

## Conference Program PCIM Europe 2024

### Keynote

- K01 **»AI between Hype and Industrial-Grade«**  
Rolf Hellinger, Siemens, DE
- K02 **»Infrastructure Requirements for Electrified Heavy Goods Transport in Germany and the EU«**  
Martin Wietschel, Daniel Speth, Steffen Link, Fraunhofer Institute ISI, DE
- K03 **»Challenges and Solutions to Power Latest Processor Generations for Hyper Scale Datacenters«**  
Gerald Deboy, Matthias Kasper, Martin Wattenberg, Roberto Rizzolatti, Infineon Technologies, AT

### GaN Ruggedness

- OP001 **An Improved Ultrafast Desaturation-Based Protection Scheme for GaN HEMT**  
Juncheng Lu, Hossein Khoun Jahan, Hamidreza Esmailian, Lei Kou, Roy Hou, Infineon Technologies, CA; Xiaoyu Wang, Carleton University, CA
- OP002 **The Performance of a GaN eMode HEMT in Surge Current Scenarios such as the Active Short Circuit**  
Dominik Nehmer, Mark-M. Bakran, University of Bayreuth, DE; Maximilian Hepp, Wolfgang Wondrak, Mercedes-Benz, DE
- OP003 **Gate Resistance Effect on Short-Circuit Robustness of p-GaN HEMTs**  
Mohamed Lemine Dedew, Valeria Rustichelli, Joao Oliveira, Maroun Alam, Fabio Coccetti, IRT Saint Exupery, FR; Stéphane Lefebvre, Tien Anh Nguyen, Matthieu Landel, SATIE, FR; Le Thanh Long, Safran, FR

### Advanced Packaging Technologies

- OP004 **Neural Network Assisted Numerical Simulation Benchmarking for Electric Vehicle Thermal Management System**  
Ekin Alp Bicer, Pascal Schirmer, Peter Schreivogel BMW, DE; Gabriele Schrag, Technical University of Munich, DE
- OP005 **Relationship Between Porosity in Cu Sintered Bonding and Bonding Reliability**  
Hideo Nakako, Michiko Natori, Dai Ishikawa, Kazuhiko Minami, Seiji Matsushima, Resonac, JP

**OP006 High Thermal Durability of Thin Copper Die-attach Layers and Finite Element Model Simulation**

Takaaki Eyama, Shuichi Inaya, Ukyo Suzuki, Taiki Fukuda, Takumi Miyamoto, Masafumi Takesue, Kao, JP

**Thermal Cycling Reliability**

**OP007 Thermal Shock Test Lifetime Improvement with Optimized Adhesive Strength between Epoxy Resin and Copper**

He Kangjia, Seiichi Hayakawa, Yukihiro Kumagai, Kan Yasui, Takayuki Kushima, Mineba Power Semiconductor Device, JP; Kisho Ashida, Osamu Ikeda, Hitachi, JP

**OP008 Power Cycling Reliability and Failure Mode Analysis of POL**

Kenichi Koi, Jumpei Tokutake, Koji Bando, Shinko Electric Industries, JP

**OP009 Accelerated Power Cycling of GaN HEMTs using Switching Loss and Fast Temperature Measurement**

Wing Tai Leung, Mehdi Niroomand, Saeed Jahdi, Bernard Stark, University of Bristol, UK

**High Power Converters**

**OP010 Control of an MMC-Based Hybrid Transformer with Star-Point Voltage Injection**

Rui Wang, Henk Huisman, C.G.E. (Korneel) Wijnards, Eindhoven University of Technology, NL

**OP011 Protection and Control of a Dual MMC Medium Voltage Supply**

Max Dupont, Drazen Dujic, EPFL, CH

**OP012 Station Power Electronics Converter with High Thermal Endurance to Pole-To-Pole Short Circuits for LVDC Distribution Grid**

Frédéric Reymond-Laruina, Djamel Hadbi, Philippe Egrot, EDF R&D, FR; Loïc Quéval, Damien Huchet, Marc Petit, GeePs, FR; Stéphane Mercier, Socomec, FR; Gustavo Alves de Lima Henn, IEDS-UNILAB, BR

**Gate Drivers**

**OP013 Suppression of Oscillations in a SiC Bridge-Leg using a Custom Single-Chip Digital Active Gate Driver with 2x255 Strength Levels**

Qilei Wang, Harry Dymond, University of Bristol, UK; Dawei Liu, Guangdong Academy of Sciences, CN; Yushi Wang, Saeed Jahdi, Bernard Stark, University of Bristol, UK

- OP014**                      **SiC MOSFET Short-Circuit Protection: A Faster Soft Shut Down Method for Gate Drivers**  
Julien Weckbrodt, Le Thanh Long, Safran, FR; Nicolas Ginot, Christophe Batard, Louison Gouy, University of Nantes, FR
- OP015**                      **Parameter Identification: Gate Sensor for Power Transistor Tolerance Compensation in Advanced Gate Driver Ics**  
Christopher Wille, Andreas Menzel, Thoralf Rosahl, Rakshith Satheesh, Pushkar Kulkarni, Robert Bosch, DE

### Advanced Control Techniques on Electrical Drives I

- OP016**                      **An Innovative High-Speed Track Range Restart Strategy for Permanent Magnet Synchronous Motor**  
Anna Corbitt, Weiping Fu, Hao Chen, Cheng Tang, Yuyang Wang, H. Alan Mantooth, University of Arkansas, US
- OP017**                      **Steady-State Error Reduction of Reinforcement Learning Based Indirect Current Control of Permanent Magnet Synchronous Machines**  
Tobias Schindler, Lara Broghammer, Nina Diringer, Benedikt Hofmann, Dennis Hufnagel, Armin Dietz, Nuremberg Institute of Technology, DE; Ralph Kennel, Technical University of Munich, DE; Petros Karamanakos, Tampere University, FI
- OP018**                      **Performance Comparison of Using Shunt-based and Integrated Current Sensing for Sensorless Field-Oriented Control**  
John Emmanuel Tan, Juan Paolo Quismundo, Jhaebhee Mark Calderon, Power Integrations, PH

### GaN Converters

- OP019**                      **Design of High-Power Inverter with 12 Parallel GaN Devices**  
Takashi Sawada, Hiroshi Tadano, Koji Shiozaki, Nagoya University, JP; Shunsuke Takuma, Yoshiya Ohnura, Nagaoka Power Electronics, JP
- OP020**                      **Over 99.7% Efficient GaN-Based 6-Level Capacitive-Load Power Converter**  
Stefan Mönch, Richard Reiner, Patrick Waltereit, Rüdiger Quay, Michael Basler, Fraunhofer Institute IAF, DE; Kilian Bartholomé, Fraunhofer Institute IPM, DE
- OP021**                      **Cascaded Primary-Side-Only Control of a Compact 2 MHz 500 W Wireless Power Transfer System**  
Tim Krigar, Martin Pfost, Tim Egener, TU Dortmund University, DE

## Advanced Materials and Technologies

- OP022**                    **Power Module Evaluation Using Ultra High Heat Dissipation and High Heat Resistance Resin Sheet Containing Card House Type Boron Nitride Filler**  
Ayano Imai, Katsuhiko Hidaka, Shuji Suzuki, Jun Matsui, Toshiyuki Sawamura, Yuya Koga, Mitsubishi Chemical, JP; Yasushi Yamada, Daido University, JP; Shinichi Yasaka, Kanagawa Institute of Industrial Science and Technology, JP; Hitoshi Habuka, Yokohama Jisso Consotium, JP
- OP023**                    **Investigating Temperature Dependent Warpage in Metal Ceramic Substrates for Power Electronics Devices**  
Benjamin Fabian, Daniel Schnee, Sebastian Fritzsche, Peter Prenosil, Marco Müller, Heraeus Electronics, DE; Felix Koser, University of Applied Sciences Aschaffenburg, DE
- OP024**                    **Degradation Mode Analysis of Different Bonding Technologies of SiC Power Semiconductors Stressed by Active Power Cycling**  
Rasched Sankari, Ulrich Kessler, Martin Rittner, Thomas Kaden, Manfred Reinold, Robert Bosch, DE; Martin Schneider-Ramelow, Fraunhofer Institute IZM, D

## Charging Station Technology

- OP025**                    **Implementation and Verification of a 50kW Opportunity Wireless Charger Design**  
Carlos Costas Sos, Juan Manuel Pere Buil, Irene Maria Torres Alfonso, Antonio Miguel Munoz Gomez, CIRCE Foundation, ES
- OP026**                    **Performance Evaluation of Silicon-Based 3-Level Vienna Rectifier in ISOPLUS SMPD Package**  
Karsten Haehre, Muhammad Yassof, Littelfuse, DE
- OP027**                    **Performance Analysis of a 25-kW SiC-Based Dual Active Bridge Converter Based on Parallel-Connected Devices**  
Francesco Porpora, Mauro Di Monaco, Giuseppe Tomasso, Vito Nardi, University of Cassino and Southern Lazio, IT; Daniele Marciano, Emanuele Di Fazio, E-Lectra, IT; Maurizio Granato, Analog Devices, IT; Eric Benedict, Ryan Schnell, Analog Devices, US

## Modelling and Monitoring

- OP028**                    **Semiconductor Chip Models are the Key for Enabling Virtual Design and Optimization Workflows of Power Electronic Systems**  
Stefan Haensel, Sebastian Nielebock, Christian Raduege, Rolf Hellinger, Markus Pfeifer, Siemens, DE; Abby Shih, Keysight Technologies, DE
- OP029**                    **Improved Resonant Frequency-Based Parasitic Inductance Estimation Method for SiC MOSFET Half-Bridge Circuit**  
Hongpeng Zhang, Felix Steiner, Horst Demattio, Thomas Blank, Karlsruhe Institute of Technology, DE
- OP030**                    **Fast Simulator with Inverter Temperature Estimation for Traction eDrives in Vehicles Subjected to Driving Cycles**  
Simone Giuffrida, Iustin Radu Bojoi, Luisa Tolosano, Fabio Mandrile, Polytechnical University of Turin, IT; Claudio Romano, Maurizio Tranchero, Ideas&Motion, IT

## Solid State Transformers

- OP031**                    **A New Family of Three-Phase-Unfolder-Based MVAC-LVDC Solid-State Transformers**  
Jonas Huber, Johann Kolar, ETH Zurich, CH; Uwe Drofenik, Francisco Canales, ABB, CH
- OP032**                    **Voltage Balancing of a Split-Capacitor IGCT 3L-NPC Leg for the Resonant DC Transformer**  
Renan Pillon Barcelos, Drazen Dujic, EPFL, CH
- OP033**                    **Comparative Analysis of Unidirectional High Step-Up Converters for Medium Voltage Applications**  
Stefan Subotic, Drazen Dujic EPFL, CH; Ralph Burkart, Thomas Gradinger, Hitachi Energy, CH

## Advanced Control Techniques on Electrical Drives II

- OP034**                    **Startup Behavior of Harmonic Suppression in Electrical Machines Using Iterative Learning Control and Neural Networks**  
Annette Mai, Maximilian Hofmann, Fraunhofer Institute IISB, DE; Bernhard Wagner, Nuremberg Institute of Technology, DE
- OP035**                    **Analytical Approach of the Vector Current Control Flux-Weakening Strategy for Permanent Magnet Synchronous Machines**  
Oriol Subirats Rillo, Daniel Montesinos i Miracle, Samuel Galceran Arellano, Carlos Miguel Espinar, UPC, ES

- OP123**                      **Statistical Variations in the Parasitic Capacitance of a Coil**  
Kevin Talits, Claas Tebrügge, HELLA, DE; Martin Pfof, TU Dortmund University, DE

### Power Electronics for E-Mobility

- OP036**                      **Investigation on Direct Liquid Cooling Design of Power Modules with Flat Baseplate for Automotive Application**  
Nobuhide Arai, Shinichiro Adachi, Kensuke Matsuzawa, Takahiro Koyama, Takanori Shintani, Fuji Electric, JP; Steffen Ewald, Fuji Electric, DE
- OP037**                      **A Novel Approach for Affordable Electric Vehicles Based on Dual 48V Battery System with Multi-functional 3-Level Converter**  
Radovan Vuletic, Dušan Graovac, Infineon Technologies, DE; Tatsuya Arai, Infineon Technologies, JP; Akihiro Furukawa, Mazda Motor, JP
- OP038**                      **An Innovative 3-level Solution for Automotive Applications: eMPack**  
Pranav Panchal, Arendt Wintrich, Oliver Tamm, Ole Muehlfeld, Semikron-Danfoss, DE
- OP039**                      **Gated Recurrent Units-Assisted State-Space Modeling for Electric Vehicle Temperature Prediction**  
Xinyuan Liao, Shaowei Chen, Northwestern Polytechnical University, CN; Shuai Zhao, Aalborg University, DK
- OP040**                      **Novel Bidirectional Single-Stage Isolated 600-V GaN M-BDSBased Single/Three-Phase-Operable EV On-Board Charger**  
Sven Weihe, Johann Kolar, David Menzi, Jerome Kaufmann, Jonas Huber, Daifei Zhang, ETH Zurich, CH; Matthias Kasper, Kenneth Kin Leong, Gerald Deboy, Infineon Technologies, AT

### Encapsulation Materials

- OP041**                      **Application-Specific Investigation of Inorganic Potting Material in Drive Trains**  
Soenke Fleck, Ulf Schuemann, University of Applied Sciences Kiel, DE
- OP042**                      **The Influence of the Glass Transition Temperature of Epoxy Mold Compounds on the Reliability of a Semiconductor Device**  
Stefan Schwab, Christoph Liebl, Alexander Roth, Infineon Technologies, DE; Timo Mueller, Infineon Technologies, SGP
- OP043**                      **Corrosion Resistant Packaging for Power Semiconductor Modules - Modified Insulation Materials for Contaminated Environments**  
Michael Hanf, Nando Kaminski, University of Bremen, DE; Andreas Brinkmann, Andrea Deißnerberger, Volkmar Stenzel, Fraunhofer Institute IFAM, DE

- OP044**                    **Investigation of Inorganic Encapsulation Materials in Power Electronic Systems for High Power Density Applications**  
Stefan Behrendt, Semikron Danfoss, DE; Christophe Fery, Tamara Albert, Heraeus Electronics, DE; Christiane Plikat, Volkswagen, DE; Rüdiger Knofe, Siemens, DE; Soenke Fleck, Ulf Schuemann, University of Applied Sciences Kiel, DE
- OP045**                    **Characterization of Thermally Aged Silicone Gels for Power Semiconductor Modules**  
Sonja Madloch, Thomas Spann, Littelfuse, DE; Elaheh Arjmand, Littelfuse, Meghna De, UK; Philip Fletcher, University of Bath, UK

### Power Quality

- OP046**                    **A Coordinated Control of Hybrid Single-Phase AC/DC Microgrids Based on the Natural Harmonic Injection Concept**  
Mehdi Baharizadeh, Mohammad Sadegh Golsorkhi Esfahani, Thomas Ebel, University of Southern Denmark, DK
- OP047**                    **A High-Power Density SiC Based TP PFC with High-Frequency Ripple Cancellation Leg**  
Serkan Dusmez, Huawei Technologies DE; Ali Tausif, Ahmet Faruk Bakan, Yildiz Technical University, TR
- OP048**                    **High Frequency Active Filter for AC-DC High Power Converters**  
Sarah Sifoune, Denis Labrousse, Pierre-Etienne Lévy, Cyrille Gautier, Bertrand Revol, Safran, F
- OP049**                    **Laboratory Setup for Accuracy Investigation of Electricity Meters and Monitors under Industry-Typical Operating Conditions**  
Matthias Schmidt, Xiaofei Guo, Robin Abraham, Physikalisch-Technische Bundesanstalt (PTB), DE; Michael Freiburg, Felix Hackeloeer, Lukas Christ, Technical University Cologne, DE; Christian Brenncke, ZERA, DE; Sascha Bierbach, Fischer & Kaufmann, DE; Ralf Schellenberg, Alfred H. Schütte, DE

### Grid Connected Converters

- OP050**                    **Real-Time Evaluation of Weighting Factorless Predictive Control of LCL Filter Equipped Grid-Side Converters using Sorting Networks**  
Kristóf Bándy, Péter Stumpf, Zoltán Sütő, Budapest University of Technology and Economics, HU
- OP051**                    **Relaxed Robust Control with Pragmatic Shortage of Passivity for Wind, Storage and PV Power Converters**  
Sergio de Lopez Diz, Pablo Moreno, Andres Agudo, Ana Rodríguez, Luis Diez, Mario Rizo, Gamesa Electric, ES

- OP052**                    **An Effective DC Voltage Regulation of Active Front-End Rectifier through Model Predictive Control**  
Mobina Pouresmaeil, Edris Pouresmaeil, Jorma Kyryä, Aalto University, FI
- OP053**                    **Bi-directional 11kW Multi-Level Active-Neutral-Point-Clamped AC-DC Converter Using 600V/750V Si Super-Junction and SiC MOSFETs for High-Efficiency and High-Density Applications**  
Mengxing Chen, Manuel Escudero Rodriguez, Matteo-Alessandro Kutschak, Alex Rossi, Infineon Technologies, AT; David Meneses Herrera, Infineon Technologies, FI
- OP054**                    **A Study of Grid-Forming Inverter Control Strategy for Fault-Ride-Through Capability**  
Hirofumi Uemura, Sachio Takano, Fuji Electric, JP

### Passive Components

- OP055**                    **Film Capacitors for High Temperature AC-DC Inverter Applications**  
Adel Bastawros, Fumio Yu, Sabic, JP; Takashi Mori, Kenichi Oshita, Nichicon, JP
- OP056**                    **Loss Reduction in HF-Transformers using Laminated Ferrite E-Cores**  
Lukas Reißerweber, Julia Rogner, Alexander Stadler, Coburg University of Applied Sciences and Arts, DE
- OP057**                    **Multigap Toroidal Transformer and Inductors for Overcoming Fringing Losses in High Frequency Converters**  
Pau Colomer, Marc Maneja, David Prados, Prax, ES
- OP058**                    **Study on Sample Geometries for Ferrite Characterisation in the MHz Range**  
Till Piepenbrock, Joachim Böcker, Sebastian Schachten, Frank Schafmeister, Paderborn University, DE; Lukas Keuck, HELLA, DE
- OP059**                    **FEM-Supported and Non-Destructive Magnetic Characterization Method for Non-Laminated Steel**  
Stefan Tobler, Simon Nigsch, Eastern Switzerland University, CH

### Drives for High Demanding Applications

- OP060**                    **Highly-Compact Bearingless Axial-Flux Motor for a Pediatric Implantable Fontan Blood Pump**  
Andreas Horat, Rosario Vincenzo Giuffrida, Jonas Huber, Johann Kolar, ETH Zurich, CH; Spasoje Miric, University of Innsbruck, AT; Marcus Granegger, Medical University of Vienna, AT



- OP061**                    **A Novel Permanent Magnet Synchronous Motor Drive for Reaction Wheels in Satellites**  
Baris Colak, Suleyman Cetinkaya, TUBITAK UZAY Space Technologies Research Institute, TR
- OP062**                    **Exploring High Frequency Operation of Motor Drives: Practical Insights on Efficiency and Loss**  
Asantha Kempitiya, Hrach Amirkhanian, Steve Oknaian, Infineon Technologies, US; Jannik Gade, Infineon Technologies, AT
- OP063**                    **High Power Density System Design for GaN-based LV Motor Drives**  
Marco Cannone, Edward Jones, Martin Wattenberg, Infineon Technologies, AT
- OP064**                    **Design of GaN Transistor based Variable Speed Drive Inverter with Output Voltage Filtering**  
Kaspars Kroics, Valerijs Maricevs, Riga Technical University, LV; Ugis Sirmelis, Energotronix, LV

## IGBT

- OP065**                    **The 8<sup>TH</sup> Generation LV100 IGBT Module with Higher Current Rating**  
Daichi Otori, Masaomi Miyazawa, Mitsubishi Electric, JP; Koichi Masuda, Eugen Stumpf, Mitsubishi Electric, DE
- OP066**                    **New Planar 4.5 kV Split-gate (SG) Si-IGBT Device for Improved Switching Characteristics and High Frequency Operation**  
Gaurav Gupta, Jeremy Jones, Boni Boksteen, Babak Nikberg, Luca De Michielis, Hitachi Energy, CH; Gontran Pâques, Hitachi Energy Research, CH
- OP067**                    **4.5 kV Double-Gate Reverse-Conducting Press-Pack IEGT**  
Satoshi Yoshida, Tatsunori Sakano, Atsushi Yamaoka, Tomoaki Inokuchi, Kazuto Takao, Toshiba, JP; Ryohei Gejo, Takahiro Kato, Toshiba Electronic Devices & Storage, JP

## Device Concepts

- OP068**                    **Evaluation of a 3 kV Polarization Superjunction GaN HEMT**  
Alireza Sheikhan, Sankara Narayanan Ekkanath Madathil, University of Sheffield, UK; Hiroji Kawai, Shuichi Yagi, Hironobu Narui, Powdec, JP
- OP069**                    **More than 1200 V Breakdown and Low Area-Specific On State Resistances by Progress in Lateral GaN-on-Si and GaN-on-Insulator Technologies**  
Richard Reiner, Stefan Müller, Patrick Waltereit, Fouad Benkhelifa, Stefan Mönch, Michael Basler, Michael Mikulla, Rüdiger Quay, Fraunhofer Institute IAF, DE

- OP070**                      **Novel 200 V MOSFET Technology Pushes Motor Drive Inverter Efficiency to an Unprecedented Level**  
Mark Thomas, Ralf Siemieniec, Elvir Kahrimanovic, Laszlo Juhasz, Michael Hutzler, Infineon Technologies, AT; Kapil Kelkar, Infineon Technologies, US

### Degradation Mechanisms

- OP071**                      **Moisture Robust Chip Design - Improved Edge-Terminations for High Lifetime under High Humid Conditions**  
Michael Hanf, Nando Kaminski, University of Bremen, DE; Arnost Kopta, Power Device Technology, CH; Yanrui Ju, Raffael Schnell, SwissSEM Technologies, CH
- OP072**                      **Method for Measuring the Initial State of a Solder Joint Delamination in a 3D PCB Integration Assembly of SiC MOSFETS**  
Souhila Bouzerd, Laurent Dupont, University Gustave Eiffel, FR; Mickael Petit, SATIE, FR; Vincent Bley, Céline Combettes, University of Toulouse, FR
- OP073**                      **Generic Lifetime Model for Wire Bonds Degradation in IGBT Modules Based on a Fracture Mechanics Parameter**  
Merouane Ouhab, Nicolas Degrenne, Mitsubishi Electric, FR; Yusaku Ito, Masaki Taya, Mitsubishi Electric, JP

### Advanced Conversion Concepts

- OP074**                      **Modular Coaxial Power Converter for High-Density Integration into Medium-Voltage Cables**  
Mark Cairnie, Aakash Kamalapur, Jack Knoll, Qingrui Yuchi, Rajaie Nassar, Christina DiMarino, Khai Ngo, Guo-Quan Lu, Qiang Li, Jung-Soo Bae, Dushan Boroyevich, Virginia Polytechnic and State University, US; Jierui Zhou, Yang Cao, University of Connecticut, US; Doug DeVoto, Bidzina Kekelia, National Renewable Energy Lab, US
- OP075**                      **Controlled Inductor Based BCM Buck Converters**  
Ziv Gellman, Sam Ben-Yaakov, Iris Eting, Yivgeni Semidotskih, Ben Gurion University, IL
- OP076**                      **Influence of Varying Common Mode Choke Sizes on the Performance and Stability of an Active EMI Filter**  
Patrick Körner, Philip Brockerhoff, Felix Müller, Vitesco Technologies, DE; Marco Jung, Bonn-Rhein-Sieg University of Applied Sciences, DE

## Photovoltaic Systems

- OP077**                    **A High Efficiency Battery Charger with Maximum Power Point Tracking for Magnetic Energy Harvesters**  
Antonio Miguel Munoz Gomez, Javier Ballestin Fuertes, CIRCE Foundation, ES;  
Jose Francisco Sanz Osorio, Zaragoza University, ES
- OP078**                    **Symmetric Flying-capacitor Boost Converter for Medium-voltage Photovoltaic Applications**  
Luis Alves Rodrigues, Guillaume Piquet-Boisson, Arnaud Revel, Anthony Bier,  
Stéphane Catellani, CEA, FR
- OP079**                    **Comparison of Si IGBT, SiC MOSFET and Adjustable Hybrid Switch PV Inverters for Different Geographical Locations**  
Tanya Thekemuriyil, Dario Schneider, Jaspera Dominique Rohner, Silvia Mastellone, Renato Amaral Minamisawa, University of Applied Sciences and Arts Northwestern Switzerland, CH; Munaf T.A. Rahimo, MTAL, CH; Vipluv Aga, Solectron, CH

## Model Based System Analysis

- OP080**                    **Optimising a Power Module for Electrical and Thermal Performance and Symmetry Using EDA Tools**  
Wilfried Wessel, Andreas Schwarzbacher, Technical University of Dublin, IE;  
Florian Bauer, Siemens EDA, DE; Christian Jakob, University of Applied Sciences Darmstadt, DE; Roland Bátai, Gergö Juhasz, Vincotech, HU
- OP081**                    **Conductor-Based Modeling of Voltage Distribution along a Single-Tooth Winding of Electrical Machines**  
Hujun Peng, Yue Yu, Svetomir Stevic, Niklas Driendl, Kay Hameyer, RWTH Aachen University, DE
- OP082**                    **Reduction of PWM Harmonics with Carrier Phase Shifting in a Dual-Stator PMSM with Magnetic Coupled Windings**  
Bünyamin Tekir, Robert Zipprich, Jan Winter, Marcus Ziegler, University of Kassel, DE

## SiC Devices

- OP083**                    **The New CoolSiC MOSFET 1200 V G2: Electrical Performance and Compact Modelling**  
Andreas Huerner, Qing Sun, Rudolf Elpelt, Infineon Technologies, DE

- OP084**                      **Paralleling SiC-Power-MOSFET Body Diodes under Harsh Switching Conditions**  
Michael Rauh, Mark-M. Bakran, University of Bayreuth, DE; Matthias Bürger, Infineon Technologies, DE
- OP085**                      **3.3kV SBD-Embedded SiC-MOSFET Module for Traction Use**  
Yoichi Hironaka, Shigeru Okimoto, Mamoru Matsuo, Shota Saito, Kenji Hatori, Mitsubishi Electric, JP; Nils Soltau, Mitsubishi Electric, DE
- OP086**                      **Dead Time Optimization for High Power SiC MOSFET Module in Consideration of Parasitic Components**  
Pham Ha Trieu To, Hao Wang, Florian Sawallich, Felix Kayser, Hans-Günter Eckel, University of Rostock, DE

### WBG Reliability

- OP087**                      **Performance Instability of 650 V p-GaN Gate HEMT Device under Temperature-related Positive Gate Bias Stresses**  
Renze Yu, Saeed Jahdi, Phil Mellor, University of Bristol, UK; Jose Ortiz Gonzalez, Olayiwola Alatise, University of Warwick, UK
- OP088**                      **Gate Oxide Reliability of Current Generation 1.2 kV SiC MOSFETs under Step-Wise Increased Gate Voltage**  
Roman Boldyrjew-Mast, Sven Thiele, Thomas Basler, Chemnitz University of Technology, DE
- OP089**                      **An Accelerated Dynamic Gate Switching Stress Test Concept of SiC MOSFETs at High Drain-Source Voltage (HV-GSS)**  
Clemens Herrmann, Sven Thiele, Dezhi Yang, Thomas Basler, Chemnitz University of Technology, DE; Matthias Neumeister, Markus Pfeifer, Siemens, DE
- OP090**                      **Silicon Carbide Power Device Use in Spacecraft and Aircraft**  
Akin Akturk, Ethan Mountfort, Christopher Darmody, Mitchell Gross, Bryce Galey, Usama Khalid, Neil Goldsman, CoolCAD Electronics, US

### Power Electronics for E-Mobility/ Control

- OP091**                      **Current Ripple Reduction by Combination of Si IGBT and SiC MOSFETs in Heavy Duty Fuel Cell Trucks**  
Yavuz Gürlek, Firat Yüce, Martin Ackerl, Roland Dold, Daimler Truck, DE; Thomas Basler, Chemnitz University of Technology, DE; Martin Neuburger, Esslingen University, DE
- OP092**                      **Evaluation of Active Gate Drivers with Switchable Gate Resistors and Intermediate Voltage Levels for SiC MOSFETs in WLTC**  
Michael Frank, Mark-M. Bakran, University of Bayreuth, DE

- OP093**                    **Performance Evaluation of TCM-based, Zero-Voltage Switching (ZVS) Three-Phase Inverter for Electric Vehicle Drive Systems**  
Khizra Abbas, Hans-Peter Nee, KTH Royal Institute of Technology, SW
- OP094**                    **A Partial Load Three-Phase Triangular Current Mode Modulation Concept with an Optimized Filter Inductor for High Efficiency Traction Drives**  
Bhaskar Chatterjee, Jan Allgeier, Thomas Plum, Robert Bosch, DE; Marc Hiller, Karlsruhe Institute of Technology, DE

### DC-DC Converters I

- OP095**                    **GaN vs Si Synchronous Rectifier for LLC Converter**  
Gokhan Sen, Milko Paolucci, Sriram Jagannath, Infineon Technologies, AT; Ahmet Cem Gungor, RWTH University Aachen, DE; Serkan Dusmez, Huawei Technologies, DE
- OP096**                    **Co-Simulation Design of a GaN-Based Three-Phase LLC Converter with Integrated Three-Phase Magnetics**  
Jhih-Cheng Hu, Ming-Shi Huang, Shih-Cyuan, Kuo, Hong-Xuan Liao, National Taipei University of Technology, TW
- OP097**                    **Switching Assisting Circuit Improving the Efficiency of DC-DC Converters Based on Piezoelectric Resonators**  
Ghislain Despesse, Valentin Breton, Emile Bigot, CEA Leti, FR; François Costa, SATIE, FR
- OP098**                    **Transformer-based Fixed-ratio Resonant DC-DC Converters for 48V Data Centers**  
Xufu Ren, Teng Long, Jinfeng Zhang, University of Cambridge, UK; Jibin Song, Lei Wang, Pengcheng Xu, EPIC Tech, CN

### PFC Converters

- OP099**                    **High-Density 3.3 kW GaN Rectifier for Server Applications Comprising a 130 kHz Totem-Pole PFC and a 500 kHz LLC**  
Manuel Escudero Rodriguez, Matteo-Alessandro Kutschak, Antonello Laneve, Infineon Technologies, AT; David Meneses Herrera, Infineon Technologies, FI
- OP100**                    **Addressing Power Switch Technology Selection Si/SiC/GaN in High Efficiency ZVS-PFC Resonant Converters**  
Marco Torrisi, Sebastiano Messina, Angelo Giordano, Daniele Giovanni Sfilio, STMicroelectronics, IT; Mario Cacciato, University of Catania, IT
- OP101**                    **Buck-Type Current Unfolding Converter with Discontinuous Conduction Mode in Ultra-Low Power-Factor Operation**  
Tomoyuki Mannen, Boseung Seo, Takanori Isobe, University of Tsukuba, JP; Ha Pham, University of Technology Sydney, AU

OP102

**GaN Based Bi-Directional 6.6kW Interleaved Totem-Pole PFC with 13kW/L Power Density and High Efficiency**

Juncheng Lu, Esmail Jalalabadi, Infineon Technologies, CA; Yang Jiao, Infineon Technologies, US; Xiaoyu Wang, Carleton University, CA

**SiC Modules**

OP103

**The Design of a 2kV 1700A SiC MOSFET Dual Module**

Jorge Mari, Tobias Schuetz, Xiaoting Dong, Yanfeng Shen, Michael Kirner, Luigi Findanno, Semikron Danfoss, DE

OP104

**Technological approaches to high-power density SiC power module for automotive**

Takeshi Tokorozuki, Hideo Komo, Rei Yoneyama, Gourab Majumdar, Mitsubishi Electric, JP; Kazuhiro Nishimura, Melco Semiconductor Engineering, JP

OP105

**Extremely Compact SiC Power Module for EV Traction Inverters in the 250 kW Class**

Raffael Schnell, Guillemin Rémi, Roger Stark, Sven Matthias, SwissSEM Technologies, CH; Samuel Hartmann, MFIS, CH; Li Coris, Sunking Pacific Semiconductors Technology, CN

OP106

**Benefits of .XT Interconnection Technology for 3.3 kV XHP 2 Module with 3.3 kV CoolSiC MOSFET**

Matthias Bürger, Tobias N. Wassermann, Infineon Technologies, DE

**Advanced Cooling**

OP107

**Large-Area Bonding with LMEE: Suppression of the Degradation of the Junction-to-Water Thermal Resistance in Power Modules**

Yo Mochizuki, ROHM Semiconductor, JP; Takukazu Otsuka, Ken Nakahara, ROHM, JP; Navid Kazem, Dylan Shah, Arieca, US

OP108

**Active Thermal Control of SiC MOSFETs Utilizing Transient Thermal Characterization**

Varaha Satya Bharath Kurukuru, Md. Nazmul Hasan, Roberto Petrella, Silicon Austria Labs, AT

OP109

**Thermal Management Solutions by Additive Manufacturing – Powder Bed Fusion and Diffusion Bonding**

Simon Jahn, Felix Gemse, Steffen Dahms, ifw Jena - Günter-Köhler-Institute, DE

OP110

**Advanced Pumped Two-Phase Cold Plate for Cooling Power Electronics**

Elizabeth Seber, Michael Ellis, Advanced Cooling Technologies, US

## DC-DC Converters II

- OP111**                    **Feasibility Study of High-Power Density Isolated CLLC DC-DC Interface with Wide Range of Voltage/Current Regulation**  
Oleksandr Husev, Dmitri Vinnikov, Oleksandr Matiushkin, Parham Mohseni, Tallinn University of Technology, EE; Francisco Canales, ABB, CH
- OP112**                    **DC-Bias Reduction in High-Frequency Dual Active Bridge DC-DC Converters through Slow DC Measurements**  
Patrick Lenzen, Martin Pfof, TU Dortmund University, DE
- OP113**                    **Optimized Current Sharing Technique for Interleaved CLLC Converters for Minimal Output Current Distortion**  
Martin Gendrin, Akshay Mahajan, Fraunhofer Institute ISE, DE
- OP114**                    **Primary-side Output Regulation Principles in Dynamic Multi-MHz Inductive Power Transfer Systems and Isolated DC/DC Converters**  
Ioannis Nikiforidis, Paul Mitcheson, Prateek Wagle, Imperial College London, UK; Roberto La Rosa, STMicroelectronics, IT

## Smart Grid

- OP115**                    **Low Voltage DC-Grids with Galvanic Isolation: System Discussion, Efficiency and Performance Comparison to AC-Feeding**  
Lukas Fräger, Sascha Langfermann, Michael Owzareck, BLOCK Transformatoren-Elektronik, DE; Andreas Schnieder, Herbert Kannegiesser, DE; Dennis Kampen, City University of Applied Sciences Bremen, DE; Jens Friebe, University of Kassel, DE
- OP116**                    **Implementation and Experimental Evaluation of an Adaptive DC Grid Controller for Decentralised Grid Control**  
Steffen Menzel, René Reimann, Lorenz Grundhoff, Wilfried Holzke, Bernd Orlik, University of Bremen, DE
- OP117**                    **Demonstrating the Effectiveness of a DC Solid-State Circuit Breaker's Fast Response Time**  
Ehab Tarmoom, Steven Chenetz, Dennis Meyer, Jason Chiang, Microchip Technology, US
- OP118**                    **Modelling and Sizing Sensitivity Analysis of a Fully Renewable Energy-based Electric Vehicle Charging Station Microgrid**  
David A. Stone, Mobin Naderi, Diane Palmer, Maria N. Munoz, Matthew Smith, Erica E.F. Ballantyne, Daniel T. Gladwin, Martin P. Foster, University of Sheffield, UK; Yazan Al-Wreikat, Ewan Fraser, University of Southampton, UK

## Measurement Techniques and Methods

- OP119**                      **LED Powered Rotor Telemetry System**  
Raphael Beyerle, Manfred Schrödl, Technical University of Vienna, AT
- OP120**                      **'Infinity Gate Sensor': a Differential Magnetic Field Sensor for Measuring Gate Current of SiC Power Transistors**  
Yushi Wang, Qilei Wang, Matthew Appleby, Jiaqi Yan, Harry Dymond, Saeed Jahdi, Bernard Stark, University of Bristol, UK
- OP121**                      **Characterising Wide Bandgap Power Modules: Validating the M-Shunt Concept for High-Power Applications in the Kiloampere Range**  
Hauke Lutzen, Jonas Müller, Lennart Dittmer, Nando Kaminski, Malte Arndt, University of Bremen, DE; Till Huesgen, Vladimir Polezhaev, Kempten University of Applied Sciences, DE; Steffen Chemnitz, SubCtech, DE
- OP122**                      **Characterization of Power-Module Parasitics: Sub-Nanosecond Large Signal Pulsing vs. Double-Pulse Testing**  
Gerhard Groos, Dennis Helmut, Felix Gesele, Thomas Brückner, Universität der Bundeswehr München, DE

## High Voltage Switches

- PP001**                      **A 4.5 kV Fast Recovery Diode Platform for High-Current IGBTs**  
Jan Vobecky, Martin Stencel, Josef Hylsky, Ladislav Radvan, Hitachi Energy, CZ; Umamaheswara Reddy Vemulapati, Urban Meier, Chiara Corvasce, Hitachi Energy, CH
- PP002**                      **6.5 kV Innovative Silicon Power Device (i-Si) Module with High Power Density and Low Loss by Stored Carrier Control**  
Takashi Hirao, Tomoyuki Miyoshi, Hiroshi Suzuki, Yusuke Takada, Tomoyasu Furukawa, Yusuke Kanno, Yasuhiko Kono, Katsumi Ishikawa, Mutsuhiro Mori, Hitachi, JP; Tsubasa Moritsuka, Masaki Shiraishi, Isamu Yoshida, Takayuki Kushima, Hitachi Power Semiconductor Device, JP
- PP003**                      **High Current Density 4.5kV PressPack IGBTs Push SOA Limits**  
Hossein Davoodi, Peter Waind, Paolo Mirone, Littelfuse, DE; Liutauras Storasta, Littelfuse, CH; Geo Joseph, Paul Hailes, Julian Pitman, Littelfuse, UK
- PP004**                      **2.5kV IGBT Module with High Reliability for Renewable Applications**  
Akiyoshi Masuda, Masaomi Miyazawa, Tsuyoshi Uraji, Mitsubishi Electric, JP; Koichi Masuda, Narendra Lakshmanan, Thomas Radke, Mitsubishi Electric, DE
- PP005**                      **New Generation 4.5kV IGCT and Fast Recovery Diode for Railway Power Supply Applications**  
Umamaheswara Reddy Vemulapati, Remo Baumann, Tobias Wikström, Thomas Stiasny, Chiara Corvasce, Christian Winter, Hitachi Energy, CH



- PP006**                      **Next Generation 4.5 kV IGBT-Only StakPak Module with Reduced Losses and High Temperature Capability**  
Jeremy Jones, Gaurav Gupta, Boni Boksteen, Evgeny Tsyplakov, Makan Chen, Luca De Michielis, Gontran Pâques, Hitachi Energy, CH

### Thermal Modelling and Simulations

- PP007**                      **Finite Element Analysis of the upscaling of Warpage and Bifurcation Hysteresis Loops: from Cu/Si Die to Large Wafers**  
Vincenzo Vinciguerra, Giuseppe Luigi Malgioglio, Marco Renna, STMicroelectronics, IT
- PP009**                      **Maximum Junction Temperature Simulation and Validation for the Hot Spot in Multi-Chip SiC Power Module**  
Wonjin Dylan Cho, Byoungok Lee, Hansol Seo, Udaykumar Vangaveti, onsemi, US
- PP010**                      **Integration of CFD-Simulation Results in PLECS Using Lookup Tables**  
Simon Cepin, Holger Borcharding, University of Applied Sciences and Arts Ostwestfalen-Lippe, DE
- PP011**                      **PCB Only Thermal Management Techniques for eGAN FETs in a Half-Bridge Configuration**  
Adolfo Herrera, Alejandro Pozo Arribas, Michael de Rooij, Efficient Power Conversion, US

### High Power Density Designs

- PP013**                      **From 4x to 3x STPAK – Optimization for a More Compact EV Traction Inverter Solution**  
Vittorio Giuffrida, Simone Buonomo, Massimiliano Chiantello, STMicroelectronics, IT
- PP014**                      **A Multi-objective Structural Optimization Method Based on Multi-Physics Simulations for Power Module**  
Baihan Liu, Mengyao Du, Yiyang Yan, Jianwei Lv Huazhong, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN
- PP015**                      **Holistic Approach to Maximize Lifetime and Power Density in High Power Semiconductor Modules**  
Martin Schulz, Lukas Kreiner, Ralf Klemmer, Littelfuse, DE
- PP016**                      **Regulated High Density Switch Capacitor Topology**  
Pierrick Ausseresse, Infineon Technologies, DE

- PP017**                      **Silicon Interposer as a Substrate for Power Modules with High Power Density and Superior Thermal Performance**  
Ahmed Ammar, Ömer Altan, Shuangyue Yang, Sebastian Tengvall, Junghyun Kang, Yasser Nour, Hoa Le Thanh Lotus Microsystems, DK

### Special Converter Applications

- PP018**                      **Analytical Modeling and Stability Characterization of a Damped VSCC CM Active EMI Filter for Single- and Three-Phase AC-DC Applications**  
Timothy Hegarty, Ben Chan, Robert Blattner, Texas Instruments, US; Ashish Kumar, Our Next Energy, US
- PP020**                      **A Repetitive High Voltage Nanosecond Pulse Generator: First Prototype Design and Test Results**  
Serge Gavin, Simon Kissling, Mauro Carpita, University of Applied Sciences of Western Switzerland, CH; Bertrand Daout, Frédéric Castella, Montena Technology, CH
- PP021**                      **Frequency Shift Keyed Dual Side Control of Inductive Power Transfer: An Application of Talkative Power Conversion**  
Hamzeh Beiranvand, Julius Maximilian Placzek, Marco Liserre, University of Kiel, DE
- PP022**                      **Study of a Multi-Active Bridge Converter for a Domestic Electrical Grid**  
Abdenmour Merrouche, Thierry Talbert, University of Perpignan, FR; Daniel Matt, Thierry Martiré, Guillaume Pellecuer, University of Montpellier, FR

### Integration Technologies and Reliability Design

- PP023**                      **Fabrication Development for Gate Driver Embedded Double-Sided Cooling SiC Power Module for Electric Vehicle Application**  
Anna Corbitt, Hao Chen, Cheng Tang, Weiping Fu, H. Alan Mantooh, University of Arkansas, US; Yuyang Wang, Riya Paul, Wolfspeed, US
- PP024**                      **Printed Circuit Embedding of Prepackaged 150V Power MOSFETs in a Portable Welding Application**  
Thomas Gebhard, Infineon Technologies, AT; Franz Musil, FRONIUS INTERNATIONAL, AT; Manuel Schumann, Unimicron, DE
- PP025**                      **Process Challenges and Progress Towards Direct Connection of Automotive Power Modules (TMM) to Heatsink**  
Indrajit Paul, Inpil Yoo, STMicroelectronics, DE; Sergio Savino, Gaetano Montalto, Ettore Chiacchio, Alessandro Tumminia, Francesco Salamone, STMicroelectronics, IT

- PP026**                      **Optimizing PCB Stackups for Enhanced GaN Transistor Performance in High-Power Applications**  
Philipp Czerwenka, Jan Frederik Wagenfeld, Gernot Schullerus, Reutlingen University, DE
- PP027**                      **New Generation Ceramic Substrates – Key Components for Power Electronic Applications: Processing and Characterization**  
Stefanie Schindler, Tanja Einhellinger-Müller, Linda Schicker, Hans-Ulrich Völler, CeramTec, DE
- PP028**                      **AI-Enhanced Vacuum Reflow Oven: Precision Control for Reliable Large-Area Soldering**  
Chih Hui Lee, Liu Ta-Chung, Mustec, TW; Shiue Yow-Ling, Pan Cheng-Tang National Sun Yat-Sen University, TW; I Lin Tsung, Lighten, TW; Yen Chung-Kun, I-Shou University, TW; Wang Shao-Yu, NPERC-J, TW
- PP030**                      **Corrosion-Compatible Drive Electronics for Electric Vehicles and Industrial Power Modules**  
Tom Petzold, Ronald Eisele, Armin Hindel, Bennet Lorbeer, Markus Bast, Mohamad Abo Ras, University of Applied Sciences Kiel GmbH, DE; Corinna Grosse-Kockert, Daniel May, Sara Panahandeh, Berliner Nanotest und Desgin, DE; Anu Mathew, Rico Eichhorn, Fraunhofer Institute ENAS, DE
- PP031**                      **Evaluating the Safety Isolation of the Package in an Integrated Power Device**  
Thomas Anthony Capobianco, Power Integrations, US

## Control Methods I

- PP032**                      **Flexible Control System for Modular One-Phase Interleaved GaN-based Totem Pole PFC Using Real-Time Hardware**  
Oleksandr Solomakha, Siddhartha Menon, Manuel Rueß, Swapnil Sunil Roge, Dominik Koch Ingmar Kallfass, University of Stuttgart, DE
- PP033**                      **A Peak Current Mode Control Method for PFC**  
Bosheng Sun, Texas Instruments, US
- PP034**                      **Adaptive Resonant Controller for a Three-Phase PFC Converter for an On-Board Charge Application**  
Rami Troudi, Kelly Ribeiro, Valeo, FR
- PP035**                      **Synthesis of a Field Oriented Control Algorithm by Using two Different Pole-Zero Compensation Approaches**  
Marco Denk, Felix Heigel, University of Applied Sciences Coburg, DE; Johannes Schwarzkopf, Roman Filka, Brose Fahrzeugteile, DE
- PP037**                      **Average Current Mode Control and Its Loop Design**  
Niklas Schwarz, Texas Instruments, DE; Feng Ji, Texas Instruments, CN

**PP038**                      **Novel Power Feed-Forward Regulation for Dual Stage PFC+DCDC Converters**  
Alfredo Medina-Garcia, Pierrick Ausseresse, Martin Krueger, Cristina Martos-Contreras, Josef Daimer, Infineon Technologies, DE; Manfred Schlenk, Dr. Schlenk Consulting, DE

**High Power AC-DC and DC-AC Converter**

**PP039**                      **22 kW Bi-directional Wall-box Charger With 1200 V SiC MOSFET**  
Sanbao Shi, Cheng Zhang, Yi Zhang, Infineon Semiconductors, CN; Sidorov Vadim, Tomislav Turscak, Infineon Technologies AT

**PP040**                      **Dynamic Switching Frequency Selection for Efficiency Optimization in On-Board Charger PFC Stage Based on Novel SiC MOSFET Power Module**  
Giuseppe Aiello, Francesco Gennaro, Dario Patti, STMicroelectronics, IT; Domenico Nardo, STMicroelectronics, DE

**PP041**                      **Design and Optimization of SiC-Based 11kW Motor Drive with High Efficiency**  
Iris Liu, Frank Wei, Jianlong Chen, Haiming Zhan, Fulin Zhang, ZongZeng Hu, Wolfspeed, CN

**PP042**                      **Model Design Development for False Turn-on characterization in SiC-Based Active T-Type Converter Considering All Parasitics**  
Amir Babaki, Mohammad Sadegh Golsorkhi Esfahani, Thomas Ebel, University of Southern Denmark, DK; Nicklas Christensen, Danfoss Drives, DK

**PP043**                      **Efficiency Investigations of an Auxiliary Resonant Commutated Pole Inverter**  
Markus Zocher, Norbert Graß, Nuremberg Institute of Technology, DE; Ralph Kennel, Technical University of Munich, DE

**PP044**                      **A Novel Hybrid Two-Stage AC-DC Converter with Soft-Switched CCM PFC Stage for EVs Charging Applications**  
Lei Wang, Sinan Li, University of Sydney, AU

**PP045**                      **A Method for Tuning Leakage Inductance in Transformers**  
Rosemary O'Keeffe, Michael Dunleavy, Cathal Sheehan, Bourns Electronics, IE

**PP046**                      **Low Cost High Density 300W/20V AC-DC Converter Enabled by GaN Power ICs**  
Tom Ribarich, Xiucheng Huang, Navitas Semiconductor, CN

**PP047**                      **25kVA Grid-Tied Bi-Directional T-Type Inverter with High-Efficiency and High-Power Density Using SiC MOSFETs**  
Tamanna Bhatia, Jun Zhang, Sumana Ghosh, Wolfspeed, US; Frank Wei, Wolfspeed, CN

**PP048**                      **Cost-Effective Efficiency Enhancement in AC-DC Converters: A Study Across the Full Load Cycle**  
Sebastian Gick, Mark-M. Bakran, University of Bayreuth, DE; Markus Pfeifer, Sebastian Nielebock, Siemens, DE

## E-Mobility Traction I

- PP049**                    **Next Generation Power Module with Parallel Connected SiC MOSFETs for BEV Traction Inverters**  
Kohei Tanikawa, Oji Sato, Kotaro Shibata, Masashi Hayashiguchi, Hiroto Sakai, Yuta Okawauchi, Kenji Hayashi, ROHM, JP
- PP051**                    **Investigation of Common Source Feedback in SiC Power Modules regarding Performance and Short Circuit Robustness**  
Dominik Ruoff, Zong Xern Sim, Robert Bosch, DE; Ulrich Burkhard, Reutlingen University, DE
- PP052**                    **HybridPACK Drive Power Modules with SiC-MOSFET's and Monolithic RC-Snubber Chips for Optimized Power Density**  
Andre Uhlemann, Thomas Hunger, Andreas Groove, Nikolaj Gorte, Infineon Technologies, DE
- PP053**                    **Robust Auxiliary Power Supply for EVs Based on Innovative STi2GaN 650V IC**  
Federica Cammarata, Filippo Scrimizzi, Claudia, Malannino, Andrea Russo, STMicroelectronics, IT
- PP054**                    **Impact of Various Silicon Diodes on the Hybrid Switch Inverter**  
Michael Walter, Mark-M. Bakran, University of Bayreuth, DE
- PP055**                    **Advanced Pulse Sequence for Saliency-Based High-Accurate Rotor Position Estimation of Railway Traction Locomotive Motors**  
Markus Vogelsberger, ALSTOM, AT; Hans Ertl, Thomas Wolbank, Technical University of Vienna, AT; Eduardo Rodriguez Montero, Wolfram Teppan, LEM, CH

## Control Techniques

- PP056**                    **Optimized Half-Bridge Gate-Drive with Low Time-Skew for RC-IGBTs and SiC-MOSFET Dead-Time Control**  
Jan Fuhrmann, Hans-Günter Eckel, University of Rostock, DE; Till-Mathis Plötz, Rostocker Kompetenzzentrum für Leistungselektronik, DE
- PP057**                    **Design of a Traction Inverter Based on PCB-Embedded GaN Devices**  
Maurizio Tranchero, Luca Bongiovanni, Claudio Romano, Paolo Santero, Ideas & Motion, IT
- PP058**                    **Optimizing Electric Vehicle Performance with GaN Design**  
Andrew Patterson, David Green, Ahmed Nejim, Silvaco, UK
- PP059**                    **Fast Analytical Calculation of the Magnetic Field in Permanent Magnet Synchronous Machines with Flux Barriers Including Saturation**  
Martin Ackermann, José-Luis Marqués, Claus Hillermeier, Universität der Bundeswehr, DE

- PP060**                    **Modeling and Control of LCL filtered 3L-VSCs in Interleaved Topology**  
Adeel Jamal, Gerd Griepentrog, Technical University of Darmstadt, DE
- PP062**                    **Enhancing Safety and Efficiency for Isolated PLC I/O Designs with SPI Daisy Chain**  
Travis Lenz, Skyworks Solutions, US
- PP063**                    **Cost-Effective Method to Discharge DC Link Capacitors with SiC Power Modules**  
Paul Kanatzar, Brian DeBoi, Stephanie Vinueza, Austin Curbow, Wolfspeed, US
- Power Quality**
- PP064**                    **A Study on Circulation Current in Parallel Operation of Transformer less UPS**  
Koji Kato, Hisakatsu Igarashi, Akira Sato, GS Yuasa International, JP
- PP065**                    **Design Challenges and Considerations for Gate Drivers of SiC MOSFETS and their Testing**  
Niranjan Hegde, Shubha B, Srikrishna N.H, Tektronix, IN
- PP066**                    **A Portable Efficiency Characterization Setup for Technology Demonstration of Power Modules**  
Sebastian Tengvall, Ariel Muszkat, Hoà Lê Thanh, Ahmed Ammar, Lotus Microsystems, DK
- PP067**                    **Fast EME Characterization of Bare-Die SiC MOSFETS**  
Robert Kragl, Frederik Jülich, Karl Oberdieck, Konstantin Spanos, Robert Bosch, DE; Rik W. De Doncker, RWTH Aachen University, DE
- PP068**                    **Theoretical Comparison of Component-Related Measurement Methods of Photovoltaic Inverters for Long-Term Testing**  
Niclas Reitz, Sebastian Sprunck, Ron Brandl, Fraunhofer Institute IEE, DE; Marco Jung, Bonn-Rhein-Sieg University of Applied Sciences, DE
- PP069**                    **Power Cycling Test Optimization Toward Reliability Assessment of Sintered Power Modules**  
Robert Graham, Macdermid Alpha Electronic Solutions, US
- PP070**                    **Real-Time Estimation and Sensitivity Analysis of Parasitic Capacitances in Electric Drive Systems**  
Mohammadreza Bagheribavaryani, Niklas Langmaack, Technical University of Braunschweig, DE

## Modelling and Testing

- PP071**                    **Parasitic Component Effects of Internal and External Package Level on Switching Performance of SiC Power Module**  
Nguyen Nghia Do, Chen-Min Chen, Sheng-Tsai Wu, Yu Tai-Jyun, Jing-Yao Chang, PowerX Semiconductor, TW
- PP072**                    **A Multi-Physics Iterative Approach for Temperature Estimation in SiC Power Module for Electric Vehicle**  
Stefano Orlando, Daniela Cavallaro, Marco Papasero, Ludovica Longo, Alessandra Cascio, STMicroelectronics, IT; Domenico Nardo, STMicroelectronics, DE
- PP073**                    **Voltage Balancing Method for Series Connection of 50 SiC MOSFETs**  
Antoine Philippe, Guillaume Piquet-Boisson, Van-Sang Nguyen, CEA, FR; Anne-Sophie Descamps, Nicolas Ginot, Christophe Batard, Nantes University, FR
- PP074**                    **A Laboratory-Scale MMC-Based DC System with RCP and PHIL Simulation Capabilities**  
Marc René Lotz, Martin Könemund, Ostfalia University, DE; Eugene Tinjinui Ndoh, DLR, DE; Michael Kurrat, Technical University of Braunschweig, DE
- PP075**                    **Film Capacitor Standard Series Digitalization: Electromagnetic & Thermal Modelling implementation in CLARA Web Tool**  
Fernando Aunon, TDK Electronics, ES; Fernando Rodriguez, TDK Electronics Components, ES; David Olalla, TDK Electronics Components, DE
- PP076**                    **Accuracy Evaluation and Proposed Dynamic Tuning Procedure of a Compact SiC SPICE Model**  
Austin Curbow, Brian DeBoi, Blake Nelson, Wolfspeed, US
- PP077**                    **Investigation of Use-Case-Dependent Modeling Approach for Switched-Mode Power Converter for LVDC Grid Evaluation**  
Melanie Lavery, Raffael Schwanninger, Martin Maerz, Friedrich-Alexander-University Erlangen-Nuremberg, DE
- PP078**                    **Averaged Model with Blocking Capability for Solid-State Transformers**  
Ahmed Meligy, Rafael Medeiros, Schneider Electric, FR; Ilknur Colak, Schneider Electric, DE; Seddik Bacha, G2Elab, FR

## Advanced Components

- PP080**                    **Surfactant-Modified Nanocomposite Thin-Film Capacitors**  
Bartosz Gackowski, William Greenbank, Thomas Ebel, University of Southern Denmark, DK
- PP081**                    **Increasing Energy Storage Capabilities of Powder Cores by Adapting the Winding and the Use of Fringing Flux**  
Paul Winkler, AnhTuan Luong, Bhartindu Bunny, Wulf Günther, Acal BFi, DE

- PP082**                      **PEEC-Based Thermal Modeling of Passive Components**  
Sascha Langfermann, Michael Owzareck, Lukas Fräger, Block Transformatoren-Elektronik, DE; Regine Mallwitz, Technical University of Darmstadt, DE
- PP083**                      **Galvanically Isolated Power Supply for Gate Drivers in High Voltage Applications**  
Priyanka Ghosh, Michael Meissner, Klaus F. Hoffmann, Helmut-Schmidt-University, DE
- PP084**                      **Fabrication Technique for Novel Nanocrystalline Cores with High Saturation Polarization and Low Losses**  
Merlin Thamm, Inge Lindemann-Geipel, Thomas, Weißgärber, Fraunhofer Institute IFAM, DE
- PP085**                      **Excitation-Dependent Temperature Behavior of the Quasi-Static Hysteresis Loss Energy Density of N87 Ferrite Material**  
Jeremias Kaiser, Thomas Dürbaum, Friedrich-Alexander-University Erlangen-Nuremberg, DE; Erika Stenglein, Siemens Energy, DE
- PP087**                      **Passive Methods Limiting Leakage Current in Metal-Oxide Varistor Used as Voltage Clamping Circuit in Low Voltage DC Semiconductor Circuit-Breakers**  
Kenan Askan, Eaton Industries, AT; Radek Klof, Eaton European Innovation Center, CZ

### GaN Devices and Applications

- PP088**                      **ESD solutions for 650V Normally-off AlGaN/GaN HEMTs**  
Thanh Hai Phung, Plinio Bau, Sebastian Gaviria-Duque, Dominique Bergogne, Bernard Bancal, Wise-integration, FR
- PP089**                      **A Simulative Study of Measurement Errors During Double Pulse Testing of GaN Devices**  
Severin Klever, Rik W. De Doncker, RWTH Aachen University, DE
- PP090**                      **Parallel Connection of GaN FETs: an Experimental Investigation Approach**  
Marco Palma, Efficient Power Conversion, IT; Salvatore Musumeci, Vincenzo Barba, Polytechnical University of Turin, IT
- PP091**                      **Repetitive Short Circuits on 650 V GaN**  
Adrien Lambert, Laurent Guillot, STMicroelectronics, FR; Hervé Morel, Dominique Planson, Luong-Viet Phung, Pascal Bevilacqua, Ampere Laboratory, FR
- PP092**                      **Comparison of Switching Losses and Dynamic on Resistance of 600 V-Class GaN HEMTs**  
André Thönnessen, Joshua Baumgärtner, Carsten Fronczek, Rik W. De Doncker, RWTH Aachen University, DE



- PP093**                      **Performance Evaluation of Deadtime and Gate Resistance for Parallel Connected GaN HEMTs**  
Junhyeok Jegal, Minho Kwon, Jong-Pil Lee, Korea Electrotechnology Research Institute, RK
- PP094**                      **Reaching Beyond 1200V: Lateral GaN HEMTs for High-Reliability EV and Industrial Applications**  
Kamal Varadarajan, Robert Yang, Alexei, Ankoudinov, Karthick Murukesan, Alexey Kudymov, Sorin Georgescu, John Rongavilla, Doug Kang, Power Integrations, US

### SiC Devices and Technologies

- PP095**                      **SmartSiC 150 & 200mm Engineered Substrate: Increasing SiC Power Device Current Density up to 30%**  
Eric Guiot, Walter Schwarzenbach, Alexis Drouin, Frédéric Allibert, SOITEC, FR; Tom Becker, Oleg Rusch, Jürgen Leib, Fraunhofer Institute IISB, DE
- PP096**                      **Dynamic Transients in High-Voltage Silicon and 4H-SiC NPN Bipolar Junction Transistors**  
Mana Hosseinzadehlish, Saeed Jahdi, Xibo, Yuan, University of Bristol, UK; Olayiwola Alatise, Jose Ortiz Gonzalez, University of Warwick, UK
- PP097**                      **An Advanced Multi-Aspect Performance Analysis of Planar-gate 1.2 kV SiC Power MOSFETs**  
Anja Katerina Brandl, Salvatore Race, Bhagyalakshmi Kakarla, Ivana Kovacevic-Badstübner, Ulrike Grossner, Michael Nagel, ETH Zurich, CH
- PP098**                      **SiC MOSFET Die Sorting and Parallel for Optimal Module Design**  
Zhong Ye, Yi Yang, Yangdong Zhou, Qing Wang, Inventchip Technology, CN,
- PP099**                      **Simulation Approach for Radiated Electro-Magnetic Fields Estimation on Acepack Drive SiC Power Module**  
Andrea Cusumano, Debora Crimi, Salvatore Oliveri, Alessandra Manzitto, STMicroelectronics, IT

### Control Methods II

- PP100**                      **Exact Analysis of Control-to-Output Transfer Functions of PWM-Converters - A Comparison of Two Methods**  
Daniel Breidenstein, Sophia Rösel, Thomas Dürbaum, Friedrich-Alexander-University Erlangen-Nuremberg, DE
- PP101**                      **3-Level Flying Capacitor Multilevel Topology with Delta-Sigma Modulation**  
Jannik Maier, Philipp Czerwenka, Gernot Schullerus, Eckhard Hennig, Ertugrul Sönmez, Reutlingen University, DE

- PP102**                    **Model Based Controlled Power Converter Test Platform**  
Dawid Koczy, Alexander Ernst, Wilfried Holzke, Bernd Orlik, University of Bremen, DE
- PP103**                    **Educational Hardware Trainer for Teaching the Dual Active Bridge in a DC Grid**  
Peter van Duijsen, Diego Zuidervliet, Sebastiaan Koning, The Hague University of Applied Sciences, NL
- PP104**                    **Study of the Operating Performance of a FCS-MPC-Controlled Matrix-Converter for PMSM at Different Frequency Ratios**  
Robert Zipprich, Bünyamin Tekir, Jan Winter, Marcus Ziegler, University of Kassel, DE
- PP105**                    **Enhancing Reactive Power Capacity in Battery-fed Power Conditioning Systems**  
Lucas Araujo, Joseph Banda, Elisabetta Tedeschi, Norwegian University of Science and Technology, NO
- PP106**                    **Pulse Sharing: Achieving High Efficiency and Excellent Regulation in Multi-Output Flyback Power Supplies**  
Xingda Yan, Toine Werner, Power Integrations, UK
- PP107**                    **Reliability-Optimized Space Vector Modulation (RO-SVM) for Semiconductors Lifetime Enhancement**  
Amin Rezaeizadeh, Silvia Mastellone, University of Applied Sciences and Arts Northwestern Switzerland, CH

### Intelligent Power Modules

- PP108**                    **Analysis and Optimization of Internal Coupling Interference in Integrated SiC Power Module Based on DBC**  
Chenhang Zeng, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN
- PP109**                    **Multispectral Electroluminescence Sensing of SiC MOSFETs for Junction Temperature and Current Extraction**  
Lukas Ruppert, Rik W. De Doncker, RWTH Aachen University, DE
- PP110**                    **SiC-IPM for Compact and Energy Efficient Low-Power Motor Drives**  
JongMu Lee, Alpha and Omega Semiconductor, KR; Jun-Ho Lee, Jin-Tae Kim, Alpha and Omega Conductors, KR; Bum-Seok Suh, Alpha and Omega Conductors, RC
- PP111**                    **Concept for a GaN-Based Intelligent Motor Controller with Integrated Failure Prediction for the Inverter and the Drive**  
Christoph Blechinger, Martin Schellenberger, Maximilian Hofmann, Fraunhofer Institute IISB, DE; Michael Mensing, Marc Gensch, David Westerhoff, Fraunhofer Institute ISIT, DE; Alexander Stanitzki, Patrick Barylla, Lukas Krupp, André Lüdecke, Fraunhofer Institute IMS, DE

**PP112**                      **Introducing the New 1200 V CIPOS Maxi IM817 Intelligent Power Module for Motor Drive Applications**  
Kihyun Lee, Jinhyeok Kim, Soohyuk Han, Bokkeun Song, Kyoungpil Kang, Minsub Lee, Infineon Technologies, KR

**PP113**                      **Thermal Performance of Infineon's New 600 V CIPOSTM Micro IM241 IPM for Low Power Motor Drive Systems Without Heatsink**  
David Jo, Kim Jingyeok, Song Hyunsoo, Bokkeun Song, Byoungcho Choo, Infineon Technologies, KR; Laurent Beaurenaut, Infineon Technologies, DE

### Intelligent Gate Drive Units

**PP114**                      **An Adaptive Dead Time Control Based on Switch Node Voltage Derivative**  
Lukas Knappstein, Martin Pfost, TU Dortmund University, DE

**PP115**                      **Coupling Coil Design and Positioning Optimization on New High Power Semiconductor Module for Fast Short Circuit Detection**  
Yannick Dumollard, Emmanuel Batista, Vincent Escrouzailles, Damien Tisne-Grimaud, Alstom, FR

**PP116**                      **Enabling Active Thermal Control via an Adaptive Multi-Voltage Gate Driver**  
Tianlong Albert, Lucas Radon, Rik W. De Doncker, RWTH Aachen University, DE

**PP117**                      **Innovative Gate Drive Method TriC3 for Motor**  
Hisashi Sugie, ROHM, JP

**PP118**                      **A New Class of Solid State Isolators Enhances the Reliability of Solid State Relays**  
Wolfgang Frank, Infineon Technologies, DE

**PP119**                      **A Self-Driving 3-Level Active Gate Driver Network to Control the Switching Slew Rate for SiC MOSFETs**  
Vin Loong Choo, Martin Pfost, TU Dortmund University, DE

### E-Mobility Traction II

**PP121**                      **Analysis of Long-Term Reliability of SiC in Traction Inverter Considering Vth Instability**  
Chi Zhang, Riccardo Negri, Volvo Cars, SW

**PP122**                      **Efficient Mapping of On-Demand Drive Load Profiles on Inverter Stress**  
Zlatko Bosnjic, Michael Hartmann, Klaus Krischan, Graz University of Technology, AT; Alexander, Loibl, Franz Königseder, MAGNA Powertrain, AT

**PP123**                      **EV Traction Inverter Optimal Design is Dominated by 3-Level ANPC**  
Timothé Delaforge, Bern University of Applied Sciences, CH; Koroos Moabber, Volvo Cars, SW

- PP124**                    **Introduction of Power Semiconductor Options for an Exciter of Electrically Excited Synchronous Motor**  
Yeriel Bai, Kangyoon Lee, Bumseung Jin, onsemi, KR
- PP125**                    **A Novel High Power Density Three Phase Traction Inverter Architecture for Electric Vehicle (EV) Applications**  
Yiyang Yan, Jiajia Guan, Baihan Liu, Jianwei Lv, Jiabin Liu, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN
- PP126**                    **A Modular DC-Link Capacitor Solution for the Main Powertrain Inverter of xEV**  
David Olalla, TDK Electronics, DE; Gayatri Kulkarni, TDK India, IN; Fernando Rodriguez, TDK Electronics Component, ES
- PP127**                    **Fault Identification Testing Methods for a Commercial Traction Inverter**  
Anna Corbitt, Chris Farnell, Justin Jackson, Alan Mantooth, University of Arkansas, US; Shailesh Joshi, Raymond Viviano, Yohei Iwahashi, Toyota Research Institute, US
- PP128**                    **Short Circuit Robustness for Traction Inverters from an Application Point of View**  
Karl Oberdieck, Semy Ben Khelifa, Manuel Horvath, Sebastian Strache, Matthias Bösing, Robert Bosch, DE

### Investigations of Particular SiC Device Phenomenon

- PP129**                    **The Impact of The Deadtime on The Stability of 1.2kV SiC MOSFET Body Diode Under Hard Switching with Synchronous Rectification**  
Mohammed Amer Karout, Mohamed Taha, Craig Fisher, Philip Mawby, Olayiwola Alatise, Ahmed Topkil, Jose Ortiz Gonzalez, University of Warwick, UK
- PP130**                    **RC-DC Snubber Implementation for Suppression of Diode Voltage Peak and Ringing in a Full SiC Half-Bridge Power Module**  
Emanuela Alfonzetti, Debora Crimi, Andrea Cusumano, STMicroelectronics, IT
- PP131**                    **Sub-5 Second Wide-Bandgap Power Device Calorimetric Measurements Utilizing Optical Sensors and Peltier Elements**  
Ruben Schnitzler, Dominik Koch, Ingmar Kallfass, Kevin Munoz Baron, Peter Rasic, Tobias Fink, University of Stuttgart, DE
- PP132**                    **SiC Trench MOSFETs in Avalanche Mode with RC Snubber Circuit**  
Sebnem Tuncay, Guang Zeng, Guangye Si, Infineon Technologies, DE; Thomas Basler, Chemnitz University of Technology, DE
- PP133**                    **High-Frequency Oscillations in SiC MOSFET Power Modules During Turn-on Switching Transient – Analysis Based on Simulations and Mitigation Methods**  
Rajani Kumar Thirukoluri, onsemi, DE; Roveendra Paul, onsemi, US

- PP134**                    **A Dynamic Current Balancing Method Using Full-Coupled Inductors in Paralleled Gate Branches**  
Jianwei Lv, Jiaxin Liu, Yiyang Yan, Zexiang Zheng, Baihan Liu, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN
- PP135**                    **Quantitative Performance Comparison of Large-Format SiC MOSFET and Si IGBT Modules**  
Arthur Boutry, Sergio Jimenez, Andrew Lemmon, Calvin Flack, University of Alabama, US

### Thermal Management and Advanced Cooling

- PP136**                    **Solder Preform Technology for Improved Thermomechanical Performance in Molded Power Module Package-Attach**  
Joseph Hertline, Ryan Mayberry, Indium, US; Aaron Hutzler, BondPulse, DE; Andreas Karch, Indium, UK
- PP138**                    **Effect of Flip-Chip Die-Attach on the Thermal Behavior of Power GaAs Diodes**  
Felix Steiner, Thomas Blank, Karlsruhe Institute of Technology, DE; Jens Kowalsky, Volker Dudek, 3-5 Power Electronics, DE
- PP139**                    **Influences of Solder Delamination on the Thermal Performance in Automotive Traction Module**  
Hansol Seo, Changsun Yun, onsemi, KR; Nick Bridwell, onsemi, US; Nasyriq Khaliddi Zainudin, MY
- PP140**                    **New Integrated Thermosiphon Solution for High-Power IGBT Cooling Applications**  
Kimmo Jokelainen, Janne Suhonen, Martti Yrjö Kemppe, Vesa Pentikäinen, CooliBlade, FI
- PP141**                    **Development of a Passive Capillary-Pumped Cooling System for High-Performance Electronics**  
Justin Fey, University of Applied Sciences Frankfurt, DE
- PP143**                    **Advanced cooling of power electronics with copper cold sprayed aluminium heatsinks & busbars**  
Michael Dasch, Reeti Singh, Jan Kondas, Max Meinicke, Leonard Holzgaßner, Markus Brotsack, Impact Innovations, DE
- PP144**                    **Cold Plate Design for Cooling LV100 Silicon Carbide Power Module Packaging**  
Wahid Cherief, Mariya Petkova, Jean-François de Palma, Mersen, FR
- PP145**                    **An Improved Double-Layer Spacer in Double-Sided Cooling Power Module**  
Linhao Ren, Zexiang Zheng, Heng Zhang, Yong Kang, Cai Chen, Jiaxin Liu, Huazhong University of Science and Technology, CN

## Reliability Testing

- PP146**                      **Power Cycling of 1.7kV Multi-Chip Power Modules – SiC MOSFETs vs Silicon IGBTs**  
Nick Baker, Andrew Lemmon, Vishesh Vikas, Chase Fortin, Justin Conzola, John Austin, Arthur Boutry, Nathan Carlson, University of Alabama, US
- PP147**                      **Power Cycling Capability of Discrete SiC MOSFET Devices with Different Designs**  
Luhong Xie, Dianjie Gu, Hao Liu, Hao Liu, Yongzhang Huang, North China Electric Power University, CN; Erping Deng, Hefei University of Technology, CN
- PP148**                      **Model-Based Parameter Tuning of Semiconductor Devices in DC Power Cycling Test**  
Yi Zhang, Yichi Zhang, Bo Yao, Huai Wang, Aalborg University, DK
- PP149**                      **Influence of Transfer Molding on the Reliability of DCM SiC Power Modules**  
Jacek Rudzki, Henning Ströbel-Maier, Martin Becker, Semikron Danfoss, DE; Patrick Heimler, Dong Xie, Mohamed Alaluss, Thomas Basler, Anu Mathew, Chemnitz University of Technology, DE; Sven Rzepka, Fraunhofer ENAS, DE
- PP150**                      **Damp Heat Behavior of High Heat Capacitors for Applications in Electric Vehicles**  
Adel Bastawros, Sabic, US; Tetsuya Motohashi, Koichi Nakashima, Takamune Sugawara, Hisao Katsuta, SABIC, JP
- PP151**                      **Influence of the Gate Voltage During On-Time on the Power Cycling Capability of SiC MOSFETs**  
Patrick Heimler, Christian Schwabe, Nick Thönelt, Sören Gesell, Josef Lutz, Thomas Basler, Chemnitz University of Technology, DE
- PP152**                      **Investigation of the Temperature Measurement via VSD(T)-Method applied to Paralleled SiC MOSFET Chips during Power Cycling**  
Kevin Ladentin, Andreas Lindemann, Carsten Kempiak, Otto-von-Guericke University Magdeburg, DE; David Strahinger, University of Freiburg, DE
- PP153**                      **Approaches of Tsep Measurements for Power Semiconductors**  
Philipp Hauenschild, Regine Mallwitz, Technical University of Darmstadt, DE
- PP154**                      **Realtime Junction Temperature Estimation in SiC Power Modules Based on Multiple TSEP Acquisition**  
Kevin Muñoz Barón, Sarthak Dash, Dominik Koch, Kanuj Sharma, Ingmar Kallfass, University of Stuttgart, DE

## High Voltage WBG Devices

- PP155**                      **Enhanced Current Measurement Approach for Non-Isolated 6.5 kV Silicon Carbide MOSFETs**  
Xinyuan Du, Ahmed Ismail, Zhuxuan Ma, Yue Zhao, University of Arkansas, US

- PP156**                    **New 2kV SiC-MOS Technology for Application Fields in the Industrial Landscape**  
Igor Kasko, Carlos D. Fuentes, Christian Felgemacher, Andreas Thamm, ROHM Semiconductor, DE; Keigo Minode, Ryo Yoshida, Seiya Nakazawa, Tomonori Hoki, ROHM, JP
- PP157**                    **High Temperature Experimental Characterizations of COSS of 3.3 kV SiC MOSFET for Medium Voltage PV Applications**  
Paul Schmidt, Van-Sang Nguyen, Stéphane Catellani, CEA, FR
- PP158**                    **Impact of Gate Control on the Switching Performance of 3.3kV SBD-Embedded SiC-MOSFET**  
Junya Sakai, Daniel He, Nils Soltau, Mitsubishi Electric, DE; Kenji Hatori, Ryo Tsuda, Shota Yamamoto, Mitsubishi Electric, JP
- PP159**                    **Comparative Assessment of Overloadability Potential of 3.3 kV Si-IGBTs and SiC-MOSFET Power Modules**  
Muhammad Nawaz, Bochen Liu, Hitachi Energy Research, SW; Virgiliu, Botan, Tobias Keller, Hitachi Energy, CH
- PP160**                    **Improved Reliability of a 2200 V SiC MOSFET Module with an Epoxy-Encapsulated Insulated Metal Substrate**  
Hiroshi Kono, Shun Takeda, Eitaro Miyake, Toshiba Electronic Devices & Storage, JP; Georges Tchouangue, Toshiba, DE; Tomohiro Iguchi, Teruyuki Ohashi, Kazuya Kodani, Toshiba, JP
- PP161**                    **Paralleling 3.3-kV/800-A rated SiC-MOSFET Modules – An Optimization Method**  
Hiroyuki Irifune, Shinichi Hiroshige, Hiroshi Matsuyama, Tsuguhiro Tanaka, Hiroshi Kono, Toshiba Electronic Devices & Storage, JP; Georges Tchouangue, Toshiba Electronics Europe, DE
- PP162**                    **Performance Assessment of 10 kV SiC MOSFET and PiN Diode in 3L-NPC Converter Topology**  
Renato Amaral Minamisawa, Lucas Spejo, University of Applied Sciences and Arts Northwestern Switzerland, CH; Lars Knoll, SwissSEM, CH
- PP163**                    **Performance Evaluation of CoolSiC 2 kV SiC MOSFET Discrete in 1500 V DC Link Systems**  
Ajith Kumar Sekar, Jorge Cerezo, Syeda Qurat ul ain Akbar, Infineon Technologies, AT
- PP164**                    **A New 2.3 kV Rated SiC MOSFET Module with Low-Inductance High-Power Package HPnC for 1500 VDC Applications**  
Junya Kawabata, Sousei Chen, Yoshihiro Kodaira, Takafumi Uchida, Taku Takaku, Yusuke Sekino, Yoshiyuki Kusunoki, Yasuyuki Kobayashi, Fuji Electric, JP; Steffen Ewald, Fuji Electric Europe GmbH, DE

## Packaging and Interconnection Materials

- PP166**                      **Mechanism for Improving the Heat-Resistance of Adhesive Interface in Flexible Printed Circuits**  
Keita Suzuki, Yuichi Aoyagi, NOK, JP; Takahisa Manabe, Hisae Oba, NOK CORPORATION, JP
- PP167**                      **A Systematic Comparison Study of Different Bonding Technologies for Substrate Attachment of Power Electronics**  
Lisheng Wang, Gert Rietveld, Ray Hueting, University of Twente, NL
- PP168**                      **Stability of Pressure Sintered Interconnects as a Function of Temperature and Environmental Conditions**  
Kentaro Yoshioka, Mutsuharu Tsunoda, Akihiro Mochizuki, MacDermid Alpha Electronics Solutions, JP; Maurizio Fenech, MacDermid Alpha Electronics Solutions, DE
- PP169**                      **The Effect of Nano-Cu Interconnection Materials on the Thermomechanical Properties of SiC Double-Sided Power Modules**  
Suhang Wei, Jiaxin Liu, Weishan Lv, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN; Yue Wu, Zhipeng He, State Key Laboratory of HVDC, CN
- PP170**                      **All-in-One-Sintering: Die-Attach and Substrate-Attach on Bare Copper in a Pressure Assisted Sintering One-Step Process**  
Battist Rabay, Adrian Stelzer, Julien Hossain, Nano-Join, DE; Constanze Weber, Matthias Hutter, Fraunhofer Institute IZM, DE; Dirk Buße, Alexander Dahlbüding, Budetec, DE
- PP171**                      **Sequential Manufacturing of Highly Functionalized Three-Dimensional Ceramic Components for Power Electronics**  
Lars Rebenklau, Henry Barth, Paul Gierth, Fraunhofer Institute IKTS, DE
- PP173**                      **Parametric Study of Damage Evolution in Silver Sintered Layers of Double Sided Power Electronics Modules of Electrical Vehicles**  
Saeed Akbari, Konstantin Kostov, Mietek Bakowski, Jang-Kwon Lim, Klas Brinkfeldt, Rise Research Institutes of Sweden, SW; Kooros Moabber, Volvo Cars, SW

## DC-DC Converter I

- PP174**                      **Tristate Modified Boost Converter**  
Johannes Gragger, Felix A. Himmelstoss, University of Applied Sciences Technikum Vienna, AT
- PP175**                      **Comparative Evaluation of the Center Tapped Boost Converter Topology**  
Bryan Radix, Moheddin Shaik, Texas Instruments, DE



- PP176**                    **Comparison of Multi-level Topologies to Reduce the Components Voltage Stresses when Powered from Industrial DC Grids**  
Katharina Machtinger, Peter Jonke, Austrian Institute of Technology, AT; Ulrich Boeke, Signify Research, NL
- PP177**                    **Hard-Switching High-Frequency GaN-based DC-DC Converters with Concomitant Data Transmission Functionality**  
Abdelmoumin Allioua, Gerd Griepentrog, Technical University of Darmstadt, DE
- PP178**                    **Efficient Design of High-Current, Low-Output Voltage DC-DC Converters Using Artificial Intelligence-Based Topology Selection and Optimization**  
Thomas Harmand, Raphael Filipe, 3D PLUS, FR; Denis Labrousse, CNAM Paris / SATIE, FR; Patrick Dubus, PowerLogy, FR

### High Power DC-DC Converter I

- PP180**                    **A SiC Based 60kW LLC Converter with Novel Transformer Design for Improving Voltage Balance**  
Frank Wei, ZongZeng Hu, Jianlong Chen, Fulin Zhang, Wolfspeed, CN
- PP181**                    **Analysis of Inverter Operation Modes of an IGBT-Based ZCS LLC Converter for a 2 kW Automotive On-Board DC-DC**  
Daniel Urbaneck, Frank Schafmeister, Paderborn University, DE
- PP182**                    **Dual Output Hybrid Converter for 48 V Data Centers: M-HSC**  
Simone Mazzer, Roberto Rizzolatti, Mario Ursino, Erik Medeossi, Infineon Technologies, AT Stefano Saggini, University of Udine, IT
- PP183**                    **3.6kW High Efficiency SiC-based HV/LV DC-DC Converter for EVs**  
Veera Bharath Chandra Reddy Gandluru, Shashank Mathur, Yuequan Hu, Wolfspeed, US
- PP184**                    **Bidirectional DC-DC Topologies Comparison for 800 V Automotive Applications Integrating 650 V GaN-on-Si Devices**  
Ilias Chorfi, Thierry Sutto, Julio Brandelero, STMicroelectronics, FR; Romain Monthéard, CEA, FR; Corinne Alonso, LAAS-CNRS, FR
- PP185**                    **Analysis of Phase Shielding Method Based on  $\Delta$ -Cr-Y Three-Phase Interleaved LLC Converter**  
Jin Wen, Jiajia Guan, Zongheng Wu, Wenzhe Xu, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN
- PP186**                    **22kW IMS-based Bidirectional DC-DC Converter Using Surface Mount SiC MOSFETs for OBCs**  
Hamlin Wang, Yuequan Hu, Wolfspeed, US; ZongZeng, Hu, Wolfspeed, CN
- PP187**                    **Comparative Analysis of DC-DC Converters for Electrolyzers Using Geometric Programming**  
Tim McRae, Ramkrishnan Maheshwari, Thomas Ebel University of Southern Denmark, DK

- PP188**                      **Design Consideration of Bi-directional CLLC Resonant Converter in Energy Storage Systems**  
Sheng-Yang Yu, Texas Instruments, US; Guangzhi Cui, Texas Instruments, CN

### Smart-Grid Technologies

- PP189**                      **Adaptive Fast Charging System with Second Life Batteries - an Overview of a Research Project**  
Lukas Böhning, Mathias Herget, Ulf Schwalbe, Nils Kasseckert, Patrick Stock, Raphael Kress, Alexander Menzel, Fulda University of Applied Sciences, DE
- PP190**                      **Parallel Operation and Synchronization of Microgrids by Using the Thevenin theorem**  
Marius Block, Stefanie Orlik, Wilfried Holzke, Holger Raffel, University of Bremen, DE
- PP192**                      **21 kA Solid State DC Breaker for Supergrid Institute's High Power Test Facility**  
Christophe Conilh, Mohammad Kabalo, GE Power Conversion, FR; Christophe Creusot, Guillaume Amodeo, Supergrid Institute, FR
- PP193**                      **Design and Analysis of a 50kW SiC-Based Active Front End with a Very Small Line Choke for DC-Grids**  
Raphael Otte, Jan-Niklas Koch, Tim Stuckmann, Holger Borcharding, University of Applied Sciences and Arts Ostwestfalen-Lippe, DE
- PP194**                      **Investigation of Load Transitions Between Loaded and Load Free Conductor Segments in Industrial Conductor Systems**  
Jan-Niklas Koch, Raphael Otte, Tim Stuckmann, Slavi Warkentin, Holger Borcharding, University of Applied Sciences and Arts Ostwestfalen-Lippe, DE
- PP195**                      **A Method to Control Voltage and Power Flow in a DC Grid**  
Peter van Duijsen, Diego Zuidervliet, The Hague University of Applied Sciences, NL

### Energy Storage Systems

- PP196**                      **Considerations on a High-Cell-Count Converter-Based Battery Storage System with Reduced Communication Effort**  
Paul Aspalter, Hans Ertl, Technical University of Vienna, AT; Markus Vogelsberger, Alstom, AT
- PP197**                      **Studying Convertors for Voltage Equalization in Energy Storage System with Active BMS**  
Dimitar Arnaudov, Krasimir Kishkin, Vladimir Dimitrov, Technical University of Sofia, BG

- PP198**                      **Challenges of High Side Gate Driver and Disconnect MOSFET for Battery Protection Unit during Start-up, Turn-off and Over Current Events**  
Niranjan Suravarapu Reddy, Infineon Technologies, AT; Jianfu Fu, Hrach Amirkhanian, Infineon Technologies, US
- PP199**                      **Electric Insulation Coordination to Prevent Electric Arcs in Lithiumion Batteries**  
Daniel Chatroux, Julien Chauvin, CEA Liten, FR
- PP201**                      **Battery Charger with Impedance Spectroscopy Capability for Li-Ion Cells**  
Christian Branás, Francisco Azcondo, Alberto Pigazo, Rosario Casanueva, Francisco Javier Díaz, University of Cantabria, ES; Juan C. Viera, Enrique Valdes, University of Oviedo, ES; Paula Lamo, International University of La Rioja, ES
- EMC**
- PP203**                      **Analytical and Experimental Validation Common Mode Feedback Loop for a Three-Phase\_Level Vienna Rectifier**  
Daniel San Laureano Igartuburu, Gonzalo Moreno Huerta, Indra, ES; Diego Moreno Ochoa, Power Smart Control, ES; Antonio Lázaro Blanco, University of Madrid, ES
- PP204**                      **Robustness of Frequency-Domain Terminal Modeling of Electromagnetic Interferences in Static Converters**  
Mehyeddine Singer, Arnaud Videt, Nadir Idir, University of Lille, FR
- PP205**                      **Study of EMI Behavior of a 2-Level GaN-Inverter – Simulation and Measurement**  
Benedikt Kohlhepp, Technical University of Berlin, DE; Yassin Fal, Julian Dobusch, Daniel Kübrich, Thomas Dürbaum, Friedrich-Alexander-University Erlangen-Nuremberg, DE
- PP206**                      **Analysis of Common-Mode Noise Generated due to Fast-Switching GaN Devices in Totem-Pole PFCs**  
Serkan Dusmez, Huawei Technologies DE; Ali Tausif, Yildiz Technical University, TR
- PP207**                      **Conducted EMI from GaN-based 48V to 12V DC-DC-Converters for Automotive Applications**  
Erik Kampert, Marita Wendt, Klaus F. Hoffmann, Stefan Dickmann, Jost Wendt, Helmut-Schmidt-University, DE

## Advanced Design

- PP208**                      **Applied Design Automation for Finding Feasible Designs for High-Frequency Planar Transformers**  
Rando Raßmann, Knud Gripp, Ulf Schuemann, Victor Golev, University of Applied Sciences Kiel, DE
- PP209**                      **Frequency Dependent Area Product Method**  
Alfonso Martínez, Würth Elektronik, ES
- PP210**                      **Designing a Control Library for Grid-Following and Grid-Forming Power Inverters**  
Lars Lindner, Matthias Klee, Daniel Stracke, Jonas Steffen, Axel Seibel, Fraunhofer Institute IEE, DE; Marco Jung, University of Applied Science Bonn-Rhein-Sieg, DE
- PP211**                      **Intelligent Optimisation of a Wind Turbine Digital Twin Model**  
René Reimann, Steffen Menzel, Wilfried Holzke, Holger Raffel, Bernd Orlik, University of Bremen, DE
- PP212**                      **Thermal Transient Digital Twin Modelling for Power Converters**  
Xianghao Mo, Daniel Ríos Linares, Regina Ramos, Miroslav Vasić, University of Madrid, ES
- PP213**                      **A Digital Twin Approach Toward Lifetime Analysis and Predictive Maintenance of Power Semiconductors for Railway Application**  
Emmanuel Batista, Michel Piton, Nicolas Alferez, Damien Tisne-Grimaud, Vincent Escrouzailles, Alstom, FR

## Inductors

- PP214**                      **Saturable Ferrite Core Inductors in LCL Filters of Three-Phase Voltage Source Inverters**  
Marius Kaufmann-Bühler, Hannah Riepe, Sibylle Dieckerhoff, Technical University of Berlin, DE
- PP215**                      **2D Copper Loss Analytical Model for Planar Inductor Combining High and Low Permeability Materials**  
Idriss Nachete, Xavier Margueron, Frédéric Gillon, University of Lille, FR; Guillaume Lefevre, Mitsubishi Electric, FR
- PP216**                      **CNC-Manufactured Power Inductors with Excellent Bandwidth for Multi-Megawatt Converters**  
Thomas Kreppel, Thomas Brückner, Rainer Marquardt, Universität der Bundeswehr, DE; Rene Weick, innovatek OS, DE
- PP217**                      **Analytical Evaluation of Differential Model DC EMI Filter Inductors using Material Saturation Coefficient**  
Lukas Mueller, Micrometals, US

- PP218**                      **Design and Performance Evaluation of Air Core Inductors for Very High Frequency Power Conversion**  
Florentin Salomez, Jean-Luc Schanen, Yves Lembeye, G2Elab, FR; Vincent Blanchon, Sébastien Carcouet, Ghislain Despesse, CEA Leti, FR
- PP220**                      **Improving Multi-Phase Ferrite Magnetics by Coupling for MV and UPS Converters**  
Michael Schmidhuber, Jonas Pfeiffer, Christoph Drexler, Philemon Wrensch, Manfred Wohlstreicher, Christian Blaum, SUMIDA Components & Modules, DE
- E-Mobility Charging**
- PP221**                      **22-kW Bidirectional Single-Stage Direct-Ac-Ac Power Conversion On-Board Charger with High-Power-Density Implementation**  
Oscar Lucia, Hector Sarnago, Ignacio Alvarez, University of Zaragoza, ES
- PP222**                      **Benchmarking DC Fast Chargers: A Comparative Analysis of Power Converter Structures for Wide Voltage Range**  
Sadik Cinik, Fangzhou Zhao, Xiongfei Wang, Aalborg University, DK; Giuseppe De Falco, Infineon Technologies, AT
- PP223**                      **Performance Optimization of Single-Phase On-Board Chargers with Ripple Port**  
Davide Gottardo, Giorgio Valente, Hexagon, UK
- PP224**                      **A Reduced-Sensor Modular Dual Active Bridge-Based Battery Charging System for Electric Vehicles Using an Improved Linear Extended State Observer**  
Armel Asongu Nkempi, Paolo Cova, Nicola Delmonte, University of Parma, IT; Marco Portesine, Emilio Sacchi, Poseico, IT; Iñigo Kortabarria, University of the Basque Country, ES
- PP225**                      **Bidirectional Non-Isolated Three-Phase Onboard Charger with a Low-Voltage Lower-Phase Operation Mode**  
Steffen Frei, Milad Khani, Gerd Griepentrog, Technical University of Darmstadt, DE
- PP226**                      **Control of a Three-Phase Inductive Power Transfer System Based on DD<sup>2</sup>Q Coil Topology**  
Nikola Mirkovic, Alberto Delgado, Miroslav Vasić, Pedro Alou, University of Madrid, ES
- PP227**                      **Comparison of Two Bidirectional 11KW 400V CLLC and CLLLC Resonant Converters for EV Applications**  
Hasan Mousavi Somarin, Norbert Messi Bene Eloundou, Farshid Sarrafin Ardebili, Luiz Braz, Valeo, FR

- PP228**                    **Dynamic Wireless Charging System Design for Extra-Urban Areas based on Resonant Inductive Power Transfer**  
Irene Maria Torres Alfonso, Carlos Costas-Sos, Juan M. Perie-Buil, José-Francisco Sanz-Osorio, Juan L. Villa, Oscar Garcia-Izquierdo, CIRCE Foundation, ES
- PP229**                    **Bidirectional Isolated 400-12V DC-DC Converter with Improved Power Density and Full-Range Operation for EV Applications**  
Oscar Lucia, Hector Sarnago, Ignacio Alvarez, University of Zaragoza, ES
- PP202**                    **Efficiency, Volume and CO2 Emissions Impact in a PFC Converter with an Active Filter Solution for OBC Application**  
Kelly Ribeiro, Jean-Raphael Capounda, Vineel Rajagopal, Pascal Menegazzi, Benjamin Paul, Nabil Kamil, Soleiman Galeshi, Norbert Messi, Valeo, FR

### High Power DC-DC Converter II

- PP230**                    **Gain Optimization Control Method for CLLLC Resonant Converters under Phase Shift Mode**  
Sean Yu, Guangzhi Cui, Texas Instruments, CN; Sheng-Yang Yu, Texas Instruments, US
- PP231**                    **Analysis of Common and Split DC-Bus Interleaved H-Bridge Converters for High-Current Low-Ripple Applications** □  
Bhavana Gudala, Riccardo Mandrioli, Vincenzo Cirimele, Mattia Ricco, University of Bologna, IT; Gaetano Longo, OCEM Power Electronics, IT
- PP232**                    **Optimal Frequency Operating Points for Hybrid Switched Capacitor Converters and Lossless Current Sense Method**  
Simone Mazzer, Roberto Rizzolatti, Mario Ursino, Erik Medeossi, Infineon Technologies, AT; Stefano Saggini, Kevin Zufferli, University of Udine, IT
- PP233**                    **Design and Testing of a 250 kW 50 kHz SiC-based Half-Bridge-Series-Resonant-Converter**  
Daniel Haake, Anton Gorodnichev, Matthias Klee, Fabian Schnabel, Fraunhofer Institute IEE, DE; Matthias Bürger, Infineon Technologies, DE; Marco Jung, University of Applied Science Bonn-Rhein-Sieg, DE
- PP234**                    **30kW - 97% Efficiency Isolated DC-DC Converter with Large Input Voltage Range Based on a Boost DAB Association**  
Jean-Jacques Huselstein, Francois Forest, University of Montpellier, FR; Olivier Martos, Patrice Levron, Gamma Technologies, FR
- PP235**                    **Analysis of a Full-Bridge Push-Pull Forward Dual Active Bridge DC-DC Converter**  
Gean Sousa, Sandip Guha Thakurta, Christos Leontaris, Marcelo Lobo Heldwein, Technical University of Munich, DE

## DC-DC Converter II

- PP236**                      **Symmetrical Operation of Four Channel Resonant Boost DC-DC Converters in Continuous Conduction Mode**  
Kristóf Bándy, János Hamar, Péter Stumpf, Róbert Orvai, Budapest University of Technology and Economics, HU
- PP237**                      **Impact of Magnetics Tolerance on the Power Sharing of Parallel Dual-Output Phase-Shift Full-Bridge Converters**  
Riccardo Mandrioli, Riccardo Barbone, Lohith Kumar, Pittala Vincenzo Cirimele, Mattia Ricco, University of Bologna, IT
- PP238**                      **A Balancing Converter with Series Connected MOSFETs for +/-700V Bipolar DC Grids**  
Sachin Yadav, Guangyao Yu, Pavol Bauer, Zian Qin, Delft University of Technology, NL
- PP239**                      **Optimization and Design of Low-Voltage and High-Current Point-of-Load Converter under 48V Bus Architecture**  
Jiajia Guan, Jin Wen, Shaungxi Zhu, Zongheng Wu, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN; Yue Wu, Zhipeng He, Electric Power Research Institute, CSG, China
- PP240**                      **Interleaved Boost Converter Efficiency and Power Density Model for Active and Passive Component Design**  
Damien Lemaitre, Ecrabey Jacques, CEA, FR

## Novel and Advanced Semiconductor Devices

- PP241**                      **Evaluation of a Hybrid Power Switch Based on Trench Clustered IGBT and SiC MOSFET**  
Alireza Sheikhan, Sankara Narayanan Ekkanath Madathil, University of Sheffield, UK
- PP242**                      **Contributions for Building Blocks for Normally-off 650V GaN-on-Si Power Integrated Circuits**  
Thanh Hai Phung, Plinio Bau, Sebastian Gaviria-Duque, Dominique Bergogne, Bernard Bancal, Wise-integration, FR
- PP243**                      **New Bidirectional Asymmetric High Voltage TVS (Transient Voltage Suppressor) diode**  
Boris Rosensaft, Martin Schulz, Littelfuse, DE; Xingchong Gu, Littelfuse Semiconductor, CN
- PP244**                      **ISO247: High Performance Ceramic based Advanced Isolated Discrete Package to Fully Exploit the Advantages of SiC MOSFET**  
Sachin Shridhar Paradkar, Aalok Bhatt, Francois Perraud, Littelfuse, DE





- PP256**                    **Challenges in Scaling SiC Single-Chip Measurements to Corresponding Power Modules**  
Hao Wang, Felix Kayser, Florian Sawallich, Pham Ha Trieu To, Hans-Günter Eckel, University of Rostock, DE
- PP257**                    **Switching Performance Evaluation of High-Power 1.7 kV SiC MOSFET Modules using a Common Busbar Design**  
Sebastian Neira, Mason Parker, Stephen J. Finney, Paul D. Judge, University of Edinburgh, UK
- PP258**                    **Characterizing the Switching Behavior of a 1.2 kV mixed SiC JFET and MOSFET Half Bridge**  
Tim Ringelmann, Mark-M. Bakran, University of Bayreuth, DE

### WBG High Frequency Application

- PP259**                    **Performance Evaluation of the Packaging of SiC Diodes in a 6.78 MHz Wireless Power Transfer System**  
Ioannis Nikiforidis, Paul Mitcheson, Prateek Wagle, Imperial College London, UK; Shu Takeuchi, Masashi Fukai, Kengo Tashiro, Sansha electric MFG, FI
- PP260**                    **Voltage Waveform Generation for Sawyer-Tower Coss Loss Measurements Using a Hybrid Power Converter**  
Malachi Hornbuckle, Steven Abrego, Katherine Liang, Sara Davidova, Zikang Tong, Juan Rivas, Stanford University, US
- PP261**                    **Evaluation of SiC Devices for Over 500kHz Application Based on Buck Circuit**  
Minli Jia, Sicheng Gong, Kang Liu, Zhen Zhou, Navitas Semiconductor, CN; Hao Sun, Navitas, CN
- PP262**                    **Linearization of Drain-Source Capacitances for Antiserial Configured SiC MOSFETs in High Frequency Solid State Switches**  
Lars Dresel, Gerd Griepentrog, Vefa Karakasli, Technical University of Darmstadt, DE

### SiC Ruggedness

- PP263**                    **Effects of Non-killer Defects on SiC MOSFET Short-circuit Ruggedness and Reliability**  
Sara Kuzmanoska, Prajeesh Karimbankara, Kaone Bogopa, Philipp Rehlaender, Swapna Sunkari, Hrishikesh Das, onsemi, DE
- PP264**                    **Dynamic Reverse Bias Test: Electro-Thermal Characterization of SiC MOSFETs**  
Giuseppe Mauromicale, Alessandro Sitta, Michele Calabretta, Luciano Salvo, STMicroelectronics, IT

- PP266**                    **Radiation Hardness of SiC Based Inverters Based on an EV Mission Profile**  
Hadiuzzaman Syed, Stephan Schwaiger, Sudhanshu Goel, Alberto Martinez-Limia, Klaus Heyers, Robert Bosch, DE
- PP267**                    **Rapid Short Circuit Protection Using didt Detection for SiC Power Modules**  
Koki Samura, Kentaro Yoshida, Kakeru Iwashita, Seiichiro Inokuchi, Mitsubishi Electric, JP
- PP268**                    **Comparison of Dynamic Gate Stress Test Results of SiC MOSFETs**  
Mathias Gebhardt, Gabriel Lieser, SET, DE
- PP269**                    **Extending SiC MOSFET Short-Circuit Withstanding Time by Two-Level Turn-Off Gate Driving**  
Kwokwai Ma, Dinesh Palaniappan, Infineon Technologies, SG
- PP270**                    **Experimental Investigations on Parasitic Turn-on of 1.2kV SiC MOSFET Discrete Devices**  
Thanh-Toan Pham, Jimmy Franchi, Martin Domeij, onsemi, SW; Kwangwon Lee, onsemi, KR; Sara Kuzmanoska, onsemi, DE
- PP271**                    **Behavior Modelling the Short Circuit Characteristics of SiC MOSFETs Using Compact Models**  
Qing Sun, Andreas Huerner, Rudolf Elpelt, Infineon Technologies, DE

## Thermal Characterization

- PP273**                    **Thermal Analysis and Modelling of Charging Stations for Electric Vehicles**  
Ruben Kopischke, Christian Koppe, Tim Schmidt, Mohamed Ayeb, Ludwig Brabetz, University of Kassel, DE
- PP274**                    **Junction Temperature Measurement of a 3.3 kV Silicon Carbide MOSFET Power Module**  
Michael Gleissner, Mark-M. Bakran, University of Bayreuth, DE; Matthias Bürger, Infineon Technologies, DE
- PP275**                    **Innovative 3D Power Module Defaults Detection via Thermal Impedance Analysis and Simulations**  
Louis Alauzet, Anne Castelan, Sophie Regnier, Jean-Pierre Fradin, Alexandre Dezalay, ICAM, FR; Patrick Tounsi, University of Toulouse, FR
- PP276**                    **Thermal Characterization of an Air-Cooled PEBB Based on SiC MOSFET Power Modules**  
Alexandre Marie, Jean-Pierre Fradin, Benjamin Vieillefosse, Icam School of Engineering, FR; Maria Alejandra Castellanos Taita, Joseph Fabre, SCLE-SFE, FR; Philippe Ladoux, LAPLACE, FR
- PP277**                    **Thermal Behaviour of SiC MOSFET with Planar Packaging Technology**  
Yijun Ye, Alexander Hensler, Thomas Bigl, Siemens, DE; Thomas Basler, Josef Lutz, Chemnitz University of Technology, DE

## Reliability and Availability

- PP279**                    **Implementing Module Health Monitoring in EV Traction Inverters**  
Karol Rendek, Adam Matajs, ON Semiconductor, SK
- PP280**                    **Reliability Tests of Copper Thick-Film Substrates for Power Electronic Applications**  
Henry Barth, Lars Rebenklau, Fraunhofer Institute IKTS, DE; Sebastian Letz, Fraunhofer Institute IISB, DE
- PP281**                    **Power Module Solutions with Improved Reliability for Elevator Drive Applications**  
Tiago Jappe, Matthias Tauer, Ábel Tőkés, Vincotech, DE
- PP282**                    **Fail-Operational LLC Topologies with Fault-Tolerance Integrated Redundant Capabilities**  
Aswathy M. Prince, Ayman Ayad, Vitesco Technologies, DE
- PP283**                    **Thermal and Reliability Optimization of Clips in SiC MOSFET Power Modules**  
Zexiang Zheng, Jianwei Lv, Yiyang Yan, Jiaxin Liu, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN
- PP284**                    **Condition Monitoring of a GaN Full-Bridge by Means of Forward Voltage in Continuous Operation**  
Michael Vogt, Nando Kaminski, Alexander Brunko, University of Bremen, DE; Gerrit Braun, Klaus Rigbers, SMA Solar Technology, DE
- PP285**                    **A Simple and Low Cost Overcurrent Protection System Based on Commercial Shunt for Wide-Bandgap Devices**  
Emanuele Martano, Giovanni Busatto, Annunziata Sanseverino, University of Cassino and Southern Lazio, IT; Yoann Pascal, Fraunhofer Institute ISIT, DE; Marco Liserre, Kiel University, DE
- PP286**                    **SVM-Based Fault-Tolerant Control for a Cascaded H-Bridge Multilevel Converter under Multiple Open-Circuit Switch Faults**  
Dong Xie, Thomas Basler, Chemnitz University of Technology, DE; Hongjian Lin, City University of Hong Kong, HK; Chunxu Lin, Southwest Jiaotong University, CN
- PP287**                    **Revolutionizing Mobility: The Second Life of Onboard Charging Systems in Commercial Vehicles**  
Ajay Krishna Voppu Muralikrishna, Bjorn Isaksson, SiNIX Group, SW; Viswanathan Ganesh, Pennsylvania State University, US; Yujing Liu, Chalmers University of Technology, SW

## Low Voltage Switches

- PP288**                    **A Behavioral Transient Model for IGBT Device with Anti Parallel Freewheeling Diode**  
Shiwu Zhu, Chunlin Zhu, Wei Gong, Nexperia, UK; Qi Huang, Ken Zhang, Huiling Zuo, Junli Xiang, Nexperia, CN; Katsuaki Saito, Nexperia, JP

- PP289**                    **Parameter Extraction for an ANN-assisted IGBT Model in Transient Simulations**  
Huaiyuan Zhang, Steven Lee, Keysight Technologies, US; Abby Shih, Keysight Technologies, DE; Stefan Haensel, Zeeshan Umar, Felix Zeyss, Siemens, DE
- PP290**                    **Fabrication of 600V RC-IGBT Using 300mm Wafer**  
Masaki Ueno, Shohta Oh, Kenji Suzuki, Takahiro Nakatani, Haruhiko Minamitake, Taiki Hoshi, Yuta Asai, Ai Sugamoto, Mitsubishi Electric, JP
- PP291**                    **Next Level of Power Module Solution for PV C&I String Inverter with 1200V H7 Technology in Easy3B Package**  
Tilo Poller, Ma Si Chao, Heike Prinz-Ruether, Maximilian Kummetat, Christian Müller, Infineon Technologies, DE
- PP292**                    **Analysis of MOSFET Switching Losses in Resonant Converters Using Electrical and Thermal Measurements and Loss Trends with MOSFET Size Variation**  
Alfio Scuto, Marco Ventimiglia, Giuseppe Sorrentino, Gaetano Belverde, STMicroelectronics, IT
- PP293**                    **OptiMOS 6 135V for High Power Motor Drives**  
Kunal Jha, Kapil Kelkar, Infineon Technologies, US; Tien Quang Tran, Josef Mohammed, Infineon Technologies, AT; Stefan Tegen, Infineon Technologies, DE
- PP294**                    **Auto Power-SOI: Shaping the Future of Battery Monitoring Technology**  
Alex Lim, Soitec, SP

### Lifetime Modelling and Condition Monitoring

- PP295**                    **Understanding the Impact of IEC60747-17 on Capacitive and Magnetic Couplers**  
Shu Ee Ong, Skyworks Solutions, US
- PP296**                    **Paris Law Applied to Wire Bonds Degradation Using Crack Growth Measurement**  
Merouane Ouhab, Pierre-Yves Pichon, Mitsubishi Electric, FR
- PP297**                    **Condition Monitoring Technique of Power Electronic Modules via Square-Wave Gate Signal Excitation**  
Isabel Austrup, Rik W. De Doncker, RWTH Aachen University, DE
- PP298**                    **Statistics-based Lifetime Simulation Environment for Power Modules incorporating Degradation Models**  
Karthik Debbadi, Martin Votava, Yoann Pascal, Marco Liserre, Fraunhofer Institute ISIT, DE; Gopal Mondal, Sebastian Nielebock, Siemens, DE
- PP299**                    **Power Cycling Results for Reliability Studies of SiC-Inverters**  
Robert Keilmann, Florian Lippold, Regine Mallwitz, Technical University of Darmstadt, DE
- PP300**                    **GaN Cascode in High Speed Driven Air Compressors for Automotive Fuel Cells**  
Florian Lippold, Regine Mallwitz, Technical University of Braunschweig, DE

- PP301**                    **Prognostic Analysis of IGBT Health: Real-Time On-State Voltage Prediction through Machine Learning**  
Tanya Thekemuriyil, Jaspera Dominique Rohner, Renato Amaral Minamisawa, University of Applied Sciences and Arts Northwestern Switzerland, CN
- PP302**                    **Robustness Analysis of Temperature-Sensitive Electrical Parameters of IGBTs**  
Laurids Schmitz, Rik De Doncker, RWTH Aachen University, DE; Tetsuya Kojima, Mitsubishi Electric, JP
- PP303**                    **Observation of Thermal-Resistance Increase of Degraded IGBT Modules by VCE (sat) Measurement in a Chopper Circuit**  
Kazunori Hasegawa, Hisaki Ueda, Kanta Hara, Satoshi Nakano, Wataru Saito, Kyushu Institute of Technology, JP; Nobuyuki Shishido, Kindai University, JP; Tamotsu Ninomiya, NPERC-J, JP
- Pulse with Modulation Methods**
- PP304**                    **Modulation Technique for Reduced AC Content of the DC Link Current in Three-Phase Two-Level Inverters**  
Steffen Frei, Gerd Griepentrog, Technical University of Darmstadt, DE
- PP305**                    **Common Mode Currents in Resonant Circuits Generated with a Delta-Sigma Modulated Voltage Source Inverter**  
Tobias Haas, Theo Zeißel, Technical University of Applied Sciences Würzburg-Schweinfurt, DE
- PP306**                    **Evaluation of New Modulation Scheme for 3L-ANPC Using Both Current Paths in Zero State**  
Felix Eichler, Markus Meißner, Matthias Meißner, Steffen Bernet, Dresden University of Technology, DE; Andreas Gießmann, SEMIKRON Elektronik, DE
- PP307**                    **An Innovative Synchronous Rectification Method for 11kW CLLC Converter**  
Sanbao Shi, Cheng Zhang, Infineon Semiconductors, CN; Sidorov Vadim, Tomislav Turscak, Infineon Technologies, AT
- PP308**                    **Interleaved Asynchronous Delta-Sigma Modulation Concept for Dynamic Power Converters**  
Philipp Czerwenka, Jannik Maier, Eckhard Hennig, Gernot Schullerus, Ertugrul Sönmez, Reutlingen University, DE
- PP309**                    **High Resolution Mixed-Signal Pulse Width Modulator for High-Frequency DC-DC Converters**  
Tim McRae, Thomas Ebel, Kasper Paasch, University of Southern Denmark, DK
- PP310**                    **Implementation and Control of Optimized Pulse Patterns for Salient Permanent Magnet Synchronous Machines in Electric Vehicles**  
Maximilian Hepp, Michael Saur, Wolfgang Wondrak, Mercedes-Benz, DE; Mark-M. Bakran, University of Bayreuth, DE

- PP311**                    **A 3-Leg Interleaved TP PFC with a 90° Phase-Shifted Asymmetric Leg for Reduced Magnetics**  
Serkan Dusmez, Huawei Technologies, DE; Ali Tausif, Ahmet Faruk Bakan, Yildiz Technical University, TR
- PP312**                    **Fault-Tolerant Operation Analysis of a Five-Phase Three-Level TNPC Inverter for Electric Aircraft Propulsion Systems**  
Chanuch Chaisakdanugull, Klaus F. Hoffmann, Helmut-Schmidt-University, DE
- AC-DC and DC-AC Converter**
- PP313**                    **CCM Totem-pole PFC for Ultra-High Power Density USB-PD Chargers**  
Manuel Escudero Rodruigez, Infineon Technologies, FI; Matteo-Alessandro Kutschak, Infineon Technologies, AT
- PP314**                    **Comparison of Hybrid Si/SiC and SiC Two-Level and Three-Level Converters for Low-Voltage Low-Power Applications**  
Tim Augustin, Muhammad Nawaz, Hitachi Energy Research, SW; Haofeng Bai, Hitachi Energy, SW; Simon Round, Peter Steimer, Hitachi Energy, CH
- PP315**                    **Analysis of Analogue Current and Flux Balancing for the Dual-Active-Bridge Converter**  
Christophe Basso, Future Electronics, FR
- PP316**                    **Design and Optimization of a Single-Stage Photovoltaic Microinverter with Integrated Magnetics**  
Jin Wen, Jiajia Guan, Chenhang Zeng, Yijie Huang, Zongheng Wu, Wenzhe Xu, Cai Chen, Yong Kang, Huazhong University of Science and Technology, CN
- PP317**                    **Experimental Investigation of Class  $\Phi$  Inverter Under Various Load Conditions**  
Baptiste Daire, Christian Martin, Fabien Sixdenier, Charles Joubert, Loris Pace, Ampere Laboratory, FR
- PP318**                    **Analysis, Modeling, Design, and Limitations of Current Injection based UPF Rectifier with Small DC-Link Capacitor**  
Ramkrishan Maheshwari, Ankur Srivastava, Prashant Surana, Thomas Ebel, University of Southern Denmark, DK; Lasse Chr. Larsen, Egon Hansen, OJ ELECTRONICS, DK
- PP319**                    **High-Efficient Isolated AC-DC Converter with Circulating Current Reduction for AC Adapters**  
Hiroki Watanabe, Jun-ichi Itoh, Nagaoka University of Technology, JP Naoto Izumoto, Kazunori Kidera, Kenji Okada, Panasonic, JP
- PP320**                    **A Phase-Locked Loop (PLL) based Strategy for Accurate Blanking Times in Bridgeless Totem-Pole PFCs**  
Sandu Tigira Tigira, Rosario Casanueva, Francisco Javier Diaz, Francisco Azcondo, Alberto Pigazo, Christian Brañas, University of Cantabria, ES; Paula Lamo, International University of Rioja, ES

- PP321**                      **Circulating Currents in Coupled Multi-Terminal Hybrid AC-DC Grids**  
Fabian Herzog, Benedict Mortimer, Rik W. De Doncker, RWTH Aachen University, DE

### Advanced Converter Topologies

- PP322**                      **Comparison of 4500V State-of-the-Art XHP3 IGBT and Conventional IHV IGBT for 3300V 3-Level ANPC Medium Voltage Drives**  
Martin Knecht, Jens Czichon, Marc Buschkuehle, Infineon Technologies, DE; Lifeng Chen, Infineon Technologies, CN; Xin Ma, Infineon Integrated Circuit, CN
- PP323**                      **Generalized Switching Sequence for Voltage Balancing in a Flying Capacitor DC-DC Converter with Quasi-2-Level Modulation**  
Jose Andres Aguilar Croston, Piotr Dworakowski, Besar Asllani, SuperGrid Institute, FR
- PP324**                      **Optimization-Based Sizing of a Modular Multilevel Converter Based on 650 V GaN Modules for New LVDC/MVDC Grids**  
Gregoire Le Goff, Corinne Alonso, University of Toulouse, FR; Ilias Chorfi, Thierry Sutto, STMicroelectronics, FR
- PP325**                      **A Novel Three-Phase Low-Switch-Count AC-DC Grid Converter Topology with Galvanic Isolation**  
Liska Steenbock, Jan Boris Loesenbeck, University of Applied Sciences and Arts Bielefeld, DE
- PP326**                      **Single-Stage LED Driver Based on Coupled Inductor Power Factor Correction and LLC Converter**  
Alireza Ramezan Ghanbari, Sayed Reza Afzali Arani, Heinz Seyringer, V-research, AT; Dietmar Klien, Lukas Saccavini, Norbert Linder, Tridonic, AT
- PP327**                      **A Inverse Coupled DC-DC Boost Inductor with 2-kV SiC MOSFET Module for 1500V Solar Inverter MPPT**  
Yusi Liu, Andrew Yang, onsemi, US
- PP328**                      **Environmental Impact of Modular Power Electronics Systems Considering Diagnostic-Driven Unit Replacement**  
Briac Baudais, Nicolas Degrenne, Mitsubishi Electric, FR; Hamid Ben Ahmed, Gurvan Jodin, Stéphane Lefebvre, SATIE, FR

### Power Electronics for Railway Applications

- PP329**                      **Switching Performance Comparison of 3.3 kV SiC MOSFET and Si IGBT Power Modules for Railway Traction Systems**  
Yue Zhao, Ahmed Ismail, Zhuxuan Ma, University of Arkansas, US

- PP330**                    **Comparison of Three-Level Inverter Topologies for MVDC Reversible Railway Substations**  
Luc Bimmel, Erick Brito, University of Toulouse, FR; Philippe Ladoux, INP-LAPLACE, FR
- PP331**                    **Control of Bidirectional Power Flow in Railway Catenary Overhead Lines**  
Peter van Duijsen, Diego Zuidervliet, The Hague University of Applied Sciences, NL
- PP332**                    **A Rail Traction Converter Platform Based on Power Module Implementations with 450 A, 600 A and 800 A 3.3 kV IGBT Modules**  
Ekrem R. Gunes, Abdulkirim Ugur, TUBITAK RUTE, TR; Osman S. Senturk, OSSEN Software and Energy, TR
- PP333**                    **Comparison of Selected Megawatt-Level Traction Converter Power Module Implementations in Terms of Commutation Inductance and Practicality**  
Abdulkirim Ugur, Ekrem R. Gunes, TUBITAK RUTE, TR; Osman S. Senturk, OSSEN Software and Energy, TR

### Current Related Testing

- PP334**                    **Pitfalls and their Avoidability in the Double-Pulse Test**  
Nikolas Förster, Daniel Urbaneck, Oliver Wallscheid, Frank Schafmeister, Paderborn University, DE; Benedikt Kohlhepp, Daniel Kübrich, Friedrich-Alexander-University Erlangen-Nuremberg, DE
- PP335**                    **Modeling and Simulation of Fluxgate Based Current Sensor**  
Yunus Çay, The Center for Solar Energy Research and Applications, TR; Ozan Keysan, Middle East Technical University, TR; Erhan Demirok, Izmir Katip Celebi University, TR
- PP336**                    **Sigma-Delta Based Current Acquisition with Reduced Settling Time**  
Joschka Randerath, Jens Onno Krahe, Cologne University of Applied Sciences, DE
- PP337**                    **Characterisation of Wide-Bandgap Semiconductors in Double Pulse Testing Using Optically Isolated Probes**  
Lennart Hoffmann, Jens Friebe, University of Kassel, DE
- PP338**                    **NON-INVASIVE Battery Condition Testing Using Electrical Signals and Oscilloscopes**  
Srikrishna N.H, Madhusudan Acharya, Ramesh PE, Tektronix, IN
- PP339**                    **Instrumentation Requirements for Fast 130 V/ns Switching of 1700 V, 35 mΩ SiC MOSFETs**  
Matthew Appleby, Yushi Wang, Qilei Wang, Jiaqi Yan, Saeed Jahdi, Bernard Stark, University of Bristol, UK



## Power Electronics for Aerospace Applications

- PP340**                      **Conceptualization and Experimental Assessment of Design Aspects for 3-Level ANPC Inverters**  
Lukas Radomsky, Matthias Klintz, Regine Mallwitz, Technical University of Darmstadt, DE
- PP341**                      **Design of a High Power Density Inverter and FOC Implementation for UAVs**  
Matthias Neuner, Maurizio Incurvati, Davide Bagnara, MCI Internationale Bildung & Wissenschaft, AT; Moritz Moroder, Matthias Moroder FlyingBasket SRL, IT
- PP342**                      **Highly-Integrated, Flexible Power Solution for Aerospace 5kVA – 20 kVA Motor Drive Applications**  
Alain Calmels, Microchip Technology, FR
- PP343**                      **Preliminary Design and Evaluation of Inverter Power Density and Reliability in Electric Aircraft Propulsion Systems**  
Jeff Kugener, Ankit Pal, Stefan Kazula, DLR, DE
- PP344**                      **Design and Analysis of Gate-Driver for SiC-based Inverter for Megawatt Scale All Electric Aircraft**  
Jeff Kugener, Stefan Kazula, DLR, DE

## Measurement Techniques and Methods

- PP345**                      **Addressing Testing Challenges for Power Modules and Three-Level Inverters**  
Oleg Fotteler, SPEA, IT
- PP346**                      **Characterization of the Bonding Quality of Silver Sintered Compounds by Means of Laser-Induced Breakdown Spectroscopy**  
Yannick Bockholt, Knud Gripp, Aylin Bicakci, Ronald Eisele, University of Applied Sciences Kiel, DE
- PP347**                      **Inverter-Integrated Measurement of the Frequency-Dependent Winding Impedance of Electric Machines**  
Christian Mühlfeld, Jens Onno Krah, Cologne University of Applied Sciences, DE
- PP348**                      **Compensation Techniques for Bandwidth-Distorted Measurements of Fast Transients in Double Pulse Tests**  
Christian Lottis, Marco Jung, University of Applied Science Bonn-Rhein-Sieg, DE; Sebastian Sprunck, Fraunhofer Institute IEE, DE
- PP349**                      **An Aerodynamic Load Measurement Technique for Autonomous Aerial Vehicles**  
Mehmet Oguz Girgin, Semih Cakiroglu, Roketsan, TR

