Journal of Power Electronics
Volume 23 · Number 8 · August 2023

LOW POWER CONVERTERS
Bi-directional non-isolated impedance converter for extra low voltage battery system safety
A. Narula · V. Verma 1161
Inverse decoupling sliding mode control for multilevel buck converters in low-power applications
J. Wu · L. Luo · C. Wen · Q. Wang 1174

HIGH POWER CONVERTERS
Modified passivity-based control method for three-phase cascaded unidirectional multilevel converters
J. Kong 1185

Electrolytic capacitorless STATCOM with both inductive and capacitive VAR compensation modes
M.S. Ylan · Y. T. Jeon · M.A. Tawfik · A. Ahmed · J.-H. Park 1196

General method for state-space modeling and nonlinear control of single-phase cascaded multilevel inverters with LCL coupling
H.M. Mirali-A · M. Salmi · J. Soltani · A. Akbarimajd 1211

MOTOR DRIVES
Influence and optimization of split-winding on induction motor performance
H. Qu · K. He · R. Yi 1223

GRID AND POWER QUALITY
Bypass arm based DC fault isolation scheme for MMC-HVDC systems
Y. Wang · R. Sun · Y. Guo · K. Wang · J. Liang 1232

DEVICES AND COMPONENTS
Estimation of switching losses considering non-linear parasitic capacitances of GaN E-HEMT
I. Lee · D. Youn · Y. Cho 1243

ENERGIZING POWER ELECTRONICS
Fourier series-based analysis of class-D converters with asymmetrical control for inductive power transfer
A.D. Scher 1252

Power conversion system integrating OBC and LDC using tapped transformers for weight, volume, and cost reductions in electric vehicles
D.-H. Heo · Y.-G. Kwek · F.-S. Kang · B.-H. Lee 1262

CORRECTION
Correction: New power equalization modulation strategy for CHB seven-level inverters
J. Gu · R.-Z. Cai · X.-Y. Zhou · C. Ding · W.-J. Wang 1272

Further articles can be found at link.springer.com

Indexed in Astrophysics Data System (ADS), Baidu, CLOCKSS, CNKI, CNPIEC, Dimensions, EBSCO Academic Search, EBSCO Discovery Service, EI Compendex, Google Scholar, Journal Citation Reports/Science Edition, Korea Citation Index (KCI), Master, Norwegian Register for Scientific Journals and Series, OCLC WorldCat Discovery Service, Portico, ProQuest-E-Prints Pro, ProQuest-E-Library, Summon, SCImago, SCOPUS, Science Citation Index Expanded (SCIE), TD Net Discovery Service, UGC CARE List (India), Wt-Ag, Wanfang

Instructions for Authors for J. Power Electron. are available at www.springer.com/43236
Journal of Power Electronics

Editor-in-Chief
Kyo-Beum Lee, Ajou University, Suwon, Korea

Editors
Wook-Jin Lee, Publication Editor, Chungnam National University, Daejeon, Korea
Young-Doo Yoon, Publication Editor, Hanyang University, Seoul, Korea
Seung-Jin Choi, University of Ulsan, Ulsan, Korea
Jee-Hoon Jung, UNIST, Ulsan, Korea

Associate Editors
Dukju Ahn, Incheon National University, Incheon, Korea
Seong-Joo Ahn, Chonnam National University, Daejeon, Korea
Jong-Bok Baek, Korea Institute of Energy Research, Daejeon, Korea
Kausik Basu, Indian Institute of Science, Bengaluru, India
Honnyong Cha, Kyungpook National University, Daegu, Korea
Wu Chen, Southeast University, Nanjing, China
Chun-An Cheng, I-Shou University, Kaohsiung, Taiwan
Younghoon Cho, Konkuk University, Seoul, Korea
Uimin Choi, Seoul National University of Science and Technology, Seoul, Korea
Pourya Davari, Aalborg University, Aalborg, Denmark
Anton Dianov, Samsung Electronics, Suwon, Korea
Xiaojian Guo, Yanshan University, Qinhuangdao, China
Zhiqiang Guo, Beijing Institute of Technology, Beijing, China
Peng Han, Ansys, Inc, San Jose, USA
Seon-Hwan Hwang, Kyungnam University, Changwon, Korea
Byungtaek Kim, Kunsan National University, Gunsan, Korea
Jonghoon Kim, Chungnam National University, Daejeon, Korea
Sungmin Kim, Hanyang University, EERICA Campus, Ansan, Korea
Sangmin Kwak, Chung-ang University, Seoul, Korea
Byoung-Hee Lee, Hanbat National University, Daejeon, Korea
Dong-Hee Lee, Kyungsung University, Busan, Korea
June-Seok Lee, Dankook University, Cheonan, Korea
Kibok Lee, Korea University, Seoul, Korea
Seongjun Lee, Chosun University, Gwangju, Korea
Xiao Li, Beihang University, Beijing, China
Fuxin Liu, Nanjing University of Aeronautics and Astronautics, Nanjing, China
Jianxing Liu, Harbin Institute of Technology, Harbin, China
Saad Mekhilef, University of Malaya, Kuala Lumpur, Malaysia
Jinyeong Moon, Florida State University, Tallahassee, USA
Woonki Na, California State University, Fresno, USA
Minh-Khai Nguyen, Ho Chi Minh City University of Technology and Education, Ho Chi Minh City, Vietnam
Joung-Hu Park, Soongsil University, Seoul, Korea
N. Prabaharan, SASTRA Deemed University, Thanjavur, India
Mattia Rico, Alma Mater Studiorum University of Bologna, Bologna, Italy
Subham Sahoo, Aalborg University, Aalborg, Denmark
Ariya Sangwongwanich, Aalborg University, Aalborg, Denmark
Gabsu Seo, Power Systems Engineering Center, National Renewable Energy Laboratory, Golden, USA
Jongwon Shin, Chung-Ang University, Seoul, Korea
Kai Song, Harbin Institute of Technology, Harbin, China
Kai Sun, Tsinghua University, Beijing, China
Xiaodong Sun, Jiangsu University, Zhenjiang, China
Gaolin Wang, Harbin Institute of Technology, Harbin, China
Wei Wang, Southeast University, Nanjing, China
Yijie Wang, Harbin Institute of Technology, Harbin, China
Huilong Wen, Xi’an Jiaotong-Liverpool University, Suzhou, China
Hongfei Wu, Nanjing University of Aeronautics and Astronautics, Nanjing, China
Kang-Hyun Yi, Daegu University, Gyeongsan, Korea
Zhonggang Yin, Xi’an University of Technology, Xi’an, China
Sang-Won Yoon, Hanyang University, Seoul, Korea
Liqiang Yuan, Tsinghua University, Beijing, China
Guoqiang Zhang, Harbin Institute of Technology, Harbin, China
Li Zhang, Hohai University, Nanjing, China
Yongchang Zhang, North China University of Technology, Beijing, China
Yun Zhang, Tianjin University, Tianjin, China

Advisory Board
Subhashish Bhattacharya, North Carolina State University, North Carolina, USA
Frede Blaabjerg, Aalborg University, Aalborg, Denmark
Dushan Boroyevich, Virginia Polytechnic Institute and State University, Blacksburg, USA
Liuchen Chang, University of New Brunswick, New Brunswick, Canada
Po-Tai Cheng, National Tsing Hua University, Hsinchu, Taiwan
Bo-Hyung Cho, Seoul National University, Seoul, Korea
Jaeho Choi, Chungbuk National University, Cheongju, Korea
Ilhami Colak, Nisantasi University, Istanbul, Turkey
Jung-Ik Ha, Seoul National University, Seoul, Korea
Dong-Seok Hyun, Hanyang University, Seoul, Korea
Atsuwawamuawa, Yokohama National University, Yokohama, Japan
Marian P. Kazmierkowski, Warsaw University of Technology, Warsaw, Poland
Ralph Kennel, Technical University of Munich, Munich, Germany
Johan W. Kolar, Swiss Federal Institute of Technology, Zurich, Switzerland
Fujio Kurokawa, Nagasaki Institute of Applied Science, Nagasaki, Japan
Dong-Choong Lee, Yeungnam University, Gyeongsan, Korea
Tsorng-Juu Liang, National Cheng-Kung University, Tainan, Taiwan
Jinjun Liu, Xi’an Jiaotong University, Xi’an, China
Sanjib Kumar Panda, National University of Singapore, Singapore
Fang-Z. Peng, Florida State University, Tallahassee, FL, USA
John Shen, Illinois Institute of Technology, Chicago, USA
Toshihisa Shimizu, Aalborg University, Aalborg, Denmark
Toshihisa Shimizu, Tokyo Metropolitan University, Tokyo, Japan
Seung-Ki Sul, Seoul National University, Seoul, Korea
Jian Sun, University, Tokyo, Japan
Toshihisa Shimizu, Tokyo Metropolitan University, Tokyo, Japan
Seung-Ki Sul, Seoul National University, Seoul, Korea
Jian Sun, Rensselaer Polytechnic Institute, New York, USA
Pat Wheeler, University of Nottingham, Nottingham, UK
Dehong Xu, Zhejiang University, Hangzhou, China

Managing Editor
Sejin Jung, The Korean Institute of Power Electronics Administrative Office, Seoul, Korea
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 2023

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 23 (12 issues) will be published in 2023.
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
LOW POWER CONVERTERS

Bi-directional non-isolated impedance converter for extra low voltage battery system safety
A. Narula · V. Verma 1161

Inverse decoupling sliding mode control for multilevel buck converters in low-power applications
J. Wu · L. Luo · C. Wen · Q. Wang 1174

HIGH POWER CONVERTERS

Modified passivity-based control method for three-phase cascaded unidirectional multilevel converters
J. Kong 1185

Electrolytic capacitorless STATCOM with both inductive and capacitive VAR compensation modes
M.S. Ylan · Y. T. Jeon · M.A. Tawfik · A. Ahmed · J.-H. Park 1196

General method for state-space modeling and nonlinear control of single-phase cascaded multilevel inverters with LCL coupling
H.M. Miralilu · M. Salimi · J. Soltani · A. Albarimajid 1211

MOTOR DRIVES

Influence and optimization of split-winding on induction motor performance
H. Qiu · K. He · R. Yi 1223

GRID AND POWER QUALITY

Bypass arm based DC fault isolation scheme for MMC-HVDC systems
Y. Wang · R. Sun · Y. Guo · K. Wang · J. Liang 1232

DEVICES AND COMPONENTS

Estimation of switching losses considering non-linear parasitic capacitances of GaN E-HEMT
J. Lee · D. Youn · Y. Cho 1243

EMERGING POWER ELECTRONICS

Fourier series-based analysis of class-D converters with asymmetrical control for inductive power transfer
A.D. Scher 1252

Power conversion system integrating OBC and LDC using tapped transformers for weight, volume, and cost reductions in electric vehicles
D.-H. Heo · Y.-G. Kwek · F.-S. Kang · B.-H. Lee 1262

CORRECTION

Correction: New power equalization modulation strategy for CHB seven-level inverters
J. Gu · R.-Z. Cai · X.-Y. Zhou · C. Ding · W.-J. Wang 1272

Further articles can be found at link.springer.com

Indexed in: Astrophysics Data System (ADS), BFI List, Beida, CLOCKSS, CNKI, CNPIEC, Dimensions, EBSCO Academic Search, EBSCO Discovery Service, EI Compendex, Google Scholar, Journal Citation Reports/Science Edition, Korea Citation Index (KCI), Naver, Norwegian Register for Scientific Journals and Series, OCLC WorldCat Discovery Service, ProQuest-ExLibris Primo, ProQuest-ExLibris Summon, SCOPUS, Science Citation Index Expanded (SCIE), TD Net Discovery Service, UGC-CARE List (India), WJ AG, Wanfang

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

**Journal of Power Electronics Vol. 23, No. 8 August 2023**

## Low Power Converters

Bi-directional non-isolated impedance converter for extra low-voltage battery system safety  
Aditya Narula, Vishal Verma  
1161

Inverse decoupling sliding mode control for multilevel buck converters in low-power applications  
Jiarong Wu, Liping Luo, Chunming Wen, Qingyu Wang  
1174

## High Power Converters

Modified passivity-based control method for three-phase cascaded unidirectional multilevel converters  
Jiayi Kong  
1185

Electrolytic capacitorless STATCOM with both inductive and capacitive VAR compensation modes  
Mohammad Sameer Irfan, Young-Tae Jeon, Mohamed Atef Tawfik, Ashraf Ahmed, Joung-Hu Park  
1196

General method for state-space modeling and nonlinear control of single-phase cascaded multilevel inverters with LCL coupling  
Hassan Manafi Miralilu, Mahdi Salimi, Jafar Soltani, Adel Akbarimajd  
1211

## Motor Dives

Influence and optimization of split-winding on induction motor performance  
Hongbo Qiu, Kun He, Ran Yi  
1223

## Grid and Power Quality

Bypass arm based DC fault isolation scheme for MMC-HVDC systems  
Yaoqiang Wang, Ruyin Sun, Yanxun Guo, Kewen Wang, Jun Liang  
1232

## Devices and Components

Estimation of switching losses considering non-linear parasitic capacitances of GaN E-HEMT  
Inwon Lee, Dongkwan Yoon, Younghoon Cho  
1243

## Emerging Power Electronics

Fourier series-based analysis of class-D converters with asymmetrical control for inductive power transfer  
Aaron Scher  
1252

Power conversion system integrating OBC and LDC using tapped transformers for weight, volume, and cost reductions in electric vehicles  
Dae-Ho Heo, Yun-Gi Kwak, Feel-Soon Kang, Byoung-Hee Lee  
1262

## Correction

Correction: New power equalization modulation strategy for CHB seven-level inverters  
Jun Gu, Run-Zhe Cai, Xiang-Yu Zhou, Chao Ding, Wei-Jian Wang  
1272