

ISSN 1598-2092
eISSN 2093-4718

Volume 21 • Number 4 • April 2021

JPE JOURNAL OF POWER ELECTRONICS

 THE KOREAN INSTITUTE OF
POWER ELECTRONICS

 Springer

Journal of Power Electronics

Editor-in-Chief

Jung-Ik Ha, Seoul National University, Seoul, Korea

Editors

Sung-Jin Choi, *Publication Editor*, University of Ulsan, Ulsan, Korea

Kyo-Beum Lee, *Publication Editor*, Ajou University, Suwon, Korea

Wook-Jin Lee, Chungnam National University, Daejeon, Korea

Young-Doo Yoon, Hanyang University, Seoul, Korea

Associate Editors

Dukju Ahn, Incheon National University, Incheon, Korea

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

Dianov Anton, Samsung Electronics, Suwon, 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

Pooya Davari, Aalborg University, Aalborg, Denmark

Xiaoqiang Guo, Yanshan University, Qinhuangdao, China

Zhiqiang Guo, Beijing Institute of Technology, Beijing, China

Peng Han, University of Kentucky, Lexington, USA

Seon-Hwan Hwang, Kyungnam University, Changwon, Korea

Jee-Hoon Jung, UNIST, Ulsan, Korea

Mehrdad Ahmadi Kamarposhti, Islamic Azad University, Jouybar, Iran

Byungtaek Kim, Kunsan National University, Gunsan, Korea

Jaehong Kim, Chosun University, Gwangju, Korea

Jonghoon Kim, Chungnam National University, Daejeon, 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

Seongjun Lee, Chosun University, Gwangju, Korea

Fuxin Liu, Nanjing University of Aeronautics and Astronautics, Nanjing, China

Jianxing Liu, Harbin Institute of Technology, Harbin, China

Hao Ma, Zhejiang University, Hangzhou, 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, Chosun University, Gwangju, Korea

Joung-Hu Park, Soongsil University, Seoul, Korea

N. Prabaharan, SASTRA Deemed University, Thanjavur, India

Mattia Ricco, Alma Mater Studiorum University of Bologna, Bologna, Italy

Gab-Su 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

Zheng Wang, Southeast University, Nanjing, China

Zhongbao Wei, Beijing Institute of Technology, Beijing, China

Huiqing 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

Xueguang Zhang, Harbin Institute of Technology, Harbin, 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

Braham Ferreira, Delft University of Technology, Delft, Netherlands

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

Tsorn-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, Michigan State University, East Lansing, 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 2021

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 21 (12 issues) will be published in 2021.

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

Highly isolated switching mode power supply for solid-state transformers in railway vehicles

Y. Lee · H. Bu · D. Lee · Y. Cho 625

Efficient single-phase full-bridge soft-switching inverter

Q. Wang · Y. Wang 634

HIGH POWER CONVERTERS

Fault-tolerant analysis of two boost inverters for open-end winding induction motor drives

C. Li · G. Wang · H. Li · F. Li · Z. Xia · Z. Liu 647

Optimization of an automotive power semiconductor switch module using inlay PCB technology

C.-W. Kim · H.-J. Do · T.-Y. Hwang · S.-H. Park 660

MOTOR DRIVES

Non-cascaded position controllers for servo motor drives

B.-G. Cho · C. Hong · J. Lee 672

Improved overmodulation technique for enhancing torque capability of inverter-driven AC motors

H.-I. Jeong · S.-H. Kim 683

Rotor position estimation over entire speed range of interior permanent magnet synchronous motors

H.-W. Lee · D.-H. Cho · K.-B. Lee 693

GRID AND POWER QUALITY

Simple current control without grid voltage sensor for traction solid-state transformer

C.-G. Yun · S. Baek · H. Bu · Y. Cho · J.-H. Park · M.-Y. Kim 703

DEVICES AND COMPONENTS

Channel current analysis of GaN HEMTs with source sense pin in DC/DC boost converters

B.T. Azizoglu · A. Balikci · E. Akpinar · E. Durbaba 713

EMERGING POWER ELECTRONICS

Adaptive coordinated control strategy for multi-terminal flexible DC transmission systems with deviation control

M. Mei · P. Wang · Y. Che · C. Xing 724

Further articles can be found at link.springer.com

Indexed in *Astrophysics Data System (ADS)*, *EBSCO Discovery Service*, *El Compendex*, *Google Scholar*, *Institute of Scientific and Technical Information of China*, *Journal Citation Reports/Science Edition*, *Naver*, *OCLC WorldCat Discovery Service*, *ProQuest-ExLibris Primo*, *ProQuest-ExLibris Summon*, *SCImago*, *SCOPUS*, *Science Citation Index Expanded (SciSearch)*, *TD Net Discovery Service*, *UGC-CARE List (India)*

Instructions for Authors for *J. Power Electron.* are available at www.springer.com/43236

Table of Contents

Journal of Power Electronics Vol. 21, No. 4 April 2021

Low Power Converters

Highly isolated switching mode power supply for solid-state transformers in railway vehicles	Yejun Lee, Hanyoung Bu, Dohong Lee, Younghoon Cho	625
Efficient single-phase full-bridge soft-switching inverter	Qiang Wang, Youzheng Wang	634

High Power Converters

Fault-tolerant analysis of two boost inverters for open-end winding induction motor drives	Chunjie Li, Guifeng Wang, Hongmei Li, Fei Li, Zhenglong Xia, Zhan Liu	647
Optimization of an automotive power semiconductor switch module using inlay PCB technology	Chae-Won Kim, Han-Jin Do, Tae-Young Hwang, Shi-Hong Park	660

Motor Drives

Non-cascaded position controllers for servo motor drives	Byung-Geuk Cho, Chanook Hong, Jeongjoon Lee	672
Improved overmodulation technique for enhancing torque capability of inverter-driven AC motors	Hye-In Jeong, Sang-Hoon Kim	683
Rotor position estimation over entire speed range of interior permanent magnet synchronous motors	Hyung-Woo Lee, Dae-Hyun Cho, Kyo-Beum Lee	693

Grid and Power Quality

Simple current control without grid voltage sensor for traction solid-state transformer	Chun-Gi Yun, Seunghoon Baek, Hanyoung Bu, Younghoon Cho, Jin-Hyuk Park, Myung-Yong Kim	703
--	--	-----

Device and Components

Channel current analysis of GaN HEMTs with source sense pin in DC/DC boost converters	Buket Turan Azizoglu, Abdul Balikci, Eyup Akpinar, Enes Durbaba	713
--	---	-----

Emerging Power Electronics

Adaptive coordinated control strategy for multi-terminal flexible DC transmission systems with deviation control	Mingwan Mei, Ping Wang, Yanbo Che, Chao Xing	724
---	--	-----