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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 other outstanding characteristics: chromatic variety, shock and vibration resistance, etc. Nevertheless, they need the development of new power supplies especially designed for boosting and taking advantage of their aforementioned characteristics. Besides, their behaviour is completely different from the rest of lighting devices and, consequently, it should be also taken into account in the design of the converters used to drive them. As a result, many well-known topologies have been optimized or

redesigned in order to be used in LED—lighting applications and many new topologies have come up in the recent years with the same purpose.

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 pouz-danosti, 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:

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