Power electronic converters are widely used to power miniaturized electronic devices in many important applications, such as communication base stations, data centers, wearable devices, smart homes and energy harvesting. However, power electronic converters are often affected by mechanical, electrical and thermal stresses, which contributes to increased equipment failures. Considering failed components may cause unexpected interruptions and serious safety issues, it is becoming even more important to improve the reliability of power electronic components and circuits.

The call for paper of the Special Issue on Emerging Technologies for Highly-Reliable Power Electronic Systems in Miniaturized Electronic Devices was published in May 2022. We received eight submissions in total. Reviews were promptly organized by Guest Editors from China and Europe. Reviewers are invited from all over the globe. After rigorous reviews, five papers were accepted. Each of these accepted papers addresses one particular challenge with innovative solutions.

The paper by Y. Song and her coauthors from Shandong University (Weihai) and Beijing Jiaotong University presents an improved parallel five-level reinjection current source converter for self-commutation of thyristor converter. The simulation and experimental results verify the effectiveness of the proposed reinjection circuit driving method.

The paper by F. Yang and his coauthors from China University of Mining and Technology and Zhengzhou University proposes a method considering different thermal stresses and fault tolerance capacity is proposed to analyze the reliability of switched reluctance generators. The results show that the two-level Markov model is the most suitable when compared to the static model and the one-level Markov model.

The paper by A. Sajja and his coauthors from Anurag University and K L University presents a chopper-stabilized amplifier with a cascaded operational transconductance amplifier. The total power consumption is 451 nW with a supplied voltage of 800 mV. The Gain and common mode rejection ratio are 48 dB and 78 dB, respectively.

The paper by M. Dai and his coauthors from Civil Aviation Flight University of China presents a dc-port voltage balance strategy for three-phase cascaded H-bridge rectifier based on logic combination modulation, which can work reliably and quickly no matter facing the problem as load-removed change or the ordinary operating conditions.

The paper by H. Chen and his coauthors from China University of Mining and Technology, University of Engineering and Technology, Saint Petersburg National Research University of Information Technologies Mechanics and Optics, National Research University Moscow Power Engineering Institute, Asian University, West Pomeranian University of Technology and Peter the Great St Petersburg Polytechnic University presents a power converter and its control strategy to improve the efficiency of switched reluctance generators (SRGs). The results show that the SRG system can keep smooth operation by the full-bridge power converter with relatively high efficiency.

We appreciate the efforts from all authors who had submitted papers and we appreciate timely reviews from reviewers, especially at this time of difficulty. We would like to express our deep gratefulness to Prof John Karl Atkinson, Editor-in-Chief, for his tremendous support from the initiative throughout the final stages of this Special Issue. Finally, we would like to thank the Microelectronics International staff involved with the production and technical support of this Special Issue. We look forward to seeing more great papers on Emerging Technologies for Highly-Reliable Power Electronic Systems in Microelectronics International in the time yet to come and your continuous support of the journal.

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