High Current Planar Magnetics for High Efficiency Bidirectional DC-DC Converters for Fuel Cell Applications - DTU Orbit (11/08/2019)

Efficiency is one of the main concerns during the design phase of switch mode power supply. Planar magnetics based on PCB windings have the potential to reduce the magnetic manufacturing cost however, one of their main drawbacks comes from their low filling factor and high stray capacitance. This paper presents an analysis of different planar windings configurations focusing on dc and ac resistances in order to achieve highly efficiency in dc-dc converters. The analysis considers different copper thicknesses form 70 μm up to 1500 μm (extreme copper PCB) taking into account manufacturing complexity and challenges. The analysis is focused on a high current inductor for a dc-dc converter for fuel cell applications and it is based on FEM simulations. Analysis and results are verified on a 6 kW dc-dc isolated full bridge boost converter prototype based on fully planar magnetics achieving a peak efficiency of 97.8%.

General information
Publication status: Published
Organisations: Department of Electrical Engineering, Electronics
Contributors: Pittini, R., Zhang, Z., Andersen, M. A. E.
Pages: 2641-2648
Publication date: 2014

Host publication information
Title of host publication: Proceedings of Twenty-Ninth Annual IEEE Applied Power Electronics Conference and Exposition
Publisher: IEEE
ISBN (Print): 978-1-4799-2325-0
DOI: 10.1109/APEC.2014.6803677
Source: dtu
Source-ID: u::10955
Research output: Chapter in Book/Report/Conference proceeding › Article in proceedings – Annual report year: 2014 › Research › peer-review