

LT3481EMSE/LT3481EDD 800kHz/2MHz Buck Regulator

DESCRIPTION

Demonstration circuit 857 features LT3481EMSE and LT3481EDD in two step-down converter circuits, one configured for high efficiency and the other for small size. The high efficiency circuit switching at 800kHz is designed for 3.3V output from a 4.5V to 34V input. The small size circuit switching at 2MHz demonstrates the LT3481's ability to operate with a small inductor and output capacitor. It is designed for 5V output from an 8.5V to 22V input. The wide input range of the LT3481 allows a variety of input sources. The typical sources are automotive batteries, wall adaptors and industrial supplies. The current mode control scheme creates fast transient response and good loop stability. In addition, the LT3481's integrated boost diode reduces the parts count. The low ripple Burst Mode Operation of LT3481 not only allows the circuit to have high effi-

ciency over a broad current range but also provides the low output ripple at light load conditions. The RUN/SS pin can be used to set the part in micropower shutdown mode, reducing the supply current to less than 1uA. The RUN/SS pin can also be used to program soft start. In this mode, the RUN/SS pin is driven through an external RC filter to create a voltage ramp on this pin. The soft start function reduces the input current surge during start-up.

The LT3481 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 857.

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

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Performance Summary for 800kHz Buck Regulator ($T_A = 25^\circ\text{C}$)

PARAMETER FOR LED DRIVER	CONDITION	VALUE
Minimum input voltage		4.5V
Maximum input voltage		34V
Output voltage V_{OUT}		3.3V +/- 4%
Maximum output current		2A
Typical switching frequency		800kHz

Performance Summary for 2MHz Buck Regulator ($T_A = 25^\circ\text{C}$)

PARAMETER FOR LED DRIVER	CONDITION	VALUE
Minimum input voltage		8.5V
Maximum input voltage		22V
Output voltage V_{OUT}		5V +/- 4%
Maximum output current		2A
Typical switching frequency		2MHz

QUICK START PROCEDURE

Demonstration circuit 857 is easy to set up to evaluate the performance of the LT3481. 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.

1. Place JP1 and JP2 on the RUN position:
2. With power off, connect the input power supply to Vin and GND.

3. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed the maximum input voltage.

4. Check for the proper output voltages.

NOTE. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

5. Once the proper output voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

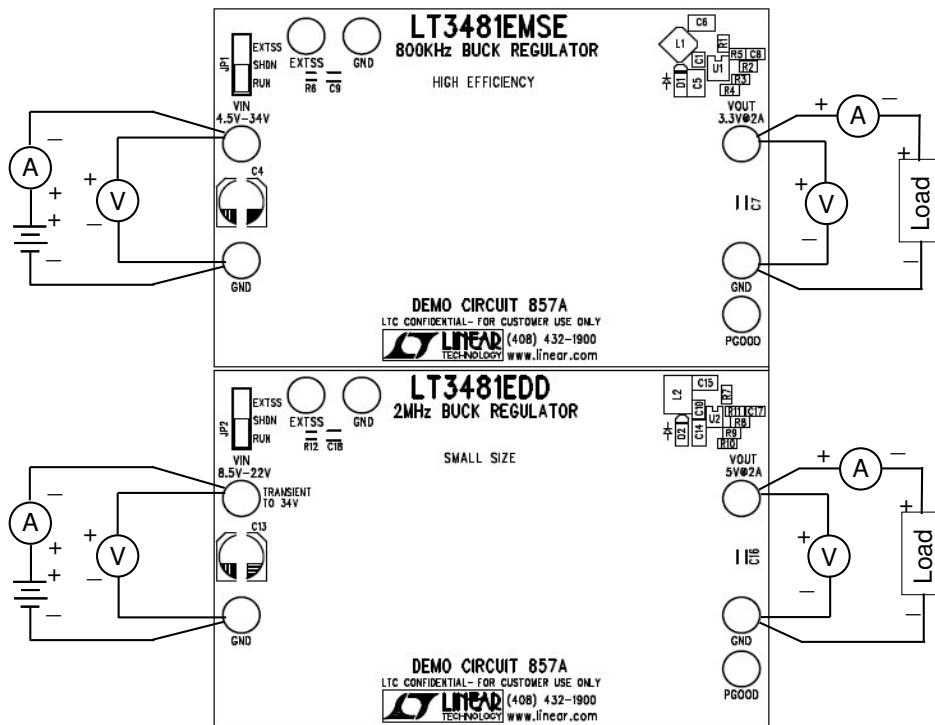


Figure 1. Proper Measurement Equipment Setup

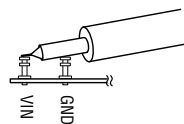
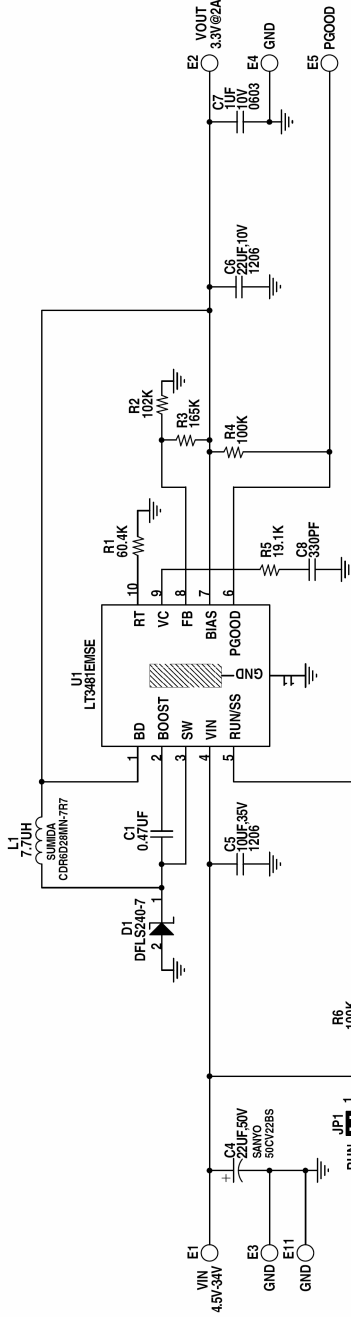


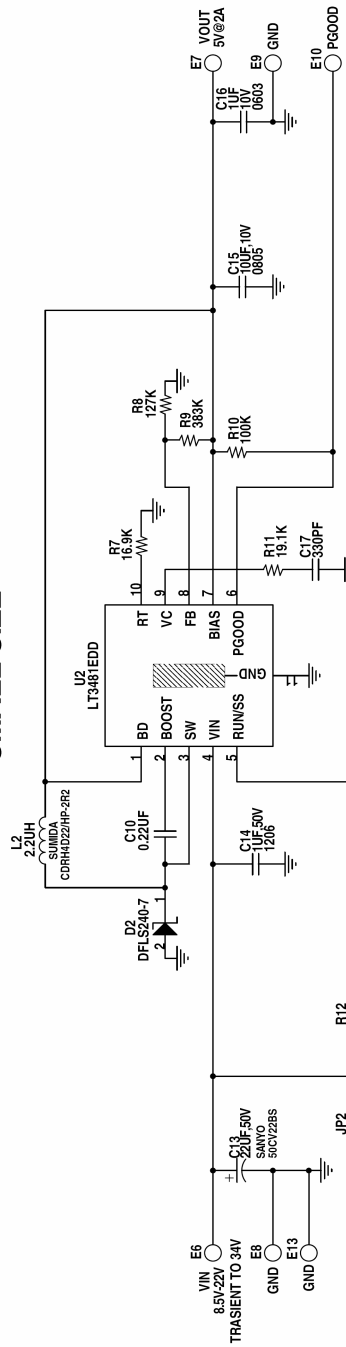
Figure 2. Measuring Input or Output Ripple

HIGH EFFICIENCY



800KHz BUCK REGULATOR

SMALL SIZE



2MHz BUCK REGULATOR

<p>CUSTOMER NOTICE LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.</p>		<p>CONTRACT NO. _____ APPROVALS _____ DRAWN: KIM T. CHECKED: _____ APPROVED: _____ ENGINEER: KEVIN H. DESIGNER: _____</p>	<p>1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408)342-1900 Fax: (408)342-0507 LTC Confidential For Customer Use Only</p>
<p>NOTES: UNLESS OTHERWISE SPECIFIED 1. ALL RESISTORS ARE IN OHMS, 0402. ALL CAPACITORS ARE IN MICROFARADS, 0402. 2. INSTALL SHUNT ON JP1 & JP2 PINS 1&2.</p>		<p>TITLE: SCHEMATIC 800KHz/2MHz BUCK REGULATOR SIZE: A DWG NO: DC857A-2 * LT3481EMSE/EDD REV: A-2</p>	<p>DATE: Tuesday, April 18, 2006 SHEET 1 OF 1</p>