

Call for Papers



IEEE Transactions on Power Electronics (TPEL) Special Section on Advancing Power Electronics Reliability: Components, Systems, and Intelligent Operation

Scheduled Publication Time: October 2024

Power electronics plays a pivotal role in various applications, ranging from renewable energy systems to electric vehicles, aerospace, industrial automation, HVDC, and more. Consequently, ensuring the reliability of power electronic components and systems becomes undoubtedly important. On the component level, SiC and GaN devices and new packaging materials are gaining prominence. Understanding the failure mechanisms, characterization techniques, and performance optimization of these new components is of utmost importance. On the system level, robust design methodologies, effective testing strategies, condition monitoring techniques, and artificial intelligence have shown tremendous potential in enhancing reliability.

This special issue tends to provide a platform to gather novel findings and cutting-edge developments with a target of addressing various facets of power electronics reliability, spanning from individual components to complex systems. Potential topics include, but are not limited to:

- Emerging devices (e.g., SiC, GaN) and their reliability considerations in power electronic applications.
- Reliability and characterization methods of power electronic components, with demonstrated utility for power-electronics metrics and/or power-electronic systems.
- Reliability testing standards, qualifications, platforms, and methodologies.
- New packaging materials and interconnection technologies, with a focus on power electronics applications
- Novel thermal modeling of power electronic components and systems.
- Robust design techniques and optimization methods for enhancing power electronics reliability.
- Fault diagnosis, prognosis, health monitoring, and predictive maintenance of power electronics.
- Reliability challenges and solutions for critical applications such as renewables, EVs, aviation, HVDC, etc.
- Reliability-oriented control and thermal management techniques.
- Integration of artificial intelligence for enhancing power electronics, including design optimization, health management, etc. Open-access data and algorithms through platforms like IEEE DataPort are encouraged.
- Intelligent operation for power electronics reliability, such as intelligent gate drivers, protection circuits, etc.

Note: If a submitted manuscript is found to have sole focus on component materials, device structures, physics of semiconductors, without any demonstrated utility for power-electronic applications, it may be returned/rejected without review.

All manuscripts must be submitted through ScholarOne at https://mc.manuscriptcentral.com/tpel-ieee. Submissions must be clearly marked "Special Section on Advancing Power Electronics Reliability: Components, Systems, and Intelligent Operation" on the cover page. When uploading your paper, please select your manuscript type "Special Section". Refer to https://www.ieee-pels.org/ for general information about electronic submission through ScholarOne. Manuscripts submitted for the special section will be reviewed separately and will be handled by the guest editorial board noted below.

Deadline for Submission of Manuscript: March 31, 2024

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Timeline

March 31, 2024 – Manuscripts Submission Deadline May 15, 2024 – Revised Manuscripts Submission Deadline June 30, 2024 – Final Acceptance Notification

July 31, 2024 - Manuscripts Forwarded to IEEE for Publication

October 2024 – Special Section Appears in IEEE TPEL