Test Report: PMP41155

Multiphase, Four-Switch, Buck-Boost DC/DC Converter Reference Design

Description

This reference design is a four-switch, buck-boost DC/DC converter used for battery backup unit (BBU) applications, targeting Open Compute Project® (OCP) Open Rack V3 Power BBU specifications. This design has a 12KW power capability. The converter works in either buck, buck-boost, or boost mode depending on the V_{in} and V_{out} voltage. The converter transitions smoothly between each mode. Peak current mode control is employed in this design, providing a fast load transient response. Relying on the LM51770 features, no extra driver is needed for field-effect transistors. This design has a total of six phases; among them, six phases are connected in parallel for battery discharging operation, provide up to 12KW discharging power.

Resources

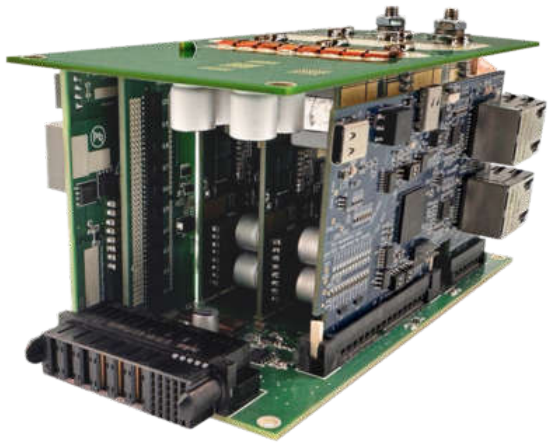
PMP41155	Design Folder
TMS320F28P650DK	Product Folder

Features

- 2kW power capability per phase with six phases in parallel provides 12kW power battery discharge operation
- Multimode operation: seamless transitions between buck to buck-boost and buck-boost to boost
- Integrated average input and output current monitor or limiter either in input or output
- Peak efficiency > 99%, exceptional high-load efficiency > 99.5% for $V_{in} \cong V_{out}$
- Meets OCP-V3, 50V BBU power conversion function

Applications

- Battery backup unit (BBU)
- Rack and server power



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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265