The Analysis and Comparison of Leakage Inductance in Different Winding Arrangements for Planar Transformer - DTU Orbit (09/12/2018)

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The coupling of the windings can be easily increased by using multiply stacked planar windings connection. Interleaving is a well-known technique used to reduce leakage inductance and minimize high-frequency winding losses. The paper aims to analyze leakage inductance based on magneto motive force (MMF) and energy distribution in planar transformer and correct the formula of leakage inductance proposed by previous publications. The investigation of different winding arrangements shows significant advantages of interleaving structure. In this work, a novel half turn structure is proposed to reduce leakage inductance further. Some important issues are presented to acquire desired leakage inductance. The design and modeling of 1 kW planar transformer is presented. In order to verify the analytical method for leakage inductance in this paper, finite element analysis (FEA) and measurement with impedance analyzer are presented. Good matching between calculation, FEA 2D simulation and measurement results is achieved.

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