

ISSN 1598-2092
eISSN 2093-4718

Volume 24 • Number 11 • November 2024

JIPE

JOURNAL OF POWER ELECTRONICS



 THE KOREAN INSTITUTE OF
POWER ELECTRONICS

 Springer

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

Sung-Jin Choi, University of Ulsan, Ulsan, Korea

Jee-Hoon Jung, UNIST, Ulsan, Korea

Associate Editors

Dukju Ahn, Incheon National University, Incheon, Korea

Seon-Ju Ahn, Chonnam National University, Daejeon, Korea

Jong-Bok Baek, Korea Institute of Energy Research, Daejeon, Korea

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

Anton Dianov, Samsung Electronics, Suwon, Korea

Xiaoqiang Guo, Yanshan University, Qinhuangdao, China

Zhiqiang Guo, Beijing Institute of Technology, Beijing, China

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, ERICA Campus, Ansan, Korea

Sangshin 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

Minh-Khai Nguyen, General Motors Company, Warren, MI, USA

Joung-Hu Park, Soongsil University, Seoul, Korea

N. Prabaharan, SASTRA Deemed University, Thanjavur, India

Ariya Sangwongwanich, Aalborg University, Aalborg, Denmark

Gab-Su Seo, Power Systems Engineering Center, National Renewable Energy Laboratory, Golden, USA

Jongwon Shin, Seoul National University, Seoul, Korea

Kai Song, Harbin Institute of Technology, Harbin, China

Xiaodong Sun, Jiangsu University, Zhenjiang, China

Gaolin Wang, Harbin Institute of Technology, Harbin, China

Jiangfeng Wang, Southeast University, Nanjing, 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, Seoul National 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

Atsuo Kawamura, Yokohama National University, Yokohama, Japan

Marian P. Kazmierkowski, Warsaw University of Technology, Warsaw, Poland

Ralph Kennel, Technical University of Munchen, Munchen, Germany

Johan W. Kolar, Swiss Federal Institute of Tech., Zurich, Switzerland

Fujio Kurokawa, Nagasaki Institute of Applied Science, Nagasaki, Japan

Dong-Choon Lee, Yeungnam University, Gyeongsan, Korea

Tsrong-Juu Liang, National Cheng-Kung University, Tainan City, 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, 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

Journal of Power Electronics

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

The Americas (North, South, Central America and the Caribbean)
Springer Nature Journal Fulfillment
Harborside Plaza II, 200 Hudson Street,
Jersey City, NJ 07302, USA
Tel.: 800-SPRINGER (777-4643);
212-460-1500 (outside North America)

Outside the Americas
Springer Nature Customer Service Center
GmbH, Tiergartenstraße 15,
69121 Heidelberg, Germany
Tel.: +49-6221-345-4303

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

Single-phase and three-phase compatible isolated on-board charging system

K. Zhou · Y. Zhang · S. Chen 1695

Three-phase three-level boost inverter with self-balanced capacitor voltage

B. Hu · H. Yan · Z. Zhang · J. Linghu · Y. Liao · X. Long 1707

HIGH POWER CONVERTERS

Assessment of vertical shifted carrier schemes for sinusoidal pulsewidth modulation

B. Kadiyala · M. Paramasivan · R. Bensraj 1719

Sliding mode model predictive power control of single-phase active neutral point clamped five-level rectifiers

Y. Zhu · L. Xia · Y. Zhang · Z. Zhang · S. Li 1731

Thermal effectiveness of explosion-proof hoist inverter based on improved QD-MPCC

S.-Z. Xu · T.-Y. Pei · X. Yang · M. Feng 1742

MOTOR DRIVES

Experimental platform for studying energy regeneration in electric vehicle powertrains

J.D.O. Velasquez · J.A.G. Moreno · N.L.D. Aldana 1751

Fault-tolerant control of in-wheel switched reluctance motor drive systems for vehicles under regenerative braking condition

C. Xing · Y. Zhu · J. Wang · Y. Lin 1766

Online correction method for phase current gain errors in permanent magnet synchronous motor sensorless control

C. Wu · W. Sha · C. Zhu 1778

Performance improvement of induction motor drives in low-speed operation using gray wolf optimizer based on IFOC

N.S. Ramadhan · E. Purwanto · B. Sumantri · H. Oktavianto · M.R.D. Abdilla · A.A. Muntashir 1791

DEVICES AND COMPONENTS

Low static power consumption GaN-based CMOS-like inverter design

Z. Wang · J. Chen · Y. Su · X. Zhang · L. Zhao 1802

Series arc fault detection based on multi-domain depth feature association

N. Qu · W. Wei · C. Hu · S. Shi · H. Zhang 1809

CONSUMER POWER ELECTRONICS

Composite control strategy for wide-gain LLC resonant converters with photovoltaic energy storage inputs

X. Feng · R. Zhang · G. Zhou 1820

EMERGING POWER ELECTRONICS

Fast bus voltage detection method for single-phase power converters with split capacitors based on reduced-order generalized integrals

C. Zhang · Y. Guan · W. Zhu · R. Gao · Z. Wang · H. Fu 1831

High gain multi-input single-output DC-DC boost converter with enhanced circuit for photovoltaic applications

S. Ramprasath · C. Krishnakumar 1843

Photovoltaic DC arc fault detection method based on deep residual shrinkage network

P. Zhang · Y. Xue · R. Song · X. Ma · D. Sheng 1855

Further articles can be found at link.springer.com

Indexed in *Astrophysics Data System (ADS)*, *BFI List*, *Baidu*, *CLOCKSS*, *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*, *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/43236

Table of Contents

Journal of Power Electronics Vol. 24, No. 11 November 2024

Low Power Converters

| | | |
|--|--|------|
| Single-phase and three-phase compatible isolated on-board charging system | Kai Zhou, Yuxin Zhang, Simin Chen | 1695 |
| Three-phase three-level boost inverter with self-balanced capacitor voltage | Bihua Hu, Han Yan, Zhi Zhang, Jinqing Linghu, Yuqing Liao, Xiafei Long | 1707 |

High Power Converters

| | | |
|---|---|------|
| Assessment of vertical shifted carrier schemes for sinusoidal pulsewidth modulation | Bhavana Kadiyala, Muthukumar Paramasivan, R. Bensraj | 1719 |
| Sliding mode model predictive power control of single-phase active neutral point clamped five-level rectifiers | Yifeng Zhu, Leibin Xia, Yi Zhang, Ziyang Zhang, Shaoling Li | 1731 |
| Thermal effectiveness of explosion-proof hoist inverter based on improved QD-MPCC | Shi-Zhou Xu, Tian-Yi Pei, Xi Yang, Min Feng | 1742 |

Motor Drives

| | | |
|--|--|------|
| Experimental platform for studying energy regeneration in electric vehicle powertrains ... Julian David Ontibon Velasquez, Javier Antonio Guacaneme Moreno, Nelson Leonardo Diaz Aldana | | 1751 |
| Fault-tolerant control of in-wheel switched reluctance motor drive systems for vehicles under regenerative braking condition | Chao Xing, Yueying Zhu, Jiaying Wang, Yier Lin | 1766 |
| Online correction method for phase current gain errors in permanent magnet synchronous motor sensorless control | Chun Wu, Weimin Sha, Chunqiao Zhu | 1778 |
| Performance improvement of induction motor drives in low-speed operation using gray wolf optimizer based on IFOC | Nibras Syarif Ramadhan, Era Purwanto, Bambang Sumantri, Hary Oktavianto, Moch Rafi Damas Abdilla, Abdillah Aziz Muntashir | 1791 |

Devices and Components

| | | |
|---|--|------|
| Low static power consumption GaN-based CMOS-like inverter design | Zilong Wang, Jiawei Chen, Yue Su, Xu Zhang, Lixia Zhao | 1802 |
| Series arc fault detection based on multi-domain depth feature association | Na Qu, Wenlong Wei, Congqiang Hu, Shang Shi, Han Zhang | 1809 |

Consumer Power Electronics

| | | |
|---|---|------|
| Composite control strategy for wide-gain LLC resonant converters with photovoltaic energy storage inputs | Xingtian Feng, Rundong Zhang, Guangrui Zhou | 1820 |
|---|---|------|

Emerging Power Electronics

| | | |
|---|--|------|
| Fast bus voltage detection method for single-phase power converters with split capacitors based on reduced-order generalized integrals | Chao Zhang, Yunhai Guan, Wenchao Zhu, Rongwei Gao, Zhuo Wang, Haijun Fu | 1831 |
| High gain multi-input single-output DC-DC boost converter with enhanced circuit for photovoltaic applications | S. Ramprasath, C. Krishnakumar | 1843 |
| Photovoltaic DC arc fault detection method based on deep residual shrinkage network | Penghe Zhang, Yang Xue, Runan Song, Xiaochen Ma, Dejie Sheng | 1855 |