High-Frequency GaN-Based QSW Buck Converter with Coupled Inductor and Integrated Current-Balancing Transformer for Battery Fast Charging Application

This paper focuses on magnetic design for a high-frequency GaN-based dc-dc converter for fast battery charging application in portable devices. In order to enhance the current output capability of the converter, a two-phase quasi-square-wave (QSW) Buck based topology is adopted and a coupled inductor with integrated current-balancing transformer (CBT) is proposed to further increase the power density. Both the proposed topology and integrated magnetic structure are verified by the prototype with 94.5% maximum efficiency at 4V/7A output.

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