DEMO CIRCUIT 1122
QUICK START GUIDE

LT3681
Step-Down Regulator

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.

LT, LTC and LT are registered trademarks of Linear Technology Corporation. ThinSOT and PowerPath are trademarks of Linear Technology Corporation.

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.

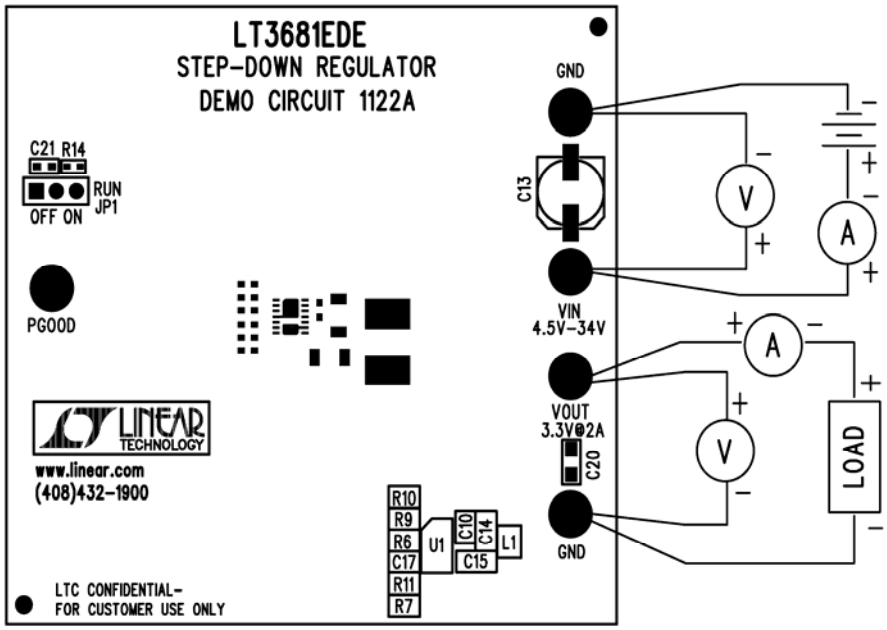


Figure 1. Proper Measurement Equipment Setup

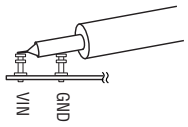
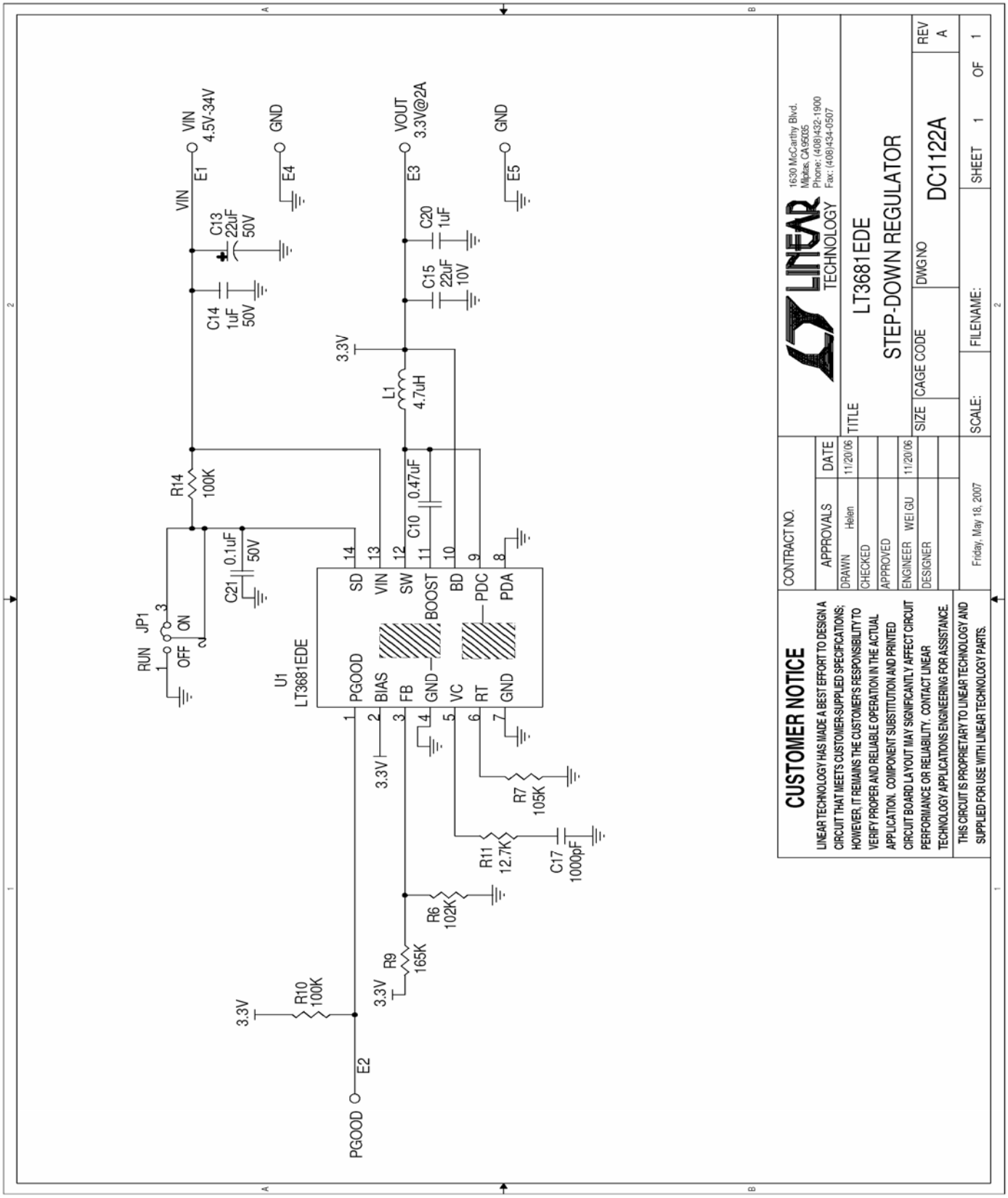


Figure 2. Measuring Input or Output Ripple


VIN
4.5V-34V
E1
C13
22uF
50V
C14
1uF
50V
GND
E4
VOUT
3.3V@2A
E3
C20
1uF
C15
22uF
10V
GND
E5
3.3V
L1
4.7uH
R14
100K
C10
0.47uF
C21
0.1uF
50V
RUN
JP1
ON
OFF
U1
LT3681EDE
PGOOD
BIAS
FB
GND
VC
RT
GND
SD
VIN
SW
BOOST
BD
PDC
PDA
3.3V
R10
100K
E2
PGOOD
3.3V
R9
165K
R6
102K
R11
12.7K
R7
105K
C17
1000pF
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.
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.
CONTRACT NO.
APPROVALS
DATE
DRAWN Helen
11/20/06
CHECKED
APPROVED
ENGINEER WEI GU
11/20/06
DESIGNER
SIZE
CAGE CODE
DWG NO
DC1122A
REV A
SCALE:
FILENAME:
SHEET 1 OF 1
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