# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 813
## HIGH VOLTAGE MICROPOWER VOLTAGE REGULATOR

## LT3013

## DESCRIPTION

Demonstration circuit 813 is a high voltage micropower voltage regulator using the LT3013 low dropout linear regulator, which comes in a low-profile 12-pin DFN package. DC813 has an input voltage range from 3V to 80V, an output voltage range between 1.24V and 60V, and is capable of delivering 250 mA max. The DC supply current is typically only 1 uA in shutdown. DC813 is installed with ceramic capacitors, because of its ability to maintain stability with ceramic output capacitors. Due to its high input voltage range, the DC813 voltage regulator is ideally suited for automotive and industrial applications.

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



## QUICK START PROCEDURE

DC813 is easy to set up to evaluate the performance of the LT3013. For proper measurement equipment configuration, set up the circuit according to the diagram in **Figure 1.**

Please follow the procedure outlined below for proper operation.

1. Before proceeding to test, insert a shunt into the OFF position of jumper JP1, and insert a shunt into jumper JP2, the 3.3V option.
2. Apply 5V across Vin (to GND). Insert the jumper JP1 shunt into the ON position. Draw 1 mA of load current. Measure Vout; it should be 3.3V +/- 2.5% (3.21V to 3.39V).
3. Vary the input voltage from 5V to 80V and the load current from no load to 250 mA. Vout should measure 3.3V +/- 5% (3.13V to 3.47V).

   Note: Be aware of the power dissipated by the LT3013, due to its high input voltage capability. Consequently, take care to stay under the maximum junction temperature, 125 deg.C, when operating the LT3013.
4. Insert the jumper JP1 shunt into the OFF position and move the shunt in jumper JP2 into the 5V output voltage option, and repeat the test. Re-insert jumper JP1 shunt into the ON position. Just as in the 3.3 Vout test, the 5V output voltage should read Vout +/- 2.5% tolerance under static line and load conditions, and +/- 5% tolerance under dynamic line and load conditions.
5. When finished evaluating, insert jumper JP1 shunt into the OFF position.

**Warning** - If long leads are used to power the demo circuit, the input voltage at the part could “ring”. This ringing could affect the operation of the circuit or even exceed the maximum voltage rating of the IC. To eliminate this, insert a small aluminum electrolytic capacitor (for instance, a Sanyo cap., part # 100CV10BS) on the pads between the input power and return terminals on the bottom of the demo board. The (greater) ESR of the aluminum electrolytic capacitor will 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.

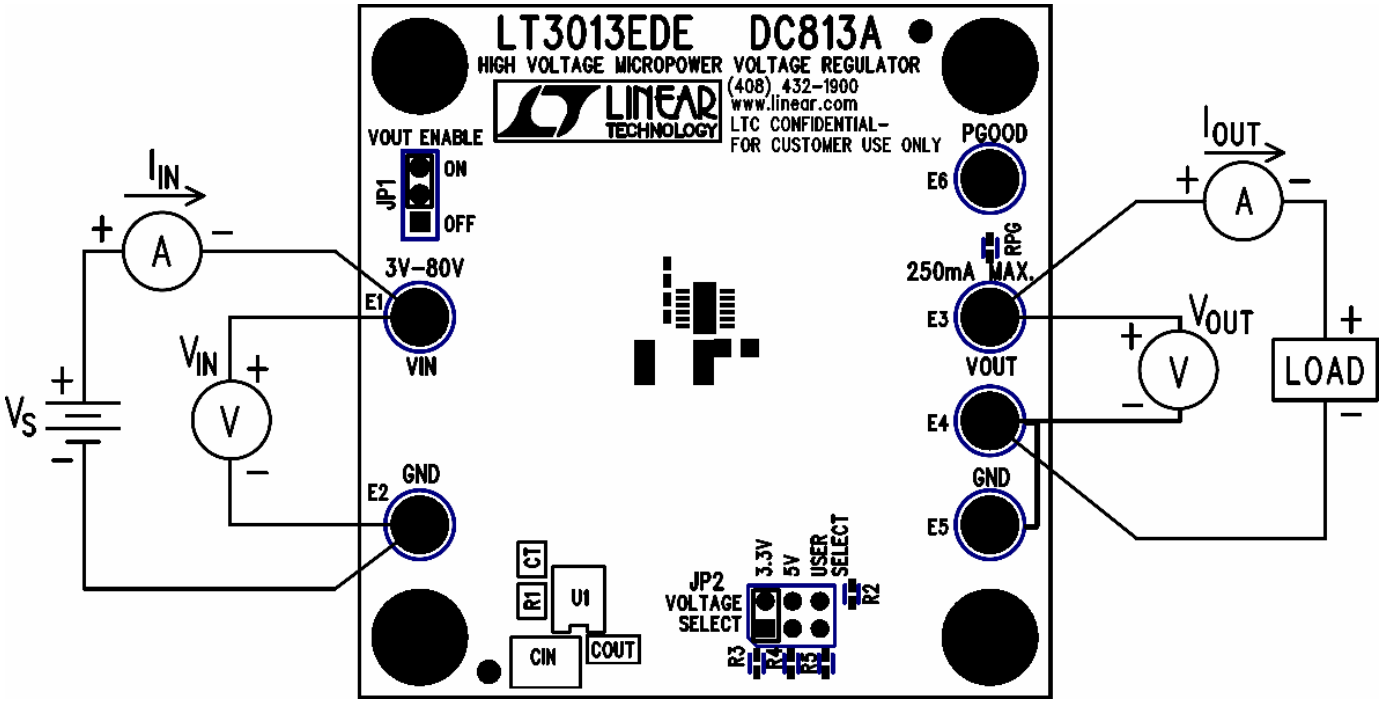



**Figure1. Proper Measurement Equipment Setup**

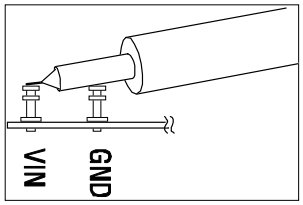
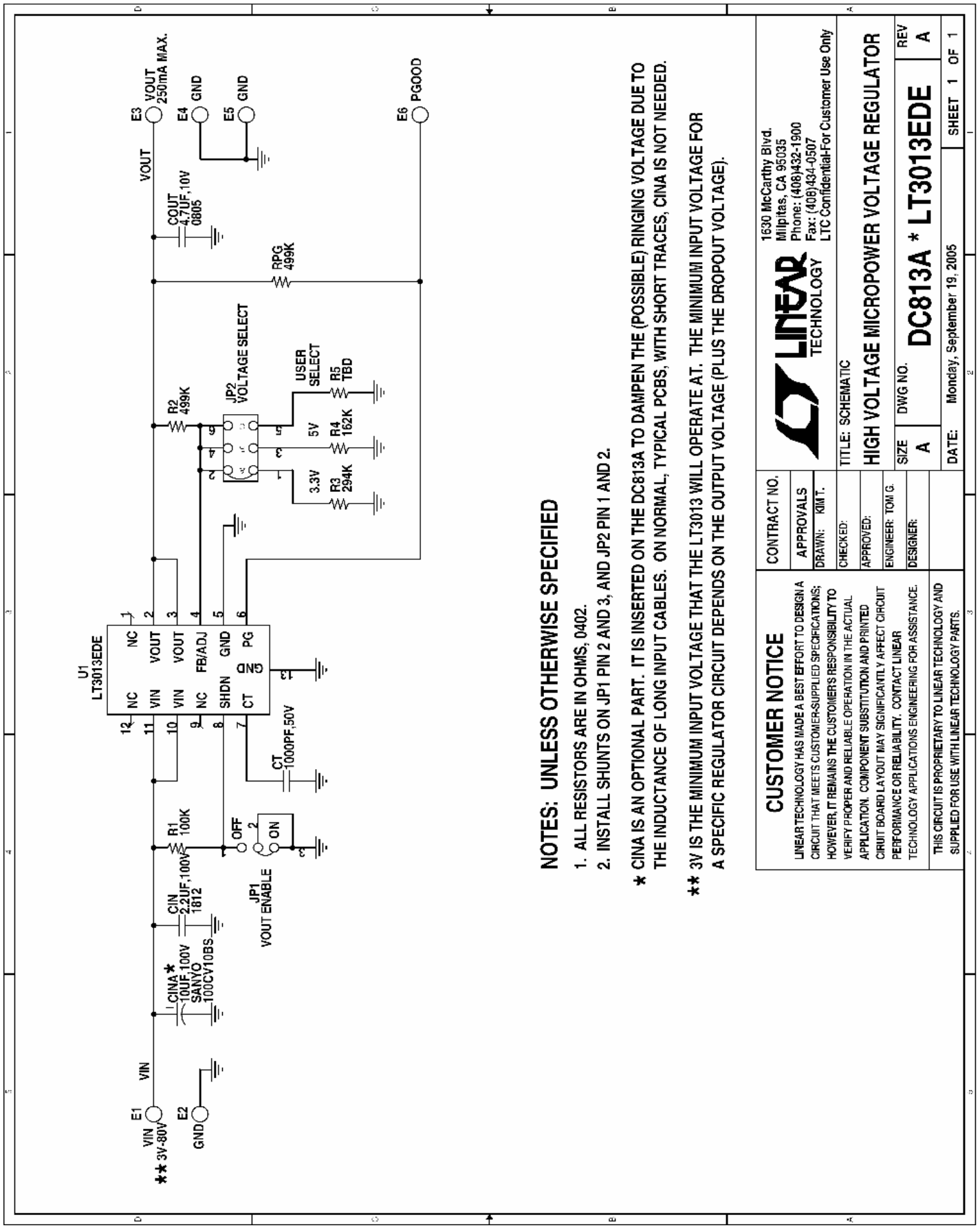



**Figure 2. Measuring Input or Output Voltage Ripple**




**NOTES: UNLESS OTHERWISE SPECIFIED**

1. ALL RESISTORS ARE IN OHMS, 0402.
2. INSTALL SHUNTS ON JP1 PIN 2 AND 3, AND JP2 PIN 1 AND 2.

* CINA IS AN OPTIONAL PART. IT IS INSERTED ON THE DC813A TO DAMPEN THE (POSSIBLE) RINGING VOLTAGE DUE TO THE INDUCTANCE OF LONG INPUT CABLES. ON NORMAL, TYPICAL PCBS, WITH SHORT TRACES, CINA IS NOT NEEDED.

** 3V IS THE MINIMUM INPUT VOLTAGE THAT THE LT3013 WILL OPERATE AT. THE MINIMUM INPUT VOLTAGE FOR A SPECIFIC REGULATOR CIRCUIT DEPENDS ON THE OUTPUT VOLTAGE (PLUS THE DROPOUT VOLTAGE).

**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 CIRUIT 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
DRAWN: KIM T.
CHECKED:
APPROVED:
ENGINEER: TOM G.
DESIGNER:

LINEAR TECHNOLOGY

1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900
Fax: (408)434-0507
LTC Confidential-For Customer Use Only

TITLE: SCHEMATIC

HIGH VOLTAGE MICROPOWER VOLTAGE REGULATOR

| SIZE | DWG NO. | REV |
|---|---|---|
| A | DC813A * LT3013EDE | A |

DATE: Monday, September 19, 2005 SHEET 1 OF 1