

# Study of Zero-Voltage-Seitching Qusai-Resonant Forward DC-DC Converter

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Yukihiro Ohta

For high efficiency, isolated switching power supplies, three types of a single-switch zero-voltage-switching quasi-resonant DC-DC converter based on the forward architecture are developed. The first type consists of the buck converter followed by the zero-voltage-switching quasi-resonant forward converter. This type shows that the efficiency of AC-DC power conversion is 85% when the output power is 3W. The second type consists of the flyback converter and the zero-voltage-switching quasi-resonant forward converter. This type shows that the efficiency of AC-DC conversion is 88% when the output power is 12W. In these converters, the input and load regulations are possible by means of the frequency modulation of the switching signal. Furthermore, the buck and flyback converters play the role of the common regulator for the plural secondary windings, thereby simplify the circuit configurations of multi-output converters. The third type incorporates the current resonant circuit to the zero-voltage-switching quasi-resonant forward converter. This zero-current- and zero-voltage switching converter has 90% efficiency of AC-DC conversion when output power is 19W. Though failing the regulation capability again the input voltage and load changes, the converter is suited for the power supplies of servomotors and inverters because of its high conversion efficiency and low EMI.

All the converters developed here allow the high power density because the forward transformers which perform the voltage conversion can be made small.