URN etd-0407109-183705-310
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Statistics This thesis had been viewed 65 times. Download 0 times.
Department
Year 2001
Semester 2
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title Analysis and Design of Single-Stages Hing Power Factor Electronic Ballast
Date of Defense 0000-00-00
Page Count 101

Keyword
single stage high power factor
flyback
Class E resonant converter
electronic ballast

Abstract
The thesis proposes two novel electronic ballasts with the advantages of low current harmonic, high power factor, and high efficiency. The proposed two electronic ballasts include (1) Combine the flyback and D class single-stage high power factor electronic ballast, (2) Combine the flyback and E class single-stage high power factor electronic ballast. The configurations of the two kind of high power factor electronic ballasts combine the flyback converter and the Class D or Class E resonant inverter to obtain a single-stage electronic ballast.

The single-stage with flyback and D class high power factor electronic ballast is combined with flyback converter and class D resonant inverter. The circuit uses double flyback converters these are alternated to turn on making the input current to be operated between discontinuous conduction mode (DCM) and continuous conduction mode (CCM). As a result, this proposed single-stage high power factor electronic ballast can obtain more smooth the input current waveform, lower input current harmonics and lower power switch current stress.

The single-stage with flyback and E class high power factor electronic ballast is combined with flyback converter and the class E resonant inverter. The circuit has only one power switch to achieve the aim for nearly unity power factor correction. The power switch with carefully designed circuit parameters has zero current switching-on (ZCS) to obtain more high circuit efficiency. Finally, a design example is conducted with experiment and simulation for verifying the theoretical prediction.
Advisory Committee Ching Lung Chu - advisor

Files No Any Full Text File.
Date of Submission 2002-07-23