

High-Voltage Resonant Converter with Extreme Load Variation: Design Criteria and Applications

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Abstract : The power converter that feeds high-frequency, high-voltage transformers must be carefully designed due to parasitic components, mainly the secondary winding capacitance and the leakage inductance, that introduces resonances in relatively low-frequency range, next to the switching frequency. This paper considers applications in which the load (resistive) has an unpredictable behavior, changing from open to short-circuit condition faster than the output voltage control loop could react. In this context, to avoid over voltage and over current situations, that could damage the converter, the transformer or the load, it is necessary to find an operation point that assure the desired output voltage in spite of the load condition. This can be done adjusting the frequency response of the transformer adding an external inductance, together with selecting the switching frequency to get stable output voltage independently of the load.

Keywords : high-voltage transformer, resonant converter, soft-commutation, external inductance

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