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Thermal Characterization of Magnetic Components

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ABSTRACT

Thermal limits are crucial constraints in the design of power magnetic components. As the power density of magnetic components continues to increase, cooling becomes more critical. Our research focuses on solving for the amount of cooling needed for a particular magnetic component. During the research process, a low-velocity wind tunnel designed and built from the ground up is used to form uniform and controlled conditions for the test components. Thermal Equivalent Circuit (TEC) and parameter identification techniques are used in conjunction to yield temperature distribution results. The expected result is temperature data on various areas of the component under different cooling air flow. Temperature data will aid developers to optimize their component designs. Future work on different types of cooling systems, such as liquid cooled, will be considered.

KEYWORDS

Thermal equivalent circuit, FEA, Power electronics, Heat transfer, Thermal wind tunnel, Inductor