Enhanced four-port dual-active-bridge converter employing power decoupling capability for DC microgrid islanding mode operation
K.-W. Heo · C.-W. Yun · G.-G. Jung · J.-S. Lee · H.-S. Kim · J.-H. Jung 171

Cascaded controllable source circuit and control of electromagnetic transmitters for deep sea exploration
H. Tao · N. Yang · H. Wang 181

Family of boost and buck-boost converters with continuous input current and reduced semiconductor count for hybrid energy systems
S. Miao · X. Luo · W. Liu · Y. Jin 192

Cascaded controllable source circuit and control of electromagnetic transmitters for deep sea exploration
H. Tao · N. Yang · H. Wang 181

Family of boost and buck-boost converters with continuous input current and reduced semiconductor count for hybrid energy systems
S. Miao · X. Luo · W. Liu · Y. Jin 192

MOTOR DRIVES

Current boundary-based predictive current control of induction machines with lower switching frequencies
X. Qi · C. Wang · B. Tian · M. Pacas · X. Shu · A. Jia 204

Efficiency optimization control of permanent magnet synchronous motors for pure electric vehicles based on GBDT
F. Xie · H. Wang · S. Ni · C. An 215

Temperature field and demagnetization analysis of in-wheel motors based on magneto-thermal two-way coupling
X. Wang · J. Zhang · C. Ou · C. Zhou 227

Research on overvoltage suppression of three-level converter based on two-three phase mixed conduction mode
S. Zhao · C. Ye · S. Wan 239

Disturbance observer based non-singular fast terminal sliding mode control of permanent magnet synchronous motors
J. Jiang · H. Zhang · D. Jin · A. Wang · L. Liu 249

Fixed-time non-singular terminal sliding mode control for PMSM drive systems
H. Liu · K. Mei · L. Liu · Y. Chang · S. Ding · H. Zhang · J. Wang 258

SiC IGBT degradation mechanism investigation under HV-H3TRB tests
Z. Wu · Z. Dai · J. Zhou · H. Dong · W. Wang · F. Xie · H. Wang · J. Yan · X. Chen · S. Yang · F. Wu 305

Study of power diodes used for MRI applications
A. Nandawodkar · M. Singh · S. Kar 316

Three-dimensional magnetic field analytical model-based electromagnetic environment assessment of WPT systems
B. Wang · P. Tan · X. Zhangguan · G. Tan · X. Xu · Y. Wu 324

Further articles can be found at link.springer.com

Indexed in: Astrophysics Data System (ADS), AITI List, Babel, CLOCKSS, COBI, CNPIEC, Dimensions, EBSCO Academic Search, EBSCO Discovery Service, El Compendio, Google Scholar, Journal Citation Reports/Science Edition, Korean Citation Index (KCI), Naver, Norwegian Register for Scientific Journals and Series, OCLC WorldCat Discovery Service, Portico, ProQuest-Ekolsminne, ProQuest-Ekolsminne, SCoPUS, Science Citation Index Expanded (SCIE), TD Net Discovery Service, UGC-CARE List (India), WTI AG, Wanfang

Instructions for Authors for J. Power Electron. are available at www.springer.com/41236
Aims and Scope

The Journal of Power Electronics (JPE) publishes papers of a high technical standard with a suitable balance of practice and theory. It covers a wide range of applications and apparatus in the power electronics field. The scope of the JPE includes the following:

• Low Power Converter
• High Power Converters
• Motor Drives
• Grid and Power Quality
• Energy Management Systems
• Devices and Components
• Consumer Power Electronics
• Emerging Power Electronics

The official abbreviation is J. Power Electron.

Copyright Information

For Authors
As soon as an article is accepted for publication, authors will be requested to assign copyright of the article (or to grant exclusive publication and dissemination rights) to the publisher (respective the owner if other than Springer Nature). This will ensure the widest possible protection and dissemination of information under copyright laws.

More information about copyright regulations for this journal is available at www.springer.com/43236

For Readers
While the advice and information in this journal is believed to be true and accurate at the date of its publication, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may have been made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, on video disks, etc., without first obtaining written permission from the publisher (respective the copyright owner if other than Springer Nature). The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.

Springer Nature has partnered with Copyright Clearance Center’s RightsLink service to offer a variety of options for reusing Springer Nature content. For permission to reuse our content please locate the material that you wish to use on link.springer.com or on springerimages.com and click on the permissions link or go to copyright.com and enter the title of the publication that you wish to use. For assistance in placing a permission request, Copyright Clearance Center can be contacted directly via phone: +1-855-239-3415, fax: +1-978-646-8600, or e-mail: info@copyright.com
© The Korean Institute of Power Electronics 2024

Journal Website

www.jpels.org
www.springer.com/43236
For the actual version of record please always check the online version of the publication.

Subscription Information

Journal of Power Electronics is published every month (12 times per year). Volume 24 (12 issues) will be published in 2024.
ISSN: 1598-2092 print
ISSN: 2093-4718 electronic
For information on subscription rates please contact Springer Nature Customer Service Center: customerservice@springernature.com

Advertisements

E-mail contact: anzeigen@springer.com

Disclaimer

Springer Nature publishes advertisements in this journal in reliance upon the responsibility of the advertiser to comply with all legal requirements relating to the marketing and sale of products or services advertised. Springer Nature and the editors are not responsible for claims made in the advertisements published in the journal. The appearance of advertisements in Springer Nature publications does not constitute endorsement, implied or intended, of the product advertised or the claims made for it by the advertiser.

Office of Publication

Springer Nature Singapore Pte Ltd. / Springer Singapore
Springer is part of Springer Science+Business Media

Funding

This work was supported by the Korean Federation of Science and Technology Societies Grant funded by the Korean Government (Ministry of Education)

Co-Publisher

The Korean Institute of Power Electronics
HIGH POWER CONVERTERS

Enhanced four-port dual-active-bridge converter employing power decoupling capability for DC microgrid islanding mode operation
K.-W. Heo · C.-W. Yun · G.-G. Jung · J.-S. Lee · H.-S. Kim · J.-H. Jung  171

Cascaded controllable source circuit and control of electromagnetic transmitters for deep sea exploration
H. Tao · N. Yang · H. Wang  181

Family of boost and buck-boost converters with continuous input current and reduced semiconductor count for hybrid energy systems
S. Miao · X. Luo · W. Liu · Y. Jin  192

MOTOR DRIVES

Current boundary-based predictive current control of induction machines with lower switching frequencies
X. Qi · C. Wang · B. Tian · M. Pacas · X. Shi · A. Jia  204

Efficiency optimization control of permanent magnet synchronous motors for pure electric vehicles based on GBDT
F. Xie · H. Wang · S. Ni · C. An  215

Temperature field and demagnetization analysis of in-wheel motors based on magneto-thermal two-way coupling
X. Wang · J. Zhang · C. Qu · C. Zhou  227

Research on overvoltage suppression of three-level converter based on two-three phase mixed conduction mode
S. Zhao · C. Ye · S. Wan  239

Disturbance observer based non-singular fast terminal sliding mode control of permanent magnet synchronous motors
J. Jiang · H. Zhang · D. Jin · A. Wang · L. Liu  249

Fixed-time non-singular terminal sliding mode control for PMSM drive systems
H. Liu · K. Moi · L. Liu · Y. Chang · S. Ding · H. Zhang · J. Wang  258

DEVICES AND COMPONENTS

Systematic study on temperature and time-varying characteristics of SiC MOSFET static parameters at 200 °C
X. Ma · J. Wang · L. Ding  269

Loss and efficiency comparisons of single-phase full-bridge inverters according to switch structures

Accurate segmented equivalent circuit-based calculation approach for non-ideal stranded Litz wire leakage energy
B. Chen · P. Jiang · N. Wan · B. Tang  292

SIC IGBT degradation mechanism investigation under HV-MTTRB tests
Z. Wu · Z. Dai · J. Zhou · H. Dong · W. Wang · F. Xie · H. Wang · J. Yan · X. Chen · S. Yang · F. Wu  305

Study of power diodes used for MRI applications
A. Nandawodekar · M. Singh · S. Kar  316

EMERGING POWER ELECTRONICS

Three-dimensional magnetic field analytical model-based electromagnetic environment assessment of WPT systems
B. Wang · P. Tan · X. Zhangguan · G. Tan · X. Xu · Y. Wu  324

Further articles can be found at link.springer.com

Indexed in: Astrophysics Data System (ADS), BTW, Bowes, CLOCKS, CNKI, CNPIEC, Dimensions, EBSCO Academic Search, EBSCO Discovery Service, El Compendex, Google Scholar, Journal Citation Reports/Science Edition, Korea Citation Index (KCI), Naver, Norwegian Register for Scientific Journals and Series, OCLC WorldCat Discovery Service, Portico, ProQuest-ExLibris Primo, ProQuest-ExLibris Summon, SCImago Journal & Country Rank, SCOPUS, Science Citation Index Expanded (SCIE), TD Net Discovery Service, USC-CARK List (Tera), WTI AG, Wanfang

Instructions for Authors for J. Power Electron. are available at www.springer.com/43236
# Table of Contents

## Journal of Power Electronics Vol. 24, No. 2 February 2024

### High Power Converters

**Enhanced four-port dual-active-bridge converter employing power decoupling capability for DC microgrid islanding mode operation**  
Kyung-Wook Heo, Chang-Woo Yun, Gwon-Gyo Jung, Jun-Suk Lee, Ho-Sung Kim, Jee-Hoon Jung 171

**Cascaded controllable source circuit and control of electromagnetic transmitters for deep sea exploration**  
Haijun Tao, Naitong Yang, Hongyi Wang 181

**Family of boost and buck-boost converters with continuous input current and reduced semiconductor count for hybrid energy systems**  
Shan Miao, Xinyuan Luo, Wei Liu, Yang Jin 192

### Motor Dives

**Current boundary-based predictive current control of induction machines with lower switching frequencies**  
Xin Qi, Chenyu Wang, Boxuan Tian, Mario Pacas, Xiangyang Shi, Aibin Jia 204

**Efficiency optimization control of permanent magnet synchronous motors for pure electric vehicles based on GBDT**  
Fang Xie, Houying Wang, Shilin Ni, Chaochen An 215

**Temperature field and demagnetization analysis of in-wheel motors based on magneto-thermal two-way coupling**  
Xiuping Wang, Jiawei Zhang, Chunyu Qu, Chuqiao Zhou 227

**Research on overvoltage suppression of three-level converter based on two-three phase mixed conduction mode**  
Sifeng Zhao, Caiyong Ye, Shanming Wan 239

**Disturbance observer based non-singular fast terminal sliding mode control of permanent magnet synchronous motors**  
Junjie Jiang, Housheng Zhang, Duo Jin, Ao Wang, Longhao Liu 249

**Fixed-time non-singular terminal sliding mode control for PMSM drive systems**  
Huixiang Liu, Keqi Mei, Lu Liu, Yafei Chang, Shihong Ding, Hanzhang Zhang, Jun Wang 258

### Devices and Components

**Systematic study on temperature and time-varying characteristics of SiC MOSFET static parameters at 200 °C**  
Xiao Ma, Jianing Wang, Lijian Ding 269

**Loss and efficiency comparisons of single-phase full-bridge inverters according to switch structures**  
So-Jeong Kong, Young-Joo Kim, Jin-Su Kim, Jae-Hyuck Choi, Jun-Young Lee 281

**Accurate segmented equivalent circuit-based calculation approach for non-ideal stranded Litz wire leakage energy**  
Bin Chen, Pengfei Jiang, Nina Wan, Bo Tang 292

**SiC IGBT degradation mechanism investigation under HV-H3TRB tests**  
Ziming Wu, Zongbei Dai, Jian Zhou, Huafeng Dong, Wencan Wang, Feiwan Xie, Haoran Wang, Jiahui Yan, Xiyu Chen, Shaohua Yang, Fugen Wu 305

**Study of power diodes used for MRI applications**  
Ajit Nandawadekar, Mukhtiar Singh, Soumen Kar 316

### Emerging Power Electronics

**Three-dimensional magnetic field analytical model-based electromagnetic environment assessment of WPT systems**  
Bo Wang, Ping-an Tan, Xu Shangguan, Guang Tan, Xining Xu, Yanming Wu 324