Estimation of Transformer Parameters and Loss Analysis for High Voltage Capacitor Charging Application

In a bi-directional DC-DC converter for capacitive charging application, the losses associated with the transformer makes it a critical component. In order to calculate the transformer losses, its parameters such as AC resistance, leakage inductance and self capacitance of the high voltage (HV) winding has to be estimated accurately. This paper analyzes the following losses of bi-directional flyback converter namely switching loss, conduction loss, gate drive loss, transformer core loss, and snubber loss, etc. Iterative analysis of transformer parameters viz., AC resistance, leakage inductance and stray capacitance of the HV winding will lead to a considerable reduction in converter losses. In this work, a 24 V to 2.5 kV bidirectional flyback converter has been implemented and the same has been used for loss calculation.

General information
State: Published
Organisations: Department of Electrical Engineering, Electronics
Contributors: Thummala, P., Schneider, H., Ouyang, Z., Zhang, Z., Andersen, M. A. E.
Pages: 704-710
Publication date: 2013

Host publication information
Title of host publication: Proceedings of ECCE Asia DownUnder 2013
Publisher: IEEE
ISBN (Print): 978-1-4799-0482-2
Keywords: High voltage bi-directional converter, Capacitive load, AC resistance, Core loss, Stray capacitance, Leakage inductance
DOIs: 10.1109/ECCE-Asia.2013.6579178
Research output: Research - peer-review › Article in proceedings – Annual report year: 2013