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# An Overview of the AC-DC and DC-DC Converters for LED Lighting Applications

## Pregled AC-DC i DC-DC pretvarača za primjene u LED rasvjeti

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### Abstract

High-Brightness Light Emitting Diodes (HB-LEDs) are considered the future trend in lighting not only due to their high efficiency and high reliability, but also due to their

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In this paper, the main HB-LED characteristics will be explained, highlighting how they influence the design of their power supplies. After, the main topologies will be presented from the simplest to the most complex ones, analysing their advantages and disadvantages.

Svjetleće diode s visokom razinom svjetline (HB-LED) smatraju se budućim trendom u rasvjeti zahvaljujući ne samo visokom stupnju efikasnosti i pouzdanosti, nego i njihovim izvanrednim svojstvima: raznolikost boja, otpornost na udarce i vibracije i sl. Ipak, s ciljem potpunog iskorištenja prethodno spomenutih svojstava, potrebno je razviti nove, posebno osmišljene izvore napajanja. Osim toga, ponašanje im se posve razlikuje od ostalih tipova rasvjete što je potrebno uzeti u obzir pri projektiranju pretvarača za njihovo napajanje. Kao posljedica toga, mnoge su poznate topologije pretvarača optimirane ili preoblikovane posebno za primjenu u LED rasvjeti, a zadnjih nekoliko godina mnoge nove su se tek pojavile.

U ovom članku objašnjena su osnovna HB-LED svojstva naglašavajući njihov utjecaj na razvoj izvora napajanja. Uz to, prikazane su osnovne topologije, od najjednostavnijih do najsloženijih, ujedno analizirajući prednosti i nedostatke pojedinih.

Key words: AC-DC converters DC-DC converters LED Lighting

Ključne riječi: AC-DC pretvarači DC-DC pretvarači LED rasvjeta

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## Manuel Arias

Manuel Arias Pérez de Azpeitia was born in Oviedo, Spain, in 1980. He received the M. Sc. degree in electrical engineering from the University of Oviedo, Gijón, Spain in 2005 and the Ph. D. degree in the same university in 2010. Since February 2005, he has been a Researcher in the Department of Electrical and Electronic Engineering, University of Oviedo, developing electronic systems for UPSs and electronic switching power supplies. Since February 2007, he has also been an Assistant Professor of electronics in the same University. His research interests include DC-DC converters, AC-DC converters and LED lighting.

## Aitor Vázquez

Aitor Vázquez was born in Oviedo, Spain, in 1984. He received the M.Sc. degree in telecommunication engineering from the University of Oviedo in 2009. He became a member of Power Supply System Group in 2010, where he is currently working toward the Ph.D. degree. His research interests include multiple input and output DC/DC conversion, power-factor corrector AC/DC converters and energy recovery systems.

## Javier Sebastián

Javier Sebastián was born in Madrid, Spain, in 1958. He received the M.Sc. degree from the Polytechnic University of Madrid, Madrid, in 1981 and the Ph.D. degree from the Universidad de Oviedo, Gijón, Spain, in 1985. He was an Assistant Professor and an Associate Professor at both the Polytechnic University of Madrid and the Universidad de Oviedo. Since 1992, he has

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