

## DESCRIPTION

Demonstration circuit 623 is a step-down (buck) regulator, using the LTC<sup>®</sup>3801 monolithic controller. The DC623 has an input voltage range of 2.5V to 9.8V and is capable of providing 1A at an output voltage of 2.5V from a single Li-Ion cell. The DC623 highlights the capabilities of the LTC3801, a constant frequency step-down DC-to-DC controller that comes in a tiny SOT-23 package and runs off extremely low quiescent currents. The LTC3801 uses a current mode PWM architecture to drive an external P-channel power

MOSFET in a buck regulator application. The result is a high performance power supply that is ideal for cell phones and other portable electronics operating from one or two Li-ion cell. Due to the use of surface mount components, the DC623 is a highly efficient power supply for use in very small spaces.

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

LTC is a registered trademark of Linear Technology Corporation.

**Table 1. Performance Summary ( $T_A = 25^\circ\text{C}$ )**

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		2.5V
Maximum Input Voltage		9.8V
Output Voltage	$V_{IN} = 2.5\text{V to } 9.8\text{V}, I_{OUT} = 0\text{A to } 1\text{A}$	$2.5\text{V} \pm 5\%$
Typical Output Ripple	$V_{IN} = 4.2\text{V}, I_{OUT} = 600\text{mA}$ (20MHz BW)	100mV <sub>P-P</sub>
Typical Supply Current	Normal $V_{IN} = 4.2\text{V}$	195
	Sleep $V_{IN} = 4.2\text{V}$	16
	Shutdown $V_{IN} = 4.2\text{V}, I_{th}/\text{Run}=0\text{V}$	5
Maximum Output Current	$V_{IN} = 4.2\text{V}, V_{OUT} = 2.5\text{V}$	1A (min)
Typical Load Regulation	$V_{IN} = 4.2\text{V}, 100\text{mA} \leq I_{OUT} \leq 1\text{A}$	1%

## QUICK START PROCEDURE

Demonstration circuit 623 is easy to set up to evaluate the performance of the LTC3801. 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  $V_{IN}$  or  $V_{OUT}$  and GND terminals. See Figure 2 for proper scope probe technique.

1. Turn on the input power supply, set to 5V, with no load on the output. Measure  $V_{OUT}$ ; it should be  $2.5\text{V} \pm 3\%$  (2.425V to 2.575V).
2. Vary the load current from no load to 1A. The output voltage should be within a tolerance of  $\pm 4\%$  (2.4V and 2.6V).
3. Vary the input voltage from 2.7V to 9.8V. The output voltage should be within  $\pm 5\%$  tolerance (2.375V and 2.625V).

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## 550KHZ MICROPOWER STEP-DOWN DC/DC CONTROLLER

4. With the load current at 1A, measure the output ripple voltage; it should measure less than 100 mVAC.
5. Observe the voltage waveform at the switch node (pin); the switching frequency should be between 500kHz and 650kHz ( $T = 2 \mu s$  and  $1.5 \mu s$ ).
6. To shut down the circuit, connect the RUN turret to ground (GND).

When finished, disconnect the power.

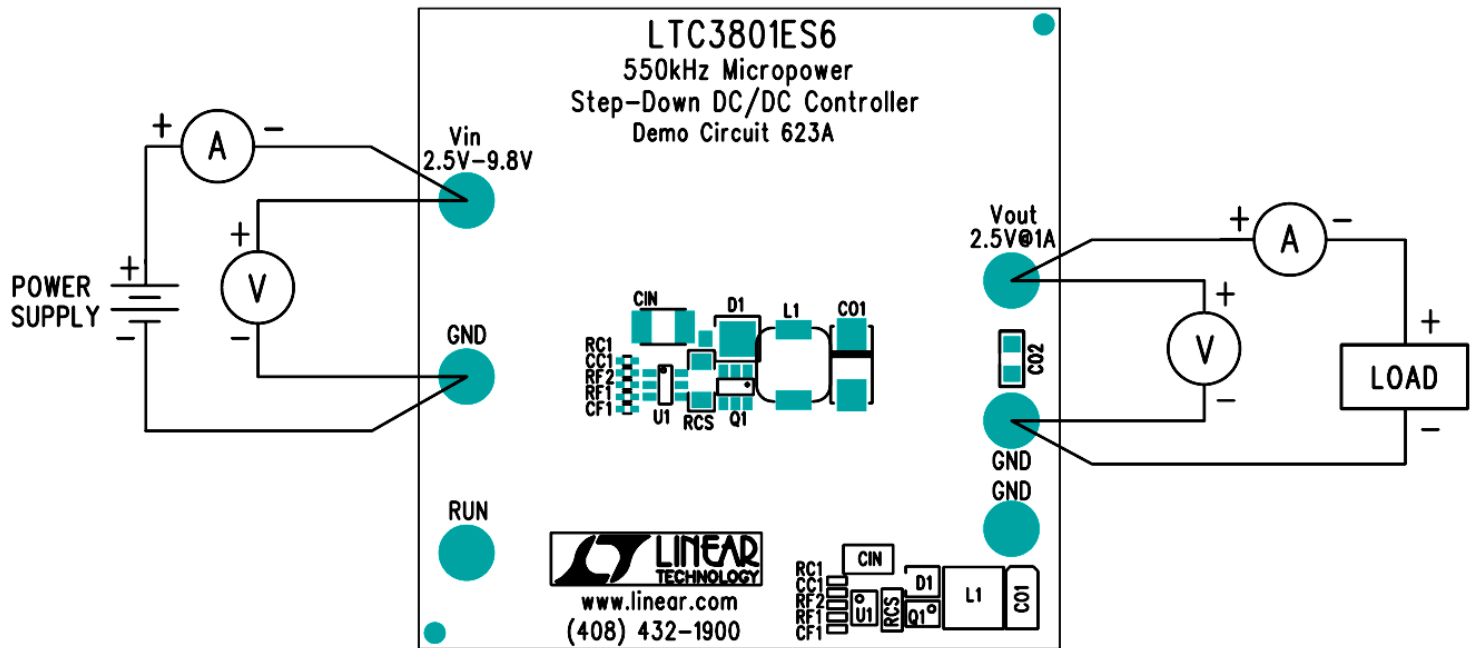


Figure 1. Proper Measurement Equipment Setup

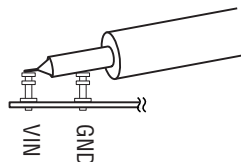
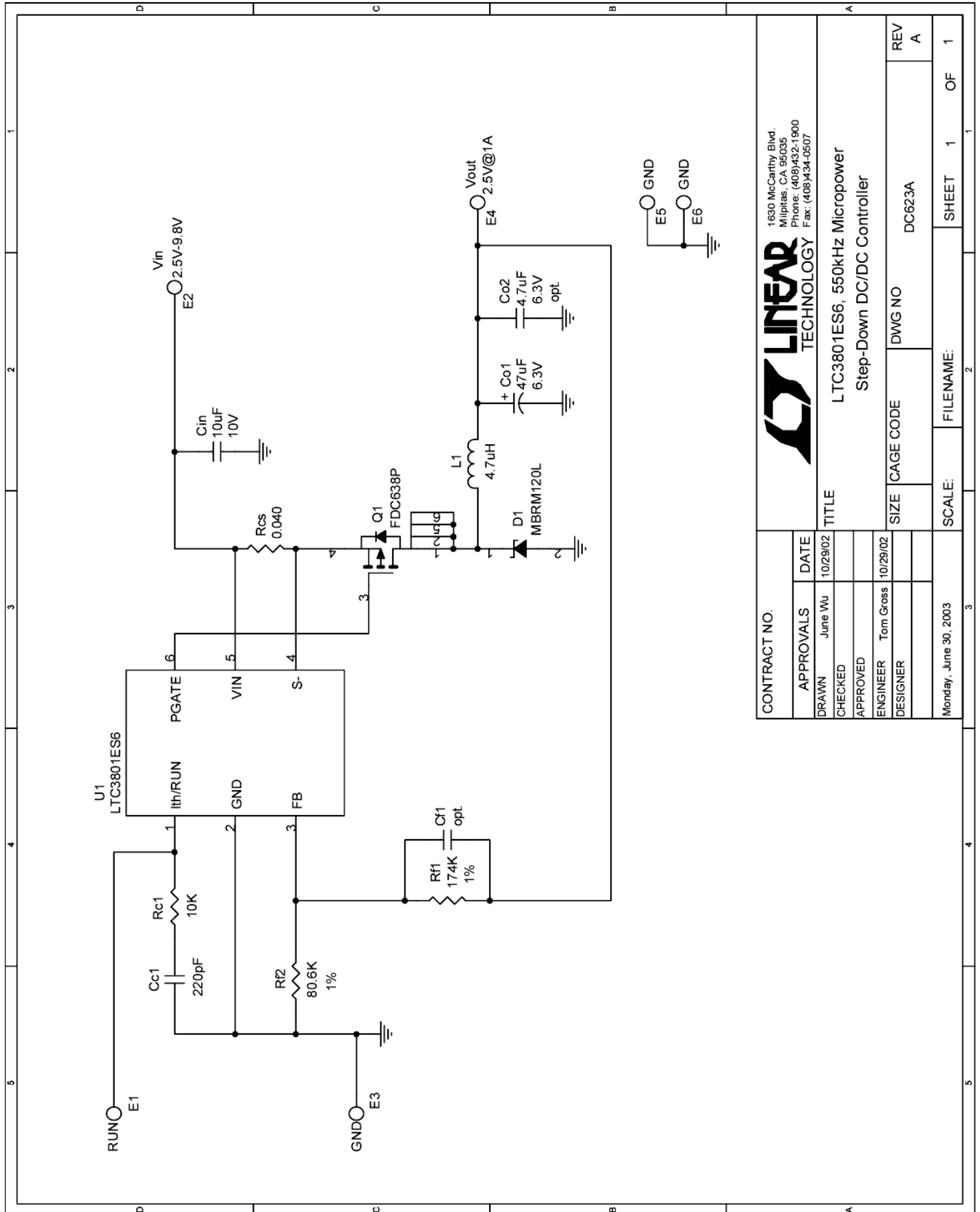


Figure 2. Measuring Input or Output Ripple

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 623

## 550KHZ MICROPPOWER STEP-DOWN DC/DC CONTROLLER



CONTRACT NO.		DATE		1630 McCarthy Blvd Milpitas, CA 95025 Phone: (408)432-1900 Fax: (408)434-0507	
APPROVALS	JUNE WU	10/29/02		LTC3801ES6, 550kHz Micropower Step-Down DC/DC Controller	
CHECKED				SIZE	REV A
APPROVED				CAGE CODE	DWG NO
ENGINEER	Tom Gross	10/29/02		SCALE	DC623A
DESIGNER				FILENAME:	REV A
Monday, June 30, 2003				SHEET	OF 1

# Mouser Electronics

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