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An Independently Controlled Two Output Half Bridge Resonant LED Driver

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Abstract

In this research work, an independently controlled two output half-bridge resonant LED driver is proposed. Half bridge series converters will be providing power to two LED lamps. The devices in half-bridge converter are switched at zero voltage using LC resonant circuit. Therefore, switching transition power losses are minimized which increases the LED driver efficiency. Each LED lamp's ripple current is decreased by adding an inductor in series with it, eliminating the need for an electrolytic capacitor and extending the life of the resonant LED driver. Both regulating and dimming operations use asymmetrical duty cycle (ADC) control. Numerical simulations are conducted to examine the suggested resonant converter topology's steady state

performance as it sources LED applications. Using the OrCAD/PSPICE tool for universal AC mains, 25 W and 29 W LED driver analysis, design, modeling, and simulation are carried out. The proposed driver needs to provide high efficiency even at reduced illumination.

Q Keywords: zero voltage switching LEDs resonant converters dimming control

Disclosure statement

No potential conflict of interest was reported by the author(s).

Additional information

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Kambhampati Venkata Govardhan Rao is working as currently Assistant Professor in Electrical and Electronics Engineering Department, St. Martin's Engineering College, Dhulapally, Secunderabad, Telangana and it is affiliated to JNTU Hyderabad. He is pursuing his Doctor of Philosophy at Koneru Laxmaiah Educational Foundation (KL Deemed to be University), Vijayawada Campus. He completed his Master of Technology at Abdul Kalam Institute of Technological Sciences, Vepalagadda, Kothagudem affiliated to JNTU Hyderabad and Bachelor of Technology at Abdul Kalam Institute of Technological Sciences, Vepalagadda, Kothagudem affiliated to JNTU Hyderabad. He has more than 09 years of teaching experience. He published over 18 Papers in various reputed journals, attended 05 conferences with ISBN number, author of 03 textbooks and published 02 Indian Patent. He is guided 05 M.Tech students. He is also a life member in Indian Society for Technical Education and Indian Association for Engineers. His area of research includes Power Electronics and Power Systems.

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Malligunta Kiran Kumar working as an Associate Professor in the Department of Electrical and Electronics Engineering Koneru Lakshmaiah Education Foundation (KL Deemed to be University) College of Engineering, has about 16 years of teaching experience. He received his B.Tech degree in Electrical and Electronics Engineering with distinction from JNTU Hyderabad and M.E. degree in Power Electronics and Drives with distinction from Anna University, Chennai. He received Ph.D degree in Electrical and Electronics Engineering from KL Deemed to be University, Guntur, Andhra Pradesh. He has published more than 84 Scopus, SCIE and ESCI research papers in refereed international journals and 20 research papers in the proceedings of various international conferences and three patents in his credit. He has received several best paper awards for his research papers at various international conferences. He is an active member of SIEEE, MISTE and IEI. He received Best Teacher Award five times, and his research interest includes Switched Reluctance Machines, Power Electronics, Electric Vehicles and Control Systems.

B. Srikanth Goud

B. Srikanth Goud has 14 years of experience in Teaching, Research and Administration. Currently working as Assistant Professor at Anurag University. He published more than 70 publications in various SCI, Scopus indexed Journals and International Conferences. He is a member of professional bodies like MIEEE and MISTE. He has good experience in organizing university programs and other outreach events that help promote learning and support the community. He is the Guest Editor, Editorial Board Member of various Journals & Reviewer for IEEE, IET, Taylor & Francis and various SCI, Scopus indexed Journals. His research areas include Distributed Generation, Power Quality, Smart grids, Power electronic converters and their applications to energy systems.

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