DESCRIPTION

Demonstration circuit 1122 features LT3681 in a 500kHz step-down converter circuit, designed for 3.3V output from a 4.5V to 34V input. The wide input range of the LT3681 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 LT3681's integrated boost diode and catch diode reduce the parts count. The low ripple Burst Mode Operation of LT3681 not only allows the circuit to have high efficiency 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. 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 LT3681 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 1122.

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

Performance Summary for Step-Down Regulator (T_A = 25°C)

PARAMETER FOR BUCK REGULATOR	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		500kHz

QUICK START PROCEDURE

Demonstration circuit 1122 is easy to set up to evaluate the performance of the LT3681. 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 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 voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.
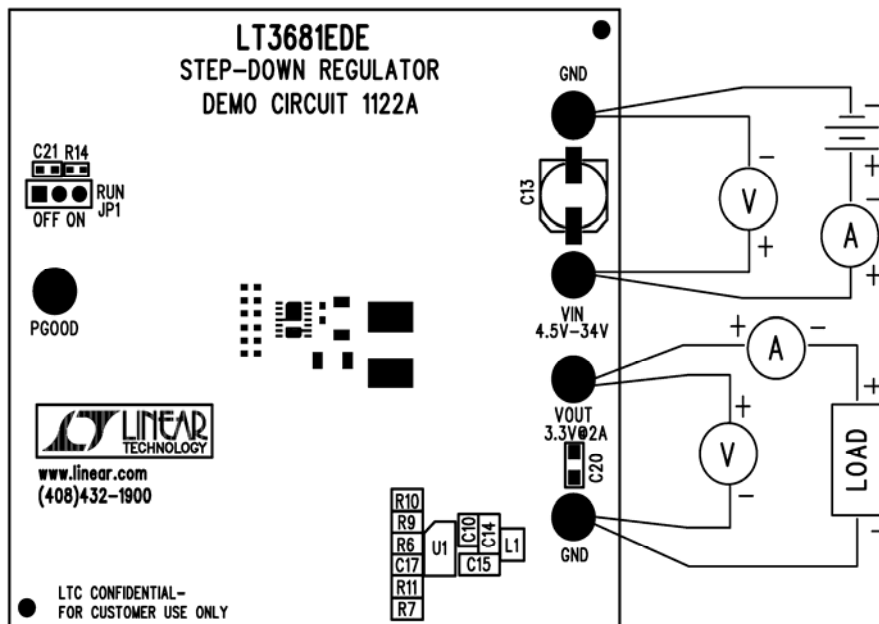

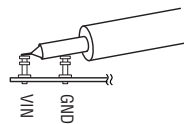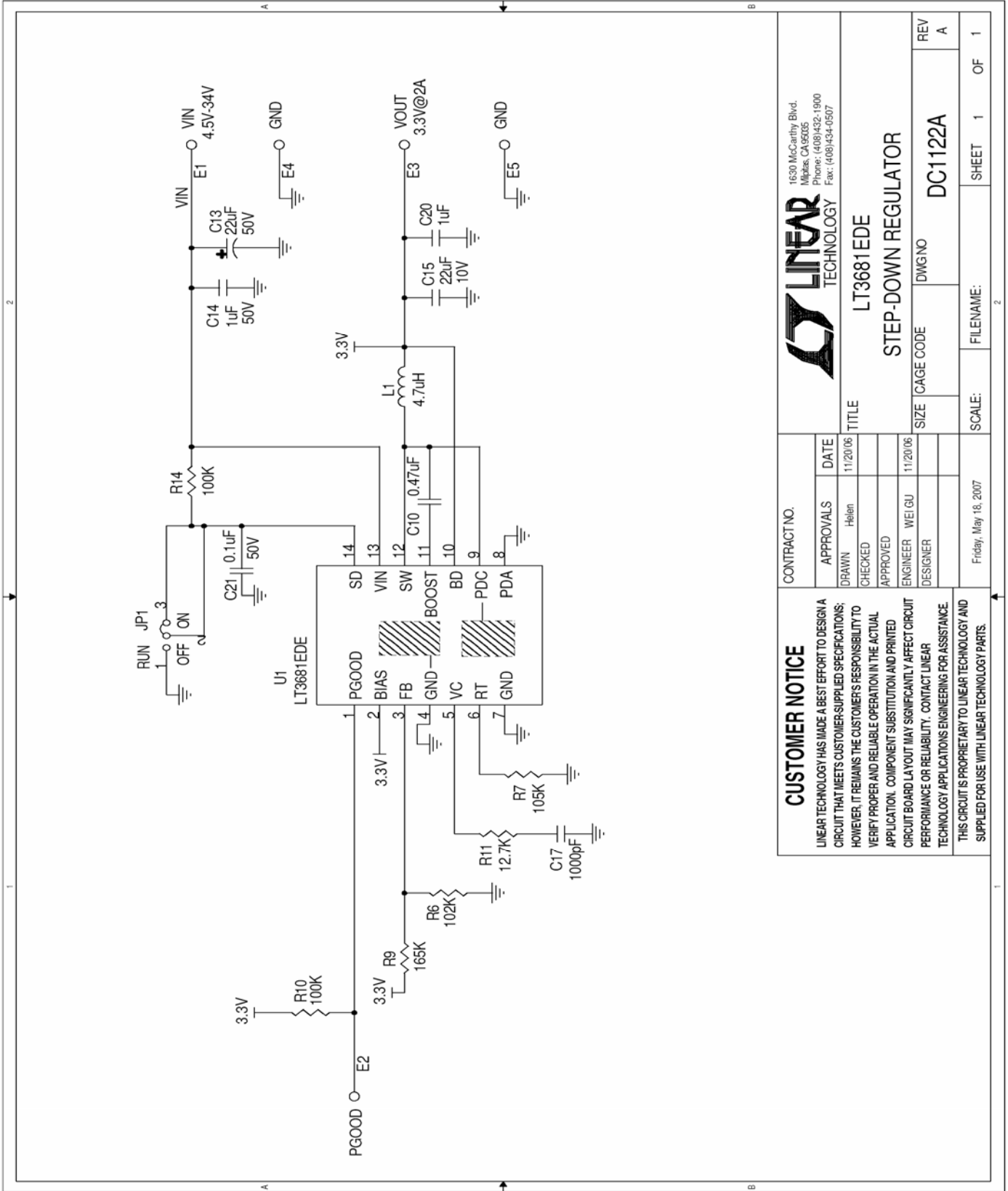**Figure 1. Proper Measurement Equipment Setup**

Figure 2. Measuring Input or Output Ripple

VIN
4.5V-34V
E1 VIN

E4 GND

VOUT
3.3V@2A
E3

E5 GND

C13
22uF
50V

C14
1uF
50V

C20
1uF

C15
22uF
10V

3.3V

L1
4.7uH

R14
100K

C21 0.1uF
50V

C10 0.47uF

RUN JP1
3
OFF ON
1

U1
LT3681EDE

SD 14
VIN 13
SW 12
BOOST 11
BD 10
PDC 9
PDA 8

PGOOD 1
BIAS 2
FB 3
GND 4
VC 5
RT 6
GND 7

3.3V

R7
105K

R11
12.7K

C17
1000pF

R6
102K

3.3V R9
165K

R10
100K

3.3V

PGOOD E2

CONTRACT NO.

APPROVALS		DATE
DRAWN	Helen	11/20/06
CHECKED		
APPROVED		
ENGINEER	WEI GU	11/20/06
DESIGNER		

Friday, May 18, 2007

LINEAR TECHNOLOGY
1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900
Fax: (408)434-0507

TITLE
LT3681EDE
STEP-DOWN REGULATOR

SIZE CAGE CODE | DWG NO DC1122A | REV A

SCALE: | FILENAME: | SHEET 1 OF 1

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