Dresel, Nils Tham, Tobias Erlbacher (Fraunhofer IISB, Germany); Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany)

Analysis of Transient Thermal-Mechanical Stresses in Power Devices Using Test Chips and Optical Techniques

Markus Feißt, Eike Möller, Jürgen Wilde (Albert-Ludwigs-Universität Freiburg, Institut für Mikrosystemtechnik – IMTEK, Germany)

Solder layer degradation measurement for SiC-MOSFET Modules under accelerated power cycling conditions

Haoze Luo, Francesco Iannuzzo, Frede Blaabjerg (Aalborg University, Denmark)

A correlative approach to observing the thermomechanically driven microstructural evolution of ultrasonically bonded copper wires

Bassem Mouawad, Pearl A. Agyakwa, Martin Corfield, C. Mark Johnson (University of Nottingham, United Kingdom, Great Britain)

Novel specimen design to test engineering plastics for power electronic applications

Bianca Boettge, Rico Bernhardt, Sandy Klengel (Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Germany); Sebastian Wels, Albert Claudi (University of Kassel, Germany)

P6: Clean switching, electromagnetic compatibility (EMC)

A mitigation solution for bifurcations in a low-power 4-Switch Buck-Boost converter (4SBB)

Amokrane Malou (University of Lyon & ON Semiconductor, France); Bruno Allard, Xuefang Lin-Shi, Alaa Hijazi (INSA Lyon, France); Berengere Le Men (ON Semiconductor, France)

Identifying the Stray Elements of the Experimental Setup Used in the Semiconductor Datasheets

Mylene Delhommis, Jean-Luc Schanen, Yvan Avenas, Frédéric Wurtz (Univ. Grenoble Alpes, CNRS, Grenoble INP, G2Elab, Grenoble, France); Cecile Rigaud, Sylvain Chardon (Tronico, France)

A Novel Gate Driving Approach to Balance the Transient Current of Parallel-Connected GaN-HEMTs

Jonathan Hackel, Michael Ebli, Martin Pfost (TU Dortmund, Germany)

Impedance analysis in a co-planar power bus interconnect prototype for low inductance switching

Xi Lin, Jianfeng Li, C. Mark Johnson (University of Nottingham, United Kingdom, Great Britain)

Session 5: General aspects of packaging (1/2)

to be continued

Chairs: Shiori Idaka (Mitsubishi Electric Europe B. V., Germany), Jürgen H. Wilde (Albert-Ludwigs-Universität Freiburg, Germany)

Thermo-mechanical stress and deformation behaviour of joined semiconductor devices using different die attach technologies

Falk Naumann, Bianca Boettge, Georg Lorenz, Michael Bernasch (Fraunhofer Institute for Microstructure of Materials and Systems IMWS, Germany); Christina Ebensperger, Stefan Oehling (SEMIKRON Elektronik GmbH & Co. KG, Germany)

Silver sinter paste optimized for pressure sintering under air atmosphere on precious and non-precious metal surfaces with high reliable sintered joints

Ly May Chew (Heraeus Deutschland GmbH & Co. KG, Germany); Wolfgang Schmitt (Heraeus Deutschland GmbH & Co. KG & Heraeus Electronics, Germany); Jens Nachreiner, Stefan Gunst (Heraeus Deutschland GmbH & Co. KG, Germany)

Improvement of power module system solders by directional solidification

Aaron Hutzler, Christoph Oetzel, Emil Friker (PINK GmbH Thermosysteme, Germany)

Power Chip Interconnections Based on TLP, Sintering and CTE-Matched Conductors

Markus Feisst, Philip Schaetzle, Jürgen Wilde (Universität Freiburg – IMTEK, Germany)

Additive Manufacturing of 3D-copper-metallizations on alumina by means of Selective Laser Melting for power electronic applications

Thomas Stoll (Friedrich-Alexander-Universität Erlangen-Nürnberg & Lehrstuhl für Fertigungsautomatisierung und Produktionssystematik (FAPS), Germany)

Session 6: Mechatronic systems and their applications

Chairs: Regine Mallwitz (Technische Universität Braunschweig, Germany), Tsuyoshi Funaki (Osaka University, Japan)

Parasitic Extraction Procedures for SiC Power Modules

Ivana Kovacevic-Badstuebner, Roger Stark (Advanced Power Semiconductor Laboratory, ETH Zurich, Switzerland); Mattia Guacci (Power Electronic Systems Laboratory, ETH Zurich, Switzerland); Johann. W. Kolar (ETH Zurich, Switzerland); Ulrike Grossner (Advanced Power Semiconductor Laboratory, ETH Zurich, Switzerland)

Applying magnetoresistive current sensors in difficult operating environments

Rolf Slatter, Matthias Brusius (Sensitec GmbH, Germany); Claudia Glenske (Sensitec GmbH)

Comparison of the Surge Current Ruggedness between the Body Diode of SiC MOSFETs and Si Diodes for IGBT

Patrick Hofstetter, Mark Bakran (University of Bayreuth, Germany)

09:30 *Integration Concept for a Traction Inverter with 3D-Printed Embedded Cooling Technology realizing Highest Power Density*

Jasper Schnack, Ulf Schümann, Dominik Hilper, Ronald Eisele (Fachhochschule Kiel, Germany); Thomas Ebel (FTCAP GmbH, Germany); Frank Osterwald, Holger Beer (Danfoss Silicon Power GmbH, Germany)

09:50 *Grid-Connected Three-Phase H-Bridge Inverter with Level Doubling Network Controlled by Staircase Modulation Techniques*

Milan Srndovic, Aleksandr Viatkin, Gabriele Grandi (University of Bologna, Italy)

Session 7: General aspects of packaging (2/2)

Chairs: Sandy Klengel (Fraunhofer Institute for Microstructure of Materials and System, Germany), Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France)

Full SiC Integrated Power Converter Module with Replaceable Building Blocks

Attahir Murtala Aliyu (University of Nottingham, United Kingdom, Great Britain); Alberto Castellazzi (University of Nottingham & Power Electronics, Machines and Control Group, United Kingdom, Great Britain); Philippe Lasserre (Primes Association, France); Nicola Delmonte (Università di Parma, Italy); Paolo Cova (University of Parma, Italy)

Making Thermal Grease Obsolete: Fully Isolated Discrete Power Package with High Thermal and Electrical Performance

Thomas Basler, Christian Kasztelan, Daniel Pedone, Edward Fürgut, Matthias Schmidt (Infineon Technologies AG, Germany)

Transfer molding for power semiconductor modules

Jürgen Schuderer, Viktor Lindström (ABB Corporate Research, Switzerland); Chunlei Liu (ABB Switzerland Ltd. Corporate Research, Switzerland); Fabian Mohn (ABB Corporate Research, Switzerland)

Thermal and thermo-mechanical design of an integrated substrate and heat sink for planar power module

Jianfeng Li, Xi Lin, Jingru Dai, Bassem Mouawad, C. Mark Johnson (University of Nottingham, United Kingdom, Great Britain)

Design and Fabrication of PCB Embedded Power Module with Integrated Heat Exchanger for Dielectric Coolant

Johann Schnur, Ankit Bhushan Sharma, Niko Haag, Thomas Kuwan, Armin Stogel, Till Huesgen (Hochschule Kempten, Germany)

Session 8: Condition Monitoring (Reliability (1/2))

Chairs: Nicolas Degrenne (Mitsubishi Electric R&D Centre Europe, France), Andreja Rojko (ECPE, Germany)

Signal Sweeping Technique to Decouple the Influence of Junction Temperature and Bond Wire Lift-off in Condition Monitoring for Multichip IGBT Modules

Cuili Chen, Volker Pickert (Newcastle University, United Kingdom, Great Britain); Maher Al-Greer (Teesside University, United Kingdom, Great Britain); Charalampos C. Tsimenidis (Newcastle University, United Kingdom, Great Britain); Thillainathan Logenthiran (Newcastle University, Singapore); Xiang Lu (Newcastle University, United Kingdom, Great Britain); Ng Chong, Chunjiang Jia (ORE Catapult, United Kingdom, Great Britain)

Real-time condition monitoring of IGBT modules in PV inverter systems

Uimin Choi (Seoul National University of Science and Technology, Korea); Frede Blaabjerg (Aalborg University, Denmark)

Investigation of the usage of a chip integrated sensor to determine junction temperature during power cycling tests

Carsten Kempiak (Otto-von-Guericke-Universität Magdeburg, Germany); Andreas Lindemann (Otto-von-Guericke-Universität Magdeburg); Eckhard Thal, Shiori Idaka (Mitsubishi Electric Europe B. V., Germany)

On-line Virtual Junction Temperature Measurement via DC Gate Current Injection

Julio Brandelero, Jeffrey Ewanchuk, Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France)

Current filament monitoring under unclamped inductive switching conditions on real IGBT interconnection

Masanori Tsukuda (Green Electronics Research Institute, Kitakyushu, Japan); Takaaki Arimoto, Ichiro Omura (Kyushu Institute of Technology, Japan)

Session 9: Components to be integrated (1/2)

to be continued

Chairs: Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany), Jan Vobecký (ABB, Switzerland)

Direct Pressed Die (DPD) Technology - a Novel Packaging Solution for Power Modules

Christian Goebel (Semikron Elektronik GmbH, Germany)

PCB-Embedding for GaN-on-Si Power Devices and ICs

Richard Reiner, Beatrix Weiss, Dirk Meder, Patrick Waltereit (Fraunhofer IAF, Germany); Christian Vockenberger (AT&S Austria Technologie & Systemtechnik, Austria); Thomas Gerrer, Rüdiger Quay (Fraunhofer IAF, Germany); Oliver Ambacher (Fraunhofer IAF & IMTEK, University Freiburg, Germany)

The M-Shunt Structure Applied to Printed Circuit Boards

Christian Bödeker, Melanie Adelmund, Nando Kaminski (University of Bremen, Germany)

An Investigation of the Parasitic Impedance on the DC-Link Capacitor of EV Drive Inverters

Stefan Piepenbreier (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Albert Käß (Chair of Electrical Engineering, University of Erlangen-Nuremberg, Germany); Martin März (FhG Erlangen, Germany)

Volumetric Evaluation of Passive Components in Multilevel Three-Phase Active Front-End AC-DC Converters

Friedrich Schultheiß (BMW Group, Germany); Martin März (FhG Erlangen, Germany)

Session 10: Degradation of Interconnects (Reliability (2/2))

Chairs: Martin Rittner (Robert Bosch GmbH, Germany), Norbert Seliger (FH Rosenheim, Germany)

On-time Dependency on the Power Cycling Capability of Al Bond Wires Measured by Shear Test

Nan Jiang (Chemnitz University of Technology, Germany); Marko Kalajica (Heraeus Deutschland GmbH & Co. KG, Germany); Josef Lutz (Chemnitz University of Technology, Germany)

Power cycling reliability of time-reduced sintering for attaching SiC diodes using nanosilver film

Jingru Dai, Jianfeng Li, Pearl Agyakwa, Christopher Johnson (University of Nottingham, United Kingdom, Great Britain)

Experimentally-Validated Models of On-State Voltage for Remaining Useful Life Estimation and Design for Reliability of Power Modules

Nicolas Degrenne, Stefan Mollov (Mitsubishi Electric R&D Centre Europe, France)

Interpretation of Power Cycling data derived from transient cooling curves

Martin Bayer, Samuel Hartmann, Marianne Berg, Robert Moody, Gontran Paques (ABB Switzerland Ltd., Switzerland)

Trends in SiC MOSFET Threshold Voltage and ON-Resistance Measurements from Thermal Cycling and Electrical Switching Stresses

Joseph Kozak (Virginia Tech, USA); Douglas DeVoto, Joshua Major (National Renewable Energy Laboratory, USA); Khai D. T. Ngo (Virginia Tech, USA)

Session 11: Components to be integrated (2/2)

Chairs: C. Mark Johnson (University of Nottingham, United Kingdom, Great Britain), Gerald Deboy (Infineon Technologies Austria AG, Austria)

Double chips low side - high side configurable full gate driver circuits for a high speed inverter leg

Van Sang Nguyen (Grenoble Institute of Technology & G2ELab, France); Pierre Lefranc, Jean-Christophe Crebier (University of Grenoble Alpes, France)

Session 12: EMI (Clean switching, electromagnetic compatibility (1/2))

Chairs: Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany), Jean-Luc Schanen (Grenoble Electrical Engineering Laboratory, France)

Characterization of ferrite core properties for FM-band filtering in automotive applications

Sven Bönisch (Brandenburg University of Technology, Germany); Stefan Hoffmann, Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany); Michael Schmidhuber (Sumida Components GmbH, Germany)

Suppression of Electromagnetic Interference using Multi-Stage Inte-grated Filtering with Screening and Partitioning

Zhe Zhang (University of Nottingham & Power Electronics, Machines and Control Group, United Kingdom, Great Britain); C Mark Johnson (University of Nottingham, United Kingdom, Great Britain)

Improving 9-150 kHz EMI Performance of Single-Phase PFC Rectifier

Pooya Davari (Aalborg University, Denmark); Eckart Hoene (Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration IZM, Germany); Firuz Zare (University of Queensland, Australia); Frede Blaabjerg (Aalborg University, Denmark)

Advantages of Gallium Nitride over Silicon transistors in soft-switched resonant switched capacitor converters

Diego Serrano, Víctor Toral, Miroslav Vasic, Pedro Alou, Jesus Oliver, Jose A. Cobos (Universidad Politécnica de Madrid (UPM), Spain)

Session 11: Power packages and modules (1/2)

to be continued

Chairs: C Mark Johnson (University of Nottingham, United Kingdom, Great Britain), Gerald Deboy (Infineon Technologies Austria AG, Austria)

Fabrication and Characterization of a High-Power-Density, Planar 10 kV SiC MOSFET Power Module

Christina DiMarino (Virginia Tech & Center for Power Electronics Systems (CPES), USA); Christopher Johnson, Bassem Mouawad, Jianfeng Li, Robert Skuriat (University of Nottingham, United Kingdom, Great Britain); Meiyu Wang, Yansong Tan (Tianjin University, P.R. China); Guo-Quan Lu (Virginia Tech & NBE Technologies, LLC, USA); Dushan Boroyevich, Rolando Burgos (Virginia Tech, USA)

A 3.3 kV SiC MOSFET Half-Bridge Power Module

Bassem Mouawad, Abdallah Hussein (University of Nottingham, United Kingdom, Great Britain); Alberto Castellazzi (University of Nottingham & Power Electronics, Machines and Control Group, United Kingdom, Great Britain)

Towards Wafer Level 3D Power Integration

Dominique Bergogne (CEA Leti University of Grenoble, France); Jean Charbonnier, Venceslass Rat (CEA Leti, France)

Session 13: Power packages and modules (2/2)

Chairs: Guo-Quan Lu (Virginia Tech & NBE Technologies, LLC, USA), Josef Lutz (Chemnitz University of Technology, Germany)

A transfer-molded high temperature SiC power module withstanding up to 250 °C

Kazuhiro Mitamura (Advanced Industrial Science And Technology (AIST) & Renesas Electronics Corporation, Japan); Yui Ozaki (Sumitomo Bakelite Co., Ltd., Japan); Yoshinori Murakami (National Institute of Advanced Industrial Science and Technology, Japan); Hiroki Takahashi (FUJI ELECTRIC CO., LTD., Japan); Hidekazu Tanisawa, Kenichi Kouji, Fumiki Kato, Shinji Sato, Hiroshi Yamaguchi, Hiroshi Sato (National Institute of Advanced Industrial Science and Technology, Japan)

High Reliable Power Modules by Pressureless Sintering

Uwe Waltrich, Christoph Friedrich Bayer, Stephanie Zötl, Sigrid Zischler, Adam Tokarski, Andreas Schletz (Fraunhofer Institute for Integrated Systems and Device Technology IISB, Germany); Martin März (FhG Erlangen, Germany)

Pressureless Silver Nanopowder Sintered Bonds for Liquid Cooled IGBT Power Modules

Namjee Kim, Rophina Li (University of Toronto, Canada); Meinrad Machler, John Brugers, Sooky Winkler (Dana, Canada); Wai Tung Ng (University of Toronto, Canada)

Low Temperature Silver Sinterprocesses on (EN)EPEAg Surfaces for High Temperature SiC Power Modules

Thomas Blank, Bao Ngoc An, Benjamin Leyrer, Michael Bruns, Michael Meisser, Torsten Scherer, Dai Isikawa, Jessica Helber, Helge Wurst, Marc Weber (Karlsruhe Institute of Technology (KIT), Germany)

Session 14: Clean switching, electromagnetic compatibility (2/2)

to be continued

Chairs: Reinhold Bayerer (Infineon Technologies AG, Germany), Martin März (FhG Erlangen, Germany)

Design of a low inductive switching cell dedicated to SiC based CSI converter

Guillaume Lefèvre (CEA – INES, France)

Novel SiC Module Design - Optimised for Low Switching Losses, Efficient Cooling Path and Low Inductance

Thomas Huber, Alexander Kleimaier (University of Applied Sciences Landshut, Germany)

Switching characteristics of low inductance SiC module with integrated capacitors for aircraft applications

Bernardo Cougo, Hans Sathler, Raphael Riva (IRT Saint-Exupery, France)

Benefits of new CoolSiC™ MOSFET in HybridPACK™ Drive package for electrical drive train applications

Waldemar Jakobi, Andre Uhlemann, Christian Schweikert, Christian Strenger, Ajay Poonjal Pai, Laurent Beurenaut, Markus Thoben (Infineon Technologies AG, Germany); Mark Niels Münzer (Infineon Technology, Germany)

Session 15: Mechatronic systems and their applications

Chairs: Sibylle Dieckerhoff (TU Berlin, Germany), Klaus Hoffmann (Helmut-Schmidt-Universität, Germany)

Google Little Box Reloaded

Johann. W. Kolar (ETH Zurich, Switzerland)

(Paper was not available)

Little Box Winner Team

Paul Bleus (CET Power, Belgium)

(Paper was not available)

Power conversion needs for high tech systems

Korneel Wijnands (Eindhoven University of Technology, The Netherlands)

(Paper was not available)

Session 16: Packaging

Chairs: Cyril Buttay (Université de Lyon Laboratoire Ampere CNRS UMR 5005 & Insa de Lyon, France), Francesco Iannuzzo (Aalborg University, Denmark)

Advanced Joining by Metal-powder Sintering: the Science, Practice, and Recent Development

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

10 kV SiC power module packaging

C. Mark Johnson (University of Nottingham, United Kingdom, Great Britain); Christina DiMarino (Virginia Tech & Center for Power Electronics Systems (CPES), USA); Bassem Mouawad, Jianfeng Li, Robert Skuriat (University of Nottingham, United Kingdom, Great Britain); Meiyu Wang, Yansong Tan (Tianjin University, P.R. China); Guo-Quan Lu (Virginia Tech & NBE Technologies, LLC, USA); Dushan Boroyevich, Rolando Burgos (Virginia Tech, USA)

Power Electronic Integration and packaging for aeronautic application in harsh environment

Regis Meuret (Safran Electrical & Power, France); Donatien Martineau, Toni Youssef (Safran, France); Christian Martin (Univ. Lyon, UCB Lyon 1, CNRS, AMPERE, France); Ousseynou Yade (AMPERE, France)

Session 17: EU Projects

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

Innovative Reliable Nitride based Power Devices and Applications – The EU Public Funded Project 'InRel-NPower'

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

Silicon Carbide PowerTechnology for Energy Efficient Devices" (SPEED) – Objectives and Main Results

Peter Friedrichs (Infineon, Germany)

(Paper was not available)