

## PCIM Asia 2020 Preliminary Conference Program

1 <sup>st</sup> July 2020, Wednesday		
A. M. 09:30	Conference Opening	
A. M. 10:00 - 10:40	<b>Room 1 Keynote</b> <b>Communication-less Coordinative Control of Distributed Energy Source Converters</b> Speaker: Jinjun Liu, Zeng Liu, Xi'an Jiaotong University, CN Chairperson: Naoto Fujishima, Fuji Electric, JP	
A.M. 10:55 - 12:35	<b>Room 1</b> <b>High Power Density Converters</b> Chairperson: Dapeng Zheng, Shenzhen Hopewind Electric, CN	<b>Room 2</b> <b>AC/DC Converters</b> Chairperson: Meiqin Mao, Hefei University of Technology, CN
P.M. 12:35 - 14:00	<b>Poster Gallery Poster session</b> <b>Advanced Power Devices I</b> Chairperson: Youngchul Choi, Panjit International, USA	<b>Poster Gallery Poster session</b> <b>Advanced Power Devices II</b> Chairperson: Enrique J. Dede, ETSE University of Valencia, ES
P.M. 14:00 - 16:20	<b>Room 1</b> <b>High Power Devices</b> Chairperson: Guoqiang Zhang, Harbin Institute of Technology, CN	<b>Room 2</b> <b>Intelligent Gate Drive</b> Chairperson: Zhihong Wu, Tongji University, CN

2 <sup>nd</sup> July 2020, Thursday		
A.M. 09:30 - 10:10	<b>Room 1 Keynote</b> <b>The Latest Technical Trend of Power Devices for E-mobility</b> Speaker: Masahito Otsuki, Fuji Electric, JP Chairperson: Dehong Xu, Zhejiang University, CN	
A.M. 10:20 - 12:15	<b>Room 1</b> <b>Special Session</b> <b>High-speed Railway Power Traction</b> Chairperson: Yongdong Li, Tsinghua University, CN	<b>Room 2</b> <b>Fast Switching Devices</b> Chairperson: Min Chen, Zhejiang University, CN
P.M. 12:15 - 13:45	<b>Poster Gallery Poster session</b> <b>Advanced Power Devices III</b> Chairperson: Lie Xu, Tsinghua University, CN	<b>Poster Gallery Poster session</b> <b>Advanced Power Devices IV</b> Chairperson: Yu-Kang Lo, Lite-On Technology, TW, CN
P.M. 14:00 - 16:20	<b>Room 1</b> <b>Advanced Packaging Technologies</b> Chairperson: Norbert Pluschke, Semikron, HKSAR, CN	<b>Room 2</b> <b>Advanced Power Converters Design</b> Chairperson: Jianping Ying, Delta Electronics, CN

3 <sup>rd</sup> July 2020, Friday		
A.M. 09:30 - 10:10	<b>Room 1 Keynote</b> <b>Compact and Reliable Isolated DC/DC and SiC Gate Driver for Automotive Application</b> Speaker: Baoxing Chen, Analog Devices, USA Chairperson: Gourab Majumdar, Mitsubishi Electric, JP	
A.M. 10:20 - 12:15	<b>Room 1</b> <b>DC/DC Converters</b> Chairperson: Xuhui Wen, Chinese Academy of Science, CN	<b>Room 2 Tutorial</b> <b>Modular Multilevel Converters – Operating Principles and Applications</b> Speaker: Drazen Dujic, Stefan Milovanovic, Power Electronics Laboratory, EPFL, CH

## 1<sup>st</sup> July 2020, Wednesday

09:30 Conference Opening

### Room 1

#### 10:00 Keynote

#### **Communication-less Coordinative Control of Distributed Energy Source Converters**

Speaker: Jinjun Liu, Zeng Liu, Xi'an Jiaotong University, China

Chairperson: Naoto Fujishima, Fuji Electric, Japan

10:40 Coffee break

### Room 1

#### High Power Density Converters

Chairperson: Dapeng Zheng, Shenzhen Hopewind Electric, China

#### 10:55 Visualization of Noise Current Distribution in Power Module

Tsuyoshi Funaki, Takaaki Ibuchi, Osaka University, Japan

#### 11:20 100kHz SiC-MOSFET SAPF with Simple PI Regulator for Selective Harmonic Suppression



Hongwei Xu, Haitao Lin, Huazhong University of Science and Technology, China

#### 11:45 78 W Auxiliary Power Supply for 22KW Drive Using 1700 V Silicon Carbide MOSFET

Simon Shi, Bruce Wu, Infineon Technologies, China

#### 12:10 Experimental Demonstration of Superior Vf-Err Characteristics of pin Body Diode in 1.2 kV IE-UMOSFET with a Very Short Channel Length

Taiga Kanamori, Ruito Aiba, Hiroshi Yano, Noriyuki Iwamuro, University of Tsukuba, Japan

Shinsuke Harada, National Institute of Advanced Industrial Science and Technology, Japan

### Room 2

#### AC/DC Converters

Chairperson: Meiqin Mao, Hefei University of Technology, China

#### 10:55 Active-Neutral-Point-Clamped (ANPC) Three-Level Converter for High Power Offshore Windmill

Heng Wang, Infineon, China

- 11:20 SiC-based High-density Charger Plie Power Module Design**  
Zhong Ye, Qixiang Han, Hailong Yang, Inventchip Technology, China
- 11:45 Proof of Reliability of Electronic Systems By Means of Virtual Failure Injection and Hardware-in-the-loop**  
Levent Erguen, Roman Mueller-Hainbach, Stefan Butzmann, University of Wuppertal, Germany
- 12:10 Unsymmetrical IGBT Design for Three-Level NPC1 Converter in the Bi-Direction Power Conversion System**  
Heng Wang, Infineon, China

**Poster Gallery Poster Session**

**12:35 - 14:00**

**Advanced Power Devices I**

Chairperson: Youngchul Choi, Panjit International, United States

- PP001 Research on Photovoltaic Grid Connected System Based on MMC**  
Yannan Yu, Jichi Yan, Rongliang Shi, Guilin University of Technology, China  
Rongfeng Yang, Jimei University, China
- PP002 Study on IMC Growth Behavior during Process and Reliability Testing of IGBT Module**  
XianKun Zhang, Jie Fang, NingHua Xu, Xiong Zeng, Zhuzhou CRRC Times Semiconductor, China
- PP003 Effect of Aluminum Wire Property on Wire Bonding Performance of IGBT Module**  
Huanhuan Dong, Xingyao Han, Xinqiang He, Jie Fang, Ninghua Xu, Zhuzhou CRRC Times Semiconductor, China
- PP004 On-State Characteristics Measurement of SiC MOSFET**  
Xiaoguang Chai, Institute of Electrical Engineering Chinese Academy of Sciences, China
- PP005 High Power Density Low Loss 3600A/1700V IGBT E3 Module with New Generation IGBT Technology**  
Xubin Ning, Zhonghua Zhang, Yuan Teng, Wang Hui, Xiao Qiang, Rongzhen Qin, Haihui Luo, Zhuzhou CRRC Times Electric, Zhuzhou, China

- PP006 Turn-Off Switching Loss Analysis Associated With Channel Path in Super Junction MOSFET**  
Geunhyoung Lee, Soohyun Kang, Youngjin Kang, Junhee Jung, ON Semiconductor, Republic of Korea
- PP007 Robust Buffer Layer of 650V Superjunction MOSFET**  
Soohyun Kang, Geunhyoung Lee, Junhee Jung, Youngjin Kang, MK Ko, ON Semiconductor, Republic of Korea
- PP008 3D-Printed Fluid Cooler Baseplate for Si IGBT Modules**  
David Buendgen, Alexander Stippich, Rik W. De Doncker, Institute of Power Electronics and Electrical Drives – RWTH Aachen, Germany
- PP009 New Generation Low Inductance 3300V/450A Full SiC Power Module for Railway Traction Application**  
Guangyuan Qin, Haotao Ke, Guozhong Dong, Guiqin Chang, Yongdian Peng, Zhuzhou CRRC Times Electric, China

### Advanced Power Devices II

Chairperson: Enrique J. Dede, ETSE University of Valencia, Spain

- PP010 Sic Power Device Hammer and Burn-In System**  
Zhong Ye, Hailong Yang, Inventchip Technology, China  
Zhenye Wang, Shanghai University, China
- PP011 Cascaded Control of High-Frequency Bidirectional Multi-Phase Boost Converters Implemented on Low-Cost FPGA**  
Alexander Sewergin, Arne Hendrik Wienhausen, Christoph H. van der Broeck, Rik W. De Doncker, Institute for Power Electronics and Electrical Drives (ISEA), RWTH Aachen University, Germany
- PP012 Advanced 3.3kV Full SiC MOSFET Module for Vehicle Control Metro inverters**  
Bo Hu, Jian Sun, Gaosheng Song, Mitsubishi Electric & Electronics (Shanghai), China  
Junya Sakai, Mitsubishi Electric, Japan
- PP013 Effect of Process and Surface Metallization on Interfacial Reaction of Silver Sintered Joint for Power Devices**  
Haoliang Zhang, Jie Fang, Ninghua Xu, Zhuzhou CRRC Times Semiconductor, China

**PP014 Experimental Analysis of the Current Carrying Capacity of Discrete IGBTs in TO-247-Based Packages**

Hao Zhang, Infineon Technologies, China

Klaus Sobe, Nauman ul Haque, Lisa Engl, Infineon Technologies, Austria

**PP015 Balancing the Switching Losses of Paralleled SiC MOSFETs Using an Intelligent Gate Driver**



Christoph Lüdecke, Finn Krichel, Michael Laumen, Rik W. De Doncker, ISEA - RWTH Aachen University, Germany

**PP016 Designing a High Reliability and Rapid Short Circuit Protection SiC MOSFETs Gate Driver for xEV Drivetrain Inverter**

Chunxian Ye, Shenzhen Advantage Power, China

Hao Zhou, South China University of Technology, China

**Room 1**

**High Power Devices**

Chairperson: Guoqiang Zhang, Harbin Institute of Technology, China

**14:00 Determination of commutation inductance for High-Power Semiconductors on a 3-phase DC-Link**

Xiaoming Liu, Semikron Electronics (Zhuhai), China

Andreas Giessmann, Semikron Electronics (Zhuhai), China

**14:25 4500V Hipak Module with 1500A Current Rating and 150°C Capability for Various Applications**

Evgeny Tsyplakov, Maxi Andenna, Boni Boksteen, Makan Chen, ABB Power Grids Switzerland, Switzerland

**14:50 The Application Benefit of X-series 6.5kV/900A HVIGBT for Rolling Stock**

Junya Sakai, Kenji Hatori, Kazuhiro Kurachi, Mitsubishi Electric, Japan

Bo Hu, Gaosheng Song, Mitsubishi Electric & Electronics (Shanghai), China

15:15 Coffee break

**15:30 1200V/600A S3+ IGBT Module with Fine Geometry Trench IGBT Technology for EV/HEV Application**

Haibo Xiao, Wei Liu, Teng Yuan, Yao Yao, Zhonghua Zhang, Wei Hu, Haihui Luo, Zhuzhou CRRC Times Electric, China

- 15:55 High Reliability HPnC module for Traction Applications with 7th Generation IGBT technology**  
Kenichi Yoshida, Hiroaki Ichikawa, Sousei Chen, Taku Takaku, Yasuyuki Kobayashi, Fuji Electric, Japan  
Jun Li, Song Chen, Fuji Electric China, China

## Room 2

### Intelligent Gate Drive

Chairperson: Zhihong Wu, Tongji University, China

- 14:00 An Intelligent Integrated IGBT Gate Driver with Gate Side Collector Current Sensing**  
Rophina Li, Mengqi Wang, Jingshu Yu, Weijia Zhang, Wai Tung Ng, University of Toronto, Canada  
Masahiro Sasaki, Tetsuya Kawashima, Haruhiko Nishio, Nakajima Hiroyuki, Fuji Electric, Japan
- 14:25 Optimize Integrated Overcurrent Protection of Gate Drivers for Current Sense Range Extension**  
Elisabeth Preuss, Emanuel-Petre Eni, Wolfgang Frank, Infineon Technologies, Germany
- 14:50 Using 1200 V Three-Phase Gate Driver to Drive Sic MOSFETs**  
Jinsheng Song, Diego Raffo, Infineon Technologies, United States
- 15:15 Coffee break
- 15:30 Foldback Current Limiting Design and Optimization for Hot-Swap and E-Fuse ICs**  
Wenjing Zhang, ON Semiconductor, China
- 15:55 Digitally Controlled IGBT Gate Driver for HVDC Applications with Advance Protection Features in a Short-Circuit Type II Scenario**  
Richa Singh, Karsten Fink, Power Integrations, Germany

## 2<sup>nd</sup> July 2020, Thursday

### Room 1

#### 09:30 Keynote

#### The Latest Technical Trend of Power Devices for E-mobility

Speaker: Masahito Otsuki, Fuji Electric, Japan

Chairperson: Dehong Xu, Zhejiang University, China

10:10 Coffee break

### Room 1

#### Special Session 'High-speed Railway Power Traction'

Chairperson: Yongdong Li, Tsinghua University, China

**10:20 TBC**  
Yongdong Li, Tsinghua University, China

**10:45 TBC**  
Zhixue Zhang, CRRC Zhuzhou Institute, China

11:10 Coffee break


**11:25 TBC**  
Chenchen Wang, Beijing Jiaotong University, China

**11:50 TBC**  
Guofeng Yuan, North China University of Technology, China

### Room 2

#### Fast Switching Devices

Chairperson: Min Chen, Zhejiang University, China

**10:20 High dV/dt Controllability of 1.2kV TCIGBT through Dynamic Avalanche Elimination**  
 Peng Luo, Sankara Narayanan Ekkanath Madathil, University of Sheffield, United Kingdom  
Shin-ichi Nishizawa, Kyushu University, Japan  
Wataru Saito, Kyushu University, Japan

**10:45 New Generation 800V SUPERFET III MOSFET for High Efficiency and Reliability in Low Power Applications**  
Dongwook Kim, Wonsuk Choi, Sungnam Kim, Edward Kim, ON Semiconductor, Republic of Korea

11:10 Coffee break

**11:25 Optimum Selection Of In 650V SUPERFET III MOSFETs between System Efficiency, EMI and Reliability**  
Sungnam Kim, Wonsuk Choi, Dongwook Kim and Edward Kim, ON Semiconductor, Republic of Korea

**11:50 Thermal Management for Buck Converters Using Integrated Packaged GaN HEMTs**



Rophina Li , Weijia Zhang, Jingyuan Liang, Namjee Kim, Wai Tung Ng,  
University of Toronto, Canada  
Gaoqiang Deng, University of Electronic Science and Technology of China,  
China  
Fred Fu, GaN Power International, Canada

**Poster Gallery Poster Session**

**12:15 - 13:45**

**Advanced Power Devices III**

Chairperson: Lie Xu, Tsinghua University, China

**PP017 High Power and High Integration Transfer-Mold Type IPM**

Hongguang Huang, Mitsubishi Electric & Electronics (Shanghai), China  
Hongbo Zhang, Power Device Works, Mitsubishi Electric, Japan  
Jian Chen, Mitsubishi Electric GEM Power Device (Hefei), China

**PP018 A Half-Bridge LLC Converter Based on Digital Control**

Ciqian Liu, Jingang Han, Jianguo Song, Tianhao Tang, Shanghai Maritime  
University, China

**PP019 Simple Constitution Reducing Noise Peak Dc-Dc Converter  
Introducing Advanced Modulation Scheme**

Atsushi Hirota, Taikei Suyama, National Institute of Technology, Japan

**PP020 An Integrated Servo Motor with Self-Cooling Design by Using SiC  
MOSFET**

Heng Wang, Infineon, China

**PP021 Experiment Based Investigation of Thermal Cross Coupling of Multi-  
Chips in High Power IGBT modules**

Xin Ma, Heng Wang, Jia Zhao, Huibo Sun, Yong Yang, Infineon Integrated  
Circuit (Beijing), China

**PP022 Key Fatal Failures & Solutions in EV Power Magnetics**

Antonio Rojas, Ezequiel Navarro, Claudio Cañete, Miguel Angel Ariza,  
Premo, Spain

**PP023 Electric Vehicle Hybrid Power Supply Discharge Control Strategy**

Xiaodong Li, Yanjing Meng, Shanxi University of Science & Technology,  
China



- PP024 A Low Cost and High Efficiency Gate Driver for EV Module**  
Lizhong Zhao, Hongtao He, Mitsubishi Electric & Electronics (Shanghai),  
China
- PP025 Anti-interference Design of Over-temperature Protection for  
Automotive Power Module with On-chip Temperature Sensor**  
Baoqi Wang, Hongtao He, Gaosheng Song, Mitsubishi Electric &  
Electronics (Shanghai), China
- PP026 A Hybrid Si IGBT with Anti-Parallel SiC Diode Discrete Component in  
the Totem-Pole PFC of On-Board Charger**  
Rui Rong, Xinxu Cui, Infineon Integrated Circuit (Beijing), China  
Ajay Poonjal Pai, Lisa Marie Holzmann, Infineon Technologies, Germany

#### Advanced Power Devices IV

Chairperson: Yu-Kang Lo, Lite-On Technology, Tai Wan, China

- PP027 Power Semiconductor Reliability under High Humidity**  
Dan Zhu, Semikron Electronics (Zhuhai), China
- PP028 A Novel Distributed Heat Source Model For IGBT Module and  
Parameter Extraction Method**  
Jie Chen, Erping Deng, Zixuan Zhao, Yongzhang Huang, North China  
Electric Power University, China
- PP029 Comparison of Two Types of PR-Repetitive Control Strategies Applied  
to Static Var Generator**  
Lintao Ren, Fei Wang, Shanghai University, China
- PP030 Research on Security Boundary of Active Power Distribution System  
with Distributed Energy Storage**  
Qi Xiong, Chunxue Wen, North China University of Technology, China
- PP031 Flexible and General Strategy of Space Vector Modulation for  
Multilevel Converters**  
Pedro dos Santos, Mateo Maceiras, Steven Liu, TU Kaiserslautern,  
Germany
- PP032 Technical Cleanliness in Electronics Manufacturing**  
Jianguang Ji, Zestron China, China  
Michael Kövi, Zestron Europe, Germany

- PP033 Mitigation of IGBT Gate Oscillation during Short Circuit through Module Layout Improvement**  
Longgu Tang, HaotaoKe, Yuan Teng, Guangyuan Qin, Huiyu Feng, Wei Yu, Yongdian Peng, Zhuzhou CRRC Times Semiconductor, China
- PP034 Numerical and Experimental Study on Improving the Surge Current Capability of IGBT Power Modules**  
Haotao Ke, Yueping Deng, Yibo Wu, Jie Fang, Wei Yu, Guiqin Chang, Yongdian Peng, Zhuzhou CRRC Times Semiconductor, China
- PP035 Hardware-in-Loop Simulation of Real-Time Cyber-Physical System for DC Microgrids**  
Tianling Shi, Fei Wang, Zhen Ge, Lijun Zhang, Shanghai University, China  
Feng Ding, Shanghai Marine Equipment Research Institute, China
- PP036 Research on Key Control Strategies for MMC-HVDC System**  
Rui Zhao, Gaosheng Song, Mitsubishi Electric & Electronics (Shanghai), China

## Room 1

### Advanced Packaging Technologies

Chairperson: Norbert Pluschke, Semikron, HKSAR, China

- 14:00 All Sic Module for Traction Inverters with 1st Generation 3.3kv Trench Gate SiC MOSFETs**  
Yusuke Sekino, Takashi Tsuji, Takashi Shiigi, Ryosuke Usui, Makoto Utsumi, Susumu Iwamoto, Yoshiyuki Kusunoki, Manabu Takei, Yasuyuki Kobayashi, Hiroshi Kimura, Fuji Electric, Japan  
Song Chen, Fuji Electric China, China
- 14:25 Optimized Power Module Terminal Design for Higher Reliability**  
Jianwen Qiu, Semikron Electronics (Zhuhai), China
- 14:50 Fourth Generation Aluminum Direct Liquid Cooling Structure with High Cooling Performance and High Reliability for Automotive**  
Yuta Tamai, Ryoichi Kato, Hiromichi Gohara, Tomoyuki Yamazaki, Fuji Electric, Japan
- 15:15 Coffee break

**15:30 Power Package Attach by Silver Sintering – Process, Performance & Reliability**

Gyan Dutt, Matthew Siebenhuhnner, Jeffrey Durham, Oscar Khaselev, Monnir Bouregghda, Julien Joguet, MacDermid Alpha Electronics Solutions, United States

Maurizio Fenech, Liliyani Susanti, MacDermid Alpha Electronics Solutions, Germany

Wilson Wu, MacDermid Alpha Electronics Solutions, China

**15:55 Advanced Power Module Technologies for Wide Band Gap Devices**

Hsueh-Kuo Liao, Wei-Hao Chi, Yu-Wen Huang, Hao-Chih Chen, Hao-Chiang Hsu and Siao-Wei Guo, Delta Electronics, Taiwan, China

**Room 2**

**Advanced Power Converters Design**

Chairperson: Jianping Ying, Delta Electronics, China

**14:00 Comparison of Chip-Optimized Split Modules and Standard Half-Bridge Modules in 3-Level NPC and ANPC Topology**

Andreas Giessmann, Semikron Electronics (Zhuhai), China

**14:25 A DC-link Voltage Estimation Based Active Damping Control Method of Single-phase Reduced DC-link Capacitance Motor Drives**



Nannan Zhao, Gaolin Wang, Binxing Li, Shaobo Liu, Dianguo Xu, Harbin Institute of Technology, China

**14:50 Frequency-Division Decimation of RDFT for Selective Harmonic Suppression of 100kHz SAPF**

Haitao Lin, Hongwei Xu, Huazhong University of Science and Technology, China

15:15 Coffee break

**15:30 Research and Application of Solid State DC Circuit Breaker Based on SiC Series and Parallel**



Lifeng Qiao, Teng Liu, Jianping Ying, Dehui Zhang, Delta Electronics (Shanghai), China

**15:55 Estimation of the Battery Capacity in the Microgrid of a Nearly Zero Energy Building According to the Desired Degree of Energy Autonomy**

Christos Mademlis, Nikolaos Jabbour, Evangelos Tsioumas, Aristotle University of Thessaloniki, Greece

## 3<sup>rd</sup> July 2020, Friday

### Room 1

09:30 **Keynote**

#### **Compact and Reliable Isolated DC/DC and SiC Gate Driver for Automotive Application**

Speaker: Baoxing Chen, Analog Devices, United States

Chairperson: Gourab Majumdar, Mitsubishi Electric, Japan

10:10 Coffee break

### Room 1

#### **DC/DC Converters**

Chairperson: Xuhui Wen, Chinese Academy of Science, China

**10:20 Efficiency and Robustness Analysis of a Novel SiGe Diode Utilized in a High Frequency 48V/12V DC/DC Converter**

Ali Aneissi, Michael Meissner, Sebastian Klötzer, Klaus F.Hoffmann, Helmut Schmidt University, Germany

Reza Behtash, Sebastian Fahlbusch, Jan Fischer, Nexperia Germany, Germany

**10:45 GaN, SiC or Silicon Mosfet – A Comparison Based On Power Loss Calculations**

Shishir Rai, DiscoverEE, United States

11:10 Coffee break

**11:25 A DC/DC Buck-Boost Converter Control Using Sliding Surface Mode Controller and Adaptive PID Controller**

Bassem Saleh, Amr Wasfi, KarmSolar, Egypt

Ahmed Teirelbar, Freelance

**11:50 A High-Voltage Resonant LLC Converter Considering Effect of Diode Junction Capacitance on Soft-Switching Condition**

Runze Wang, University of Electronic Science and Technology of China, China

Xiong Xin, Shan Yin, China Academy of Engineering Physics, China.

### Room 2

10:20 **Tutorial**

#### **Modular Multilevel Converters – Operating Principles and Applications**

Speaker: Drazen Dujic, Stefan Milovanovic, Power Electronics Laboratory, EPFL, Switzerland

