



RESEARCH ARTICLE

QUASI RESONANT BUCK CONVERTER FOR DUAL STRING BUCK LED DRIVER

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Abstract—The project presents the digital simulation of Quasi Resonant Converter for driving multiple LED strings using MATLAB Simulink. Quasi Resonant Converter (QRC) is fast replacing conventional PWM converters in high frequency operation. The salient feature of QRC is that the switching devices can be either switched on at Zero Voltage or switched off at Zero Current, so that switching losses are zero ideally. It adopts suitable PWM switching method using resonance. QRC based digitally controlled dual output buck switching LED driver operates in Discontinuous Conduction Mode (DCM) to reduce the input current ripple and extends it to drive multiple outputs. Based on the time multiplexing control scheme in DCM, a theoretical upper limit of the total number of outputs in a buck switching LED driver for various backlight LED current values can be derived analytically. The PWM gate pulses are generated using active current summation technique and it is used to regulate the LED current accurately. The output of QRC is regulated by varying the switching frequency of the converter. The proposed scheme eliminates the series current regulation element present in all conventional LED drivers and it greatly improves efficiency and reduces cost.

Keywords— Discontinuous Conduction Mode (DCM); Quasi Resonant Converter (QRC); Soft Switching, LED Lamp Driver; Zero Current Switching (ZCS); Pulse Width Modulation (PWM)

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