DESCRIPTION

Demonstration circuit DC822 is a Dual channel Synchronous, 2.25MHz Step-Down DC/DC Regulator featuring the LTC®3548. The DC822 has an input voltage range of 2.5V to 5.5V. The 2.5V output is capable of delivering up to 400mA of output current; The jumper selective 1.2V/1.5V/1.8V output is capable of delivering up to 800mA of current. In Burst Mode™ operation, the LTC3548 requires only 40uA of quiescent current, as a result, the DC822 provides good efficiency at light load currents. In Pulse Skip mode, the DC822 provides lower output ripple voltage at light load currents than in Burst Mode. In either mode, the DC822 can provide up to 95% efficiency and consumes less than 1uA in shutdown. The LTC3548 comes in a small 10-Pin DFN package, which has an exposed pad on the bottom-side of the IC for good thermal performance. These features, plus the nominal operating frequency of 2.25MHz (allowing the exclusive use of low profile surface mount components), make the DC822 demo board an ideal reference circuit for battery-powered, hand-held applications.

Design files for this circuit board are available. Call the LTC factory.

Table 1. **Performance Summary (T_A = 25°C)**

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		2.5V
Maximum Input Voltage		5.5V
Output Voltage V_{OUT1}	V_{IN} = 2.5V to 5.5V, I_{OUT1} = 0A to 800mA	1.2V ±2% 1.5V ±2% 1.8V ±2%
Typical Output Ripple V_{OUT1}	V_{IN} = 5V, I_{OUT1} = 800mA (20MHz BW)	$20mV_{P-P}$
Output Regulation	Line	±1%
	Load	±1%
Output Voltage V_{OUT2}	V_{IN} = 2.5V to 5.5V, I_{OUT2} = 0A to 800mA	2.5V ±2%
Typical Output Ripple V_{OUT2}	V_{IN} = 5V, I_{OUT2} = 400mA (20MHz BW)	$20mV_{P-P}$
Output Regulation	Line	±1%
	Load	±1%
Nominal Switching Frequency		2.25MHz

QUICK START PROCEDURE

Demonstration circuit 822 is easy to set up to evaluate the performance of the LTC3548. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below.

Note: When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the Vin or Vout and GND terminals. See Figure 2 for proper scope probe technique.

Note: The POR pin is an open-drain output which pulls low when either regulator is out of regulation. When both output voltages are within –8.5% of regulation, a timer is started which releases POR after 2^{18} clock cycles. This delay can be significantly longer in Burst Mode operation with low load currents, since the clock cycles only occur during a burst and there could be milliseconds of time between bursts. This can be bypassed by tying the POR output to the MODE/SYNC input to force pulse skipping mode during a reset (JP4 needs to be removed when connecting POR to MODE/SYNC).

1. Connect the input power supply to the Vin and GND terminals on the left-side of the board. Do not hot-plug Vin or increase Vin over the rated maximum supply voltage of 5.5V. Connect the loads between the Vout and GND terminals on the right-side of the board. Refer to Figure 1 for the proper measurement equipment setup.
2. Before proceeding to operation, insert jumpers JP1 and JP2 into the OFF positions, jumper JP3 into the Vout1 voltage position of choice (1.2V, 1.5V, and 1.8V), and jumper JP4 into the desired mode of operation: Pulse Skip or Burst Mode.
3. Apply 3.3V at Vin. Measure both Vouts; they should read 0V. The supply current will be approximately 33uA in shutdown, with roughly 32uA due to the optional 100kΩ pull-up resistor of the Power-On Reset (POR) feature. This resistor can be removed to measure the actual shutdown supply current (of approx. 1uA).
4. Turn on Vout1 and Vout2 by changing jumpers JP1 and JP2 from the OFF position(s) to the ON position(s). Vary the input voltage from 2.5V to 5.5V and adjust each load current from 0 to full load. Both output voltages should be regulating. The regulated error is less than 2% of rated voltage.
5. Set the load current of outputs between 25% to 100% load range, and measure both output ripple voltages; they should measure less than 20mV each. The switching frequencies should be between 1.8MHz and 2.7MHz (T = 0.555 us and 0.37 us)

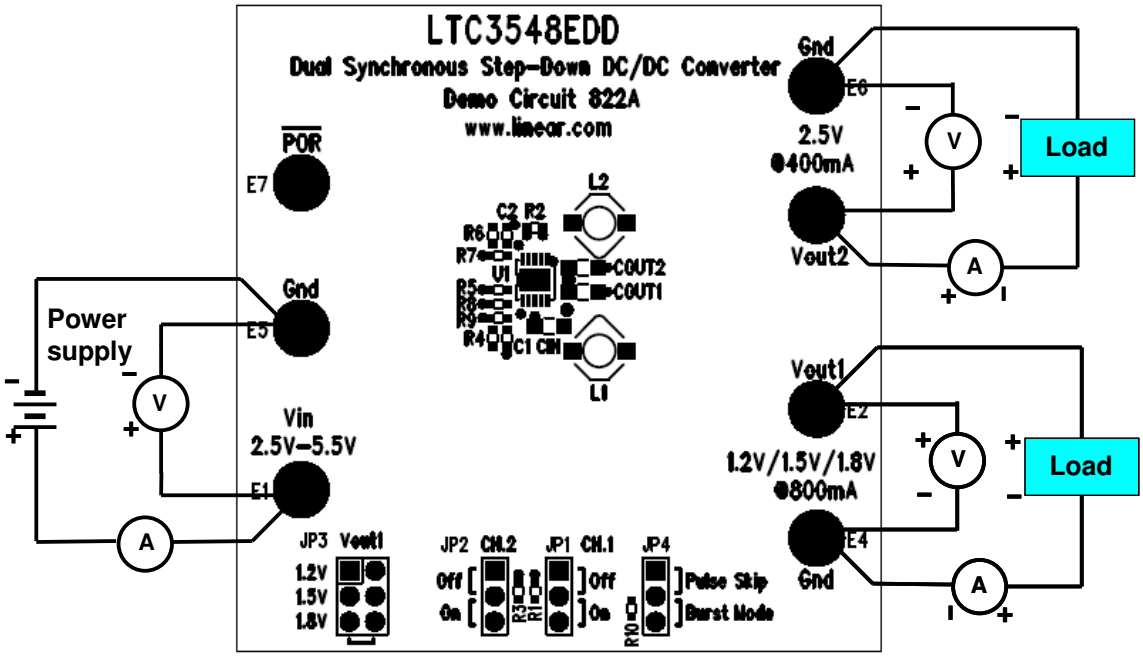


Figure 1. Proper Measurement Equipment Setup

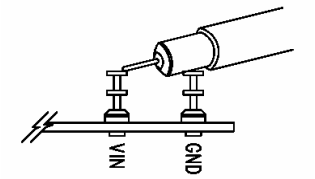
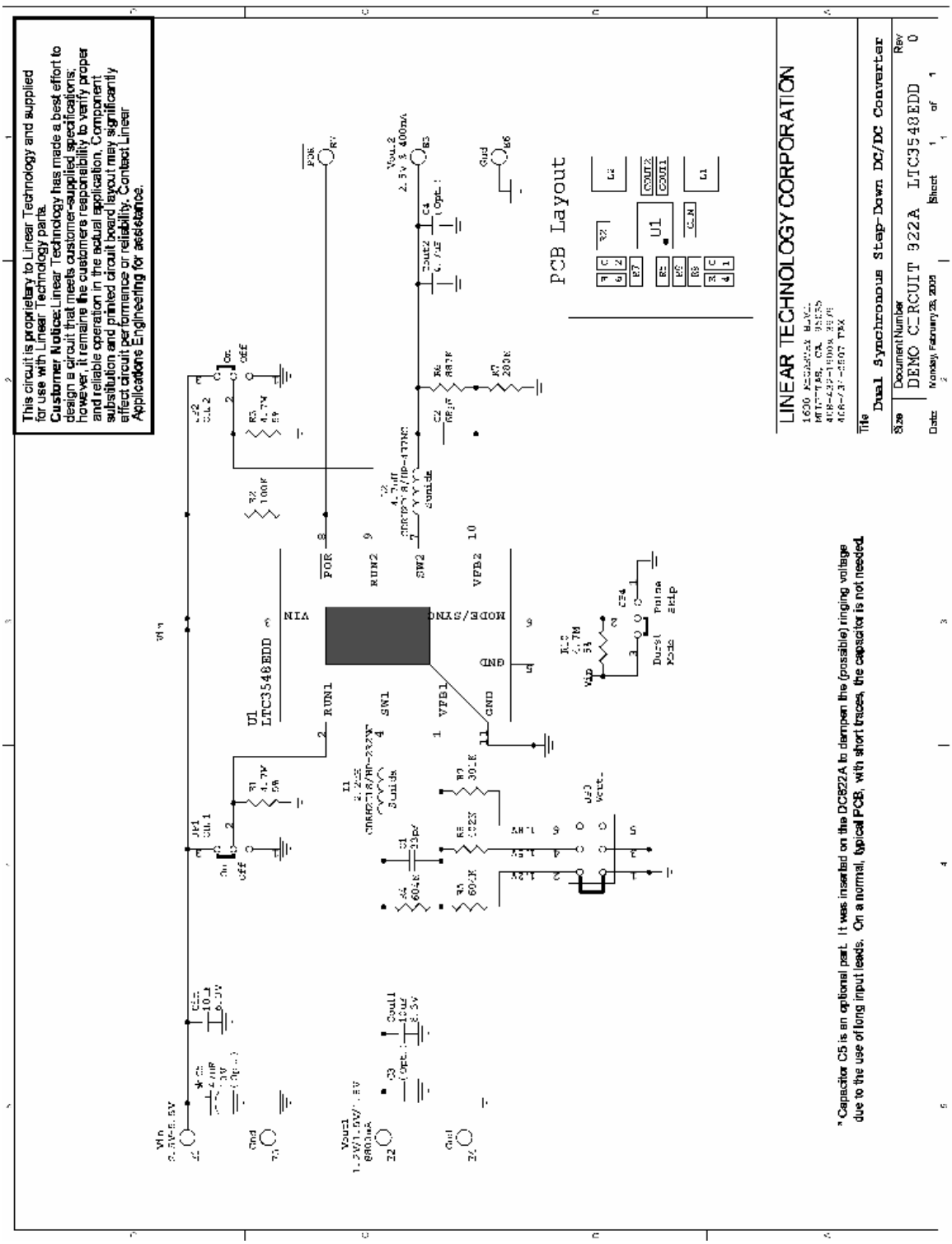


Figure 2. Scope Probe Placement for Measuring Input or Output Ripple


This circuit is proprietary to Linear Technology and supplied for use with Linear Technology parts.
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PCB Layout
LINEAR TECHNOLOGY CORPORATION
Dual Synchronous Step-Down DC/DC Converter
DEMO CIRCUIT 822A LTC3548EDD
* Capacitor C5 is an optional part. It was inserted on the DC822A to dampen the (possible) ringing voltage due to the use of long input leads. On a normal, typical PCB, with short traces, the capacitor is not needed.