



Call for Papers

IEEE Transactions on Power Electronics (TPEL)

Special Section on High-Power Electronics for Modern Energy Grids

Scheduled Publication Time: October 2026

The rapid transition toward low-carbon and sustainable energy systems is driving unprecedented demand for high-power electronic technologies. Against the backdrop of growing renewable energy generation, large-scale electrification in transportation and industry, and increasingly complex power networks, medium- and high-voltage converters have become indispensable. They facilitate the efficient integration of intermittent renewable sources, enable reliable long-distance energy transmission, and enhance the flexibility and stability of the grid—thereby playing a central role in shaping modern energy infrastructures.

In parallel, foundational technologies supporting high-power electronics are advancing rapidly. Major breakthroughs are being made in areas such as novel semiconductor device design, advanced packaging, thermal management, and intelligent gate-drive solutions, all contributing to improved capacity and efficiency. Furthermore, research and development on converter topologies and control strategies, interactions among multiple converters, and advanced sensing and monitoring techniques is gaining importance under high-power scenarios aiming for enhanced robustness and reliability.

The objective of this Special Section is to bring together researchers, engineers, and practitioners to showcase and advance the state of the art in high-power electronics and their applications in modern energy systems. Emphasis will be placed on innovative device technologies, application-driven solutions, as well as emerging methods in modeling, control, hardware integration, and reliability. By addressing these diverse yet interconnected topics, this Special Section aims to foster knowledge exchange, highlight practical implementations, and accelerate the development of intelligent, efficient, and resilient high-power electronic systems for tomorrow's grid.

The scope of this Special Section includes, but is not limited to, the following areas:

- Fundamental and practical advancements of high-power semiconductor devices (Si, SiC, GaN, etc.), covering advanced chip design, packaging technologies, thermal management, intelligent gate drives, and overload capacity enhancement.
- Applications and implementations of high-power electronics in the electrified power systems, such as large-scale renewable energy integration, grid-forming strategies, HVDC systems, power supplies for hyperscale data centers, hydrogen-grid coordination, and grid-scale energy storage technologies.
- Novel topologies for high-voltage electronic systems—including AC/DC converters, hybrid DC transformers and breakers, and FACTS devices—alongside their hardware implementation, dynamic interactions, and integration with measurement, control, and communication infrastructures.
- Modeling and simulation methodologies of high-power electronics, including equivalent circuit models, DC and AC cable modeling, simulation tools, and digital real-time simulation for high-power converters.
- Hardware design and integration of high-power electronics for high-voltage applications, addressing mechanical structures, insulation coordination, EMI/EMC considerations, and testing techniques.
- Robustness and reliability of high-power electronic equipment, with emphasis on online monitoring, predictive maintenance, and coordination between converter control and grid protection.

All manuscripts must be submitted through ScholarOne at <https://mc.manuscriptcentral.com/tpel-ieee>. Submissions must be clearly marked “Special Section on High-Power Electronics for Modern Energy Grids” on the cover page. **Hardware based experimental results are desired to support proposed ideas.** 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, 2026

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Timeline

- March 31st, 2026 Manuscripts Submission Deadline
- May 15th, 2026 Revised Manuscripts Submission Deadline
- June 30th, 2026 Final Acceptance Notification
- July 31st, 2026 Manuscripts Forwarded to IEEE for Publication
- October, 2026 Special Section Appears in IEEE TPEL

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