Abstract

High efficiency DC-DC converters with high-voltage gain have been researched due to increasing demands. A soft-switching single-ended primary inductor converter (SEPIC) is presented in this work. An auxiliary switch and a clamp capacitor are presented in this project. A coupled inductor and an auxiliary inductor are utilized to obtain ripple-free input current and achieve zero voltage-switching (ZVS) operation of the main and auxiliary switches. The voltage multiplier technique and active clamp technique are applied to the conventional SEPIC converter to increase the voltage gain, reduce the voltage stresses of the power switches and diode. Moreover, by utilizing the resonance between the resonant inductor and the capacitor in the voltage multiplier circuit, the zero-current-switching (ZVS) operation of the output diode is achieved and its reverse-recovery loss is significantly reduced. The converter achieves high efficiency due to soft switching commutation of the power semiconductor device. The circuit is simulated using MATLAB Simulink and output result is verified.

References


Index Terms

Computer Science
Circuits And Systems

Keywords
Sepic converter  DC drive