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Electrolytic Capacitor-Less Transformer-Less AC-DC LED Driver with Current Ripple Canceller

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Abstract : This paper proposes an electrolytic capacitor-less transformer-less AC-DC LED driver with a current ripple canceller. The proposed LED driver includes a diode bridge, a buck-boost converter, a negative feedback controller and a current ripple cancellation circuit. The current ripple canceller works as a bi-directional current converter using a sub-inductor, a sub-capacitor and two switches for controlling current flow. LED voltage is controlled in order to regulate LED current by the negative feedback controller using a current sense resistor. There are two capacitors which capacitance of 5 uF. We describe circuit topologies, operation principles and simulation results for our proposed circuit. In addition, we show the line regulation for input voltage variation from 85V to 130V. The output voltage ripple is 2V and the LED current ripple is 65 mA which is less than 20% of the typical current of 350 mA. We are now making the proposed circuit on a universal board in order to measure the experimental characteristics.

Keywords : LED driver, electrolytic, capacitor-less, AC-DC converter, buck-boost converter, current ripple canceller
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