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AC-DC BOOST CONVERTER WITH IMPROVED POWER FACTOR AND REGULATED BUS AND OUTPUT VOLTAGES

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Abstract

Unlike existing single-stage AC-DC converters with uncontrolled intermediate bus voltage, a new single-stage AC-DC converter achieving power factor correction (PFC), intermediate bus voltage output regulation and output voltage regulation is proposed. The single power stage circuit is formed by integrating a boost PFC converter with a two-switch-clamped forward converter. The current stress of the main power switches is reduced due to separated conduction period of the two source currents flowing through the power switch. A dual-loop peak current mode controller is proposed to achieve PFC, and ensure independent bus voltage and output voltage regulations. Experimental results on a 24V/100W hardware prototype are given to confirm the theoretical analysis and performance of the proposed converter. The converter ranges 86%–92% of conversion efficiency at full load condition.

Keywords : ac-dc converter, power factor correction (PFC), single-stage.