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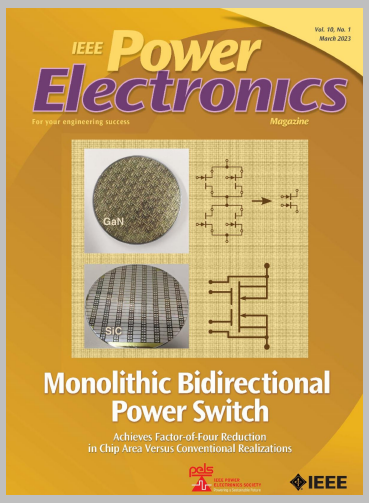
IEEE Power Electronics Magazine



In last 10 years or so, wide bandgap (WBG) devices, such as silicon carbide (SiC) and gallium nitride (GaN) power transistors, have made significant progress in reliability, performance, and cost, driving adoption of these devices in a wide range of applications. Now, the emergence of monolithic bidirectional power switches (MBDS) is expected to open many more opportunities for WBG devices. Some mass volume power applications ready to benefit from the control of bidirectional power include EVs, distributed and grid-tie power systems, solid-state circuit breakers and more.

Three cover features in the March 2023 issue of *IEEE Power Electronics Magazine* give us the current status in terms of device development and applications. The first cover feature "***The BiDFET Device and its Impact on Power Converters***" is by B. Jayant Baliga, Douglas Hopkins, Subhashish Bhattacharya, Aditi Agarwal, Tzu-Hsuan Cheng, Ramandeep Narwal, Ajit Kanale, Suyash Shah, and Kijeong Han. It presents improvements in Gen-2 SiC bidirectional FET (BiDFET). The second feature "***Monolithic Bidirectional Power Transistors: Opening New Horizons in Power Electronics***" by Jonas Huber, and Johann W. Kolar identifies converter families that will benefit from MBDS. While the third feature "***Power Conversion Systems Enabled by SiC BiDFET Device***" by Subhashish Bhattacharya and the NCSU team demonstrates the feasibility of matrix converter topologies using monolithic BiDFET.

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IEEE Transactions on Power Electronics (TPEL)

❶ The April 2023 **issue** of TPEL is now available online. Be sure to check out these

highlighted articles selected by TPEL editors.

"**Ensemble Learning and Voltage Reconstruction Based State of Health Estimation for Lithium-Ion Batteries With Twenty Random Samplings**" by Xing Shu, Zheng Chen, Jiangwei Shen, Shiquan Shen, Fengxiang Guo, Yuanjian Zhang, and Yonggang Liu. This manuscript presents smart learning algorithms for battery SOH evaluation.

"**Wafer-Level Fabricated Tight-Coupling Dual-Solenoid Transformer Chips With Watt-Scale Power Transfer**" by Changnan Chen, Pichao Pan, Dongfeng Lyu, Jiebin Gu, Min Liu, and Xinxin Li. The authors discuss a wafer-level integrated transformer working up to 100MHz.

❷ TPEL Special Sections

TPEL will have three special sections published in October of 2023.
1. Advanced WPT Systems with High Efficiency and Misalignment Tolerance Characteristics
2. Multilevel Converters as an Enabler for Grid Modernization
3. Switched Capacitor Converters (SCCs)

The Call for Papers can be accessed on the TPEL **website**. March 31, 2023 is the manuscript submission deadline.

IEEE Power Electronics Letters

In the March 2023 **issue**, 17 letters are featured that explore the latest advancements in various fields, including the advanced design of power modules, DC-DC and grid-connected converters, as well as power conversion improvements in cost, power quality, fault diagnosis, and more. Two interesting works from the issue are highlighted below.

"**A Piezoelectric-Resonator-Based DC–DC Converter Demonstrating 1 kW/cm3 Resonator Power Density**" by Jessica D. Boles, Joseph E. Bonavia, Jeffrey H. Lang, and David J. Perreault. Leveraging the recent decades developments on this unique technology, the designed converter exceeds the densities of previous designs and shows the significant miniaturization potential of piezoelectrics for power conversion.

"**Spectrum Estimation of Input Current Ripple on a Wide Class of Multilevel Grid-Tied Converters**" by Davide Biadene. This simple yet universal work provides a closed form of the input current spectrum of the multilevel converter to ease harmonic content estimations in input inductor/EMI filter design, which is relatively independent of the selected modulation scheme and topology.

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IEEE Open Journal of Power Electronics (OJPEL)

For its next collection of papers, **OJPEL** is featuring papers based on converters and chargers. Below are the links to the featured papers.

"**Miniaturization and Thermal Design of a 170 W AC/DC Battery Charger Utilizing GaN Power Devices**" by Julian Weimer, Dominik Koch, Maximilian Nitzsche, Jörg Haarer, Jörg Roth-Stielow, and Ingmar Kallfass.

"**A Fixed Frequency Zero-Voltage-Switching On-Board EV Charger**" by Changsheng Hu, Ruizhe Wang, Yunpeng Shi, Xiaoyu Jia, and Dehong Xu.

"**An Efficient PV Battery Charger/Harvester for Low Power Applications, Suitable for Heavily Overcast Operations**" by Maziar Rastmanesh, Ezz El-Masry, and Kamal El-Sankary.

"**Implementation of Time Division Multiplexing With Commercial Flyback Controller for Multi-Outputs USB Power Delivery Charger**" by Lingxiao Xue, Xingyue Tian, and Han Cui.

IEEE Transactions on Transportation Electrification (TTE)

The Special Issue on "Advanced Energy Storage Technologies and Safety Management for E-Mobility" is to be published soon! The safety of energy storage has been recognized as the most important concern for the future popularity of E-mobility. Focused on this topic, this special issue has attracted worldwide attention from both academia and industry. 28 papers among 117 submissions have been accepted for publication.

Some featured papers can be found in the early-access section of IEEE *Xplore* Digital Library. Two representative featured papers can be found as following.

"**Current Distribution and Anode Potential Modelling in Battery Modules with a Real-World Busbar System**" by Yaxing Ren, Kailong Liu, Thomas Grandjean, W. Dhammika Widanage, and James Marco.

"**Beyond Battery State of Charge Estimation: Observer for Electrode-Level State and Cyclable Lithium with Electrolyte Dynamics**" by Dong Zhang, Saehong Park, Luis D. Couto, Venkatasubramanian Viswanathan, and Scott

J. Moura.

IEEE Journal of Emerging and Selected Topics in Power Electronics (JESTPE)

JESTPE's next issue is coming in April. There are interesting articles scheduled for this issue, including some that are a part of the Special Issue on Integrated Control and Modulation for Electric Drives. For more information, visit the JESTPE **website**.

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