Call for Papers

CPSS Transactions on Power Electronics and Applications

Special Issue on Safety and Reliability of Power Electronics Components and Systems, 2023

Scheduled Publication Time: March 30, 2023

Efficiency and power density have been widely concerned with the development of power electronics, while the safety and reliability issues have been attracting more and more attention in a few years due to the increasingly stringent safety requirements, e.g., in electric vehicle and aerospace industries. To understand the failure mechanisms and the safe operation area of components/systems in practical applications, comprehensive testing methods considering the operating conditions are becoming essential. Besides accelerated aging tests, multi-physics modeling, physics-of-failure analyses, degradation modeling, electro-thermal simulation, and lifetime assessment contribute to a better understanding of the failure roots in components and systems and the design of a safer system. Moreover, designing condition monitoring and health status estimation tools, fault diagnosis, fault tolerance, and active thermal management techniques help to realize the predictive maintenance of power electronic components and systems. Finally, the emerging artificial intelligence (AI) and machine learning (ML) techniques are getting a lot of attention in aging data processing, remaining useful life estimation, etc.

This special issue aims to collect emerging research achievements within the scope of safety and reliability of power electronics components and systems (e.g., passive and magnetic components, SiC, GaN, and Si devices, sensors, batteries, connectors) and circuits. Prospective authors are invited to submit original contributions or survey papers for peer review for publication in CPSS Transactions on Power Electronics and Applications. Topics of interest in this Special Issue include, but are not limited to:

- Accelerated aging techniques and testing circuits
- Characteristic analysis and modeling of active/passive components and batteries
- Failure mechanism and failure modes of power electronic components and systems
- Component degradation modeling, thermal modeling, and lifetime modeling techniques
- Reliability prediction of power electronic components and systems
- Electro-thermal modeling and simulation of power electronic components/systems for lifetime assessment
- Reliability modeling and design in automotive, aircraft and space applications
- Reliability-oriented optimization in power electronics
- Life cycle cost and maintenance analysis of power electronic systems
- Active thermal management and advanced control algorithm with reliability
- Condition and safe monitoring techniques
- Emerging sensing and measurement technologies
- Fault diagnosis and fault tolerance strategy
- Failure analysis and failure propagation modeling
- AI and ML-assisted solutions for reliability management and assessment
- Digital twin technologies for reliability analysis, design, and maintenance

The manuscripts should be submitted through Manuscript Central at https://mc03.manuscriptcentral.com/tpea-cpss. Submissions must be clearly marked “Special Issue on Safety and Reliability of Power Electronics Components and Systems, 2023” on the cover page. The information about manuscript preparation and requirements is provided on http://tpea.cpss.org.cn/Home/Page?colId=dc338218-413b-45d5-8a23-cd91d6c90b2b. Manuscripts submitted to this Special Issue will be reviewed and handled by the guest editorial board as noted below.

Deadline for Submission of Manuscripts: December 15, 2022

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Proposed Timeline:

- December 15, 2022 – Manuscripts submission deadline
- January 15, 2023 – Final acceptance notification
- March 30, 2023 – Camera-ready manuscripts for publication