Call for Papers

IEEE Journal of Emerging and Selected Topics in Power Electronics

Special Issue on

High Power Density Power Converters Achieved by Device and Components Integration

High-density integration and miniaturization are constant trends in power electronics systems. The development of new generation semiconductor devices, as well as emerging applications such as AI computing and robotics, has increased the demand for high-density integration in power electronics. This demand aims to reduce volume, lower costs, improve efficiency, and enhance reliability. Miniaturization can be achieved at different levels, including the device and component level, converter level, and system level. Key factors for device-level miniaturization include low parasitic inductance and high thermal conductivity packaging, particularly for wide bandgap semiconductors that operate at high switching frequencies. Additionally, the use of new materials and structures for magnetics and capacitors plays a crucial role in reducing overall volume. At the converter level, integrated power electronics modules (PEBB) are essential for increasing power density. Advanced packaging technology for heterogeneous integration, such as granular power supply, is gradually merging into power electronics systems. Gate driving and soft switching are also key factors in achieving high-density integration of power converters. As volume decreases, managing thermal stress becomes a significant challenge for reliability, leading to the investigation of various thermal management techniques like microchannel and jet cooling.

The objective of this special issue is to encourage the scholarly community to explore multidisciplinary techniques for integrating devices, components, converters, and systems. The main focus is on achieving high-density integration to enhance system performance. Through in-depth examination of innovative solutions, we aim to advance high-density power converter technologies, ultimately driving the development of power electronics systems for new power systems. This special issue covers various topics, including but not limited to the following aspects:

Topics of interest include, but are not limited to:

- Monolithic Integrated Circuit
- Characteristics and Modeling of Power devices
- Packaging of Power Devices
- Gate Drive, Protection and Other Auxiliary Circuits
- High Temperature & High Voltage Dielectrics
- High Frequency, High Efficiency WBG Converters
- Reliability Assessment & Lifetime Prediction
- Electromagnetic Interference
- Power Management
- Integrated Magnetics
- Integrated Capacitors and Energy Storage
- Thermal Management
- High-Performance Passive Components
- System on Chip
- Granular Power Supply
- System Integrated Packaging & Manufacturing

All submissions should be made through *Manuscript Central* at http://mc.manuscriptcentral.com/jestpe-ieee. The cover page should be clearly marked with “High Density Integration of Devices, Components, Converters and Systems” and the appropriate manuscript type should be selected when uploading the submission. Manuscripts submitted for this special issue will be handled by the guest editorial board outlined below. For more information on special issues and electronic submissions, please go to http://www.ieee-pels.org/publications/jestpe.

Note: The core of JESTPE is power electronics, so papers must include power electronics contents, and experimental verification is compulsory, otherwise papers may be considered as out of scope".

Deadline for Submission of Manuscript: 31 January 2025

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- **Laili Wang** (Xi’an Jiaotong University, China)
- **Alan Mantooth** (University of Arkansas, USA)
- **Yan-Fei Liu** (Queen’s University, Canada)

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Proposed Timeline

- **20 Sep. 2024:** Call for papers to IEEE JESTPE Editorial Office
- **31 Jan. 2025:** Manuscript submission deadline
- **30 Apr. 2025:** Final acceptance notification
- **31 May 2025:** Manuscript forwarded to IEEE for publication
- **Aug. 2025:** Special Issue appears in IEEE JESTPE