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A Single Phase ZVT-ZCT Power Factor Correction Boost Converter

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Abstract : In this paper, a single phase soft switched Zero Voltage Transition and Zero Current Transition (ZVT-ZCT) Power Factor Correction (PFC) boost converter is proposed. In the proposed PFC converter, the main switch turns on with ZVT and turns off with ZCT without any additional voltage or current stresses. Auxiliary switch turns on and off with zero current switching (ZCS). Also, the main diode turns on with zero voltage switching (ZVS) and turns off with ZCS. The proposed converter has features like low cost, simple control and structure. The output current and voltage are controlled by the proposed PFC converter in wide line and load range. The theoretical analysis of converter is clarified and the operating steps are given in detail. The simulation results of converter are obtained for 500 W and 100 kHz. It is observed that the semiconductor devices operate with soft switching (SS) perfectly. So, the switching power losses are minimum. Also, the proposed converter has 0.99 power factor with sinusoidal current shape.

Keywords : power factor correction, zero-voltage transition, zero-current transition, soft switching
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