

High Efficiency High Density Dual-Phase Hybrid Buck Controller

General Description

The evaluation circuit EVAL-LTC7822-AZ features LTC7822: a dual-phase hybrid step-down synchronous controller with a load current monitor. The LTC7822 uses an ADI-proprietary architecture that merges a soft switching charge pump topology with a dual-phase interleaved synchronous step-down converter to provide superior efficiency and low EMI performance. The LTC7822 can operate at a wide V_{IN} Range: 19V to 90V (100V ABS Max), output voltage up to 35V and a phase-lockable fixed frequency from 150kHz to 1.5MHz, enabling flexible configuration for different applications.

The EVAL-LTC7822-AZ operates from 36V to 60V input voltage and produces an output of 12V. More than 1kW output power delivery is achieved within a quarter-brick solution size, with a peak efficiency of 98.4%. Optimized at 150kHz, the EVAL-LTC7822-AZ is ideal for 48V to 12V applications with high efficiency and high-power density.

Due to the proprietary architecture, the dual-phase EVAL-LTC7822-AZ features a minimum total C_{MID} capacitance value compared with traditional paralleled single-phase hybrid switch cap solutions. 10V gate drive voltage of the LTC7822 reduced MOSFETs' power loss. The $EXTV_{CC}$ pin

allows LTC7822's internal LDO to utilize a lower power supply voltage than the lossy V_{IN} . Furthermore, the coupled inductor applied on the board enables minimum solution size and the highest efficiency performance.

The output voltage and V_{IN} ENABLE/UVLO voltage are both programmed by resistor dividers on the FB pin and RUN pin, respectively. The RUN pin is set so the circuit will turn on when input voltage rises above 33V and will turn off when input voltage falls below 27V. \overline{FAULT} and PGOOD status flags indicate die temperature deviation, V_{OUT} voltage deviation, and other fault conditions. IMON and IMON_REF reports output current and can be easily accessed on the board for system monitoring purposes.

The EVAL-LTC7822-AZ allows paralleling multiple boards to achieve higher output power. For more details, follow the instructions in this user guide.

The LTC7822 is in a 48-lead, 7mm x 7mm plastic QFN package. The LTC7822 data sheet gives a complete description of the part operation and application information. The LTC7822 data sheet must be read in conjunction with this user guide to properly use the evaluation circuit EVAL-LTC7822-AZ.

Performance Summary ($T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Input Voltage Range	V_{IN}			36		60	V
Output Voltage	V_{OUT}				12		V
Maximum Output Current	I_{OUT}	No Heatsink, No Airflow			85		A
Gate Driver Supply Voltage	V_{DRVCC}				10		V
V_{IN} Turn-On Rising	$V_{IN_EN(+)}$				33		V
V_{IN} Undervoltage Lockout (UVLO) Falling	$V_{IN_UVLO(-)}$				27		V
Switching Frequency	f_{SW}				150		kHz
Full Load Efficiency	η_{FULL}	$I_{OUT} = 80\text{A}$	$V_{IN} = 42\text{V}$		96.4		%
			$V_{IN} = 48\text{V}$		97.5		%
			$V_{IN} = 54\text{V}$		97.6		%
Peak Efficiency	η_{PEAK}	$I_{OUT} = 30\text{A}$	$V_{IN} = 48\text{V}$		98.4		%

ABRIDGED DATA SHEET

Evaluation Board User Guide

EVAL-LTC7822-AZ

Notes

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