

DESCRIPTION

Demonstration circuit 623 is a step-down (buck) regulator, using the LTC[®]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°C)

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		2.5V
Maximum Input Voltage		9.8V
Output Voltage	V _{IN} = 2.5V to 9.8V, I _{OUT} = 0A to 1A	2.5V ±5%
Typical Output Ripple	V _{IN} = 4.2V, I _{OUT} = 600mA (20MHz BW)	100mV _{P-P}
Typical Supply Current	Normal	V _{IN} = 4.2V
	Sleep	V _{IN} = 4.2V
	Shutdown	V _{IN} = 4.2V, I _{th} /Run=0V
Maximum Output Current	V _{IN} = 4.2V, V _{OUT} = 2.5V	1A (min)
Typical Load Regulation	V _{IN} = 4.2V, 100mA ≤ I _{OUT} ≤ 1A	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 2.5V ±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 ±4% (2.4V and 2.6V).
3. Vary the input voltage from 2.7V to 9.8V. The output voltage should be within ±5% tolerance (2.375V and 2.625V).

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 623

550KHZ MICROPPOWER 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 ($T = 2 \mu\text{s}$ and $1.5 \mu\text{s}$).
6. To shut down the circuit, connect the RUN turret to ground (GND).

When finished, disconnect the power.

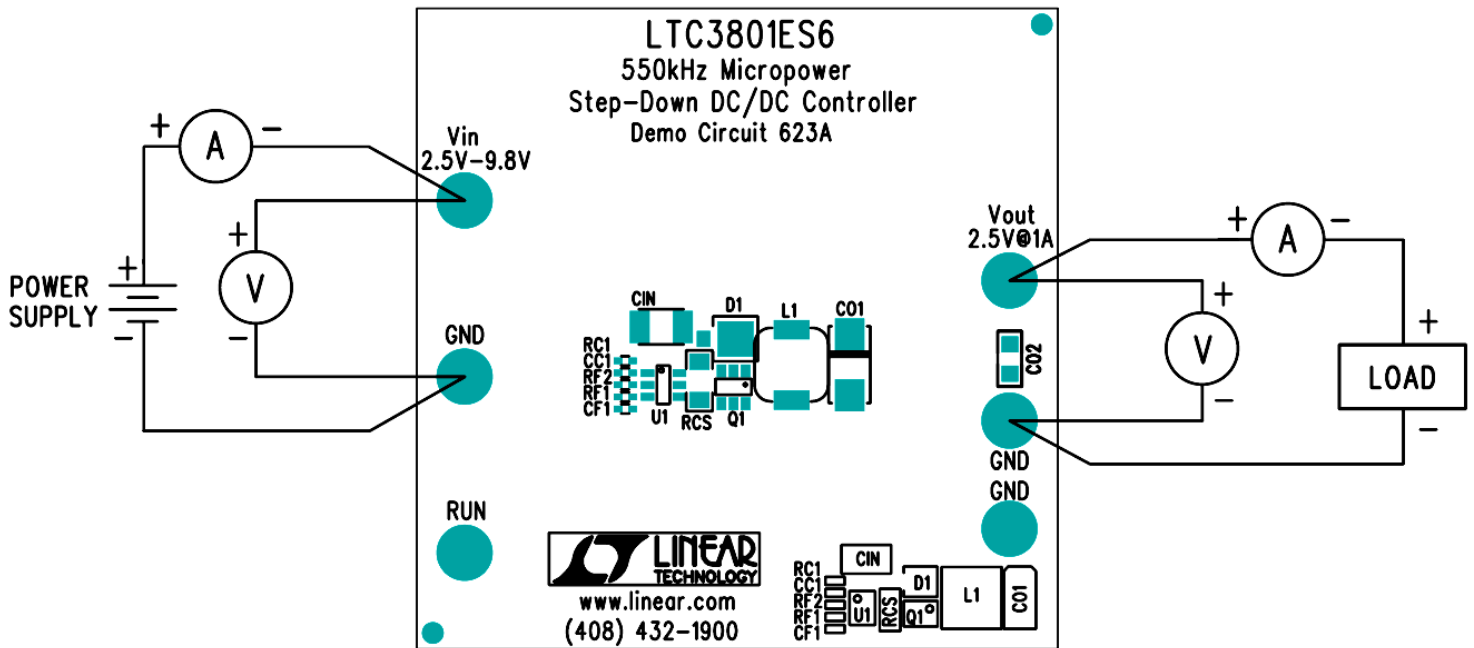


Figure 1. Proper Measurement Equipment Setup

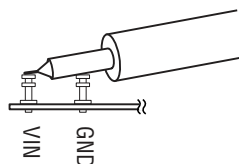
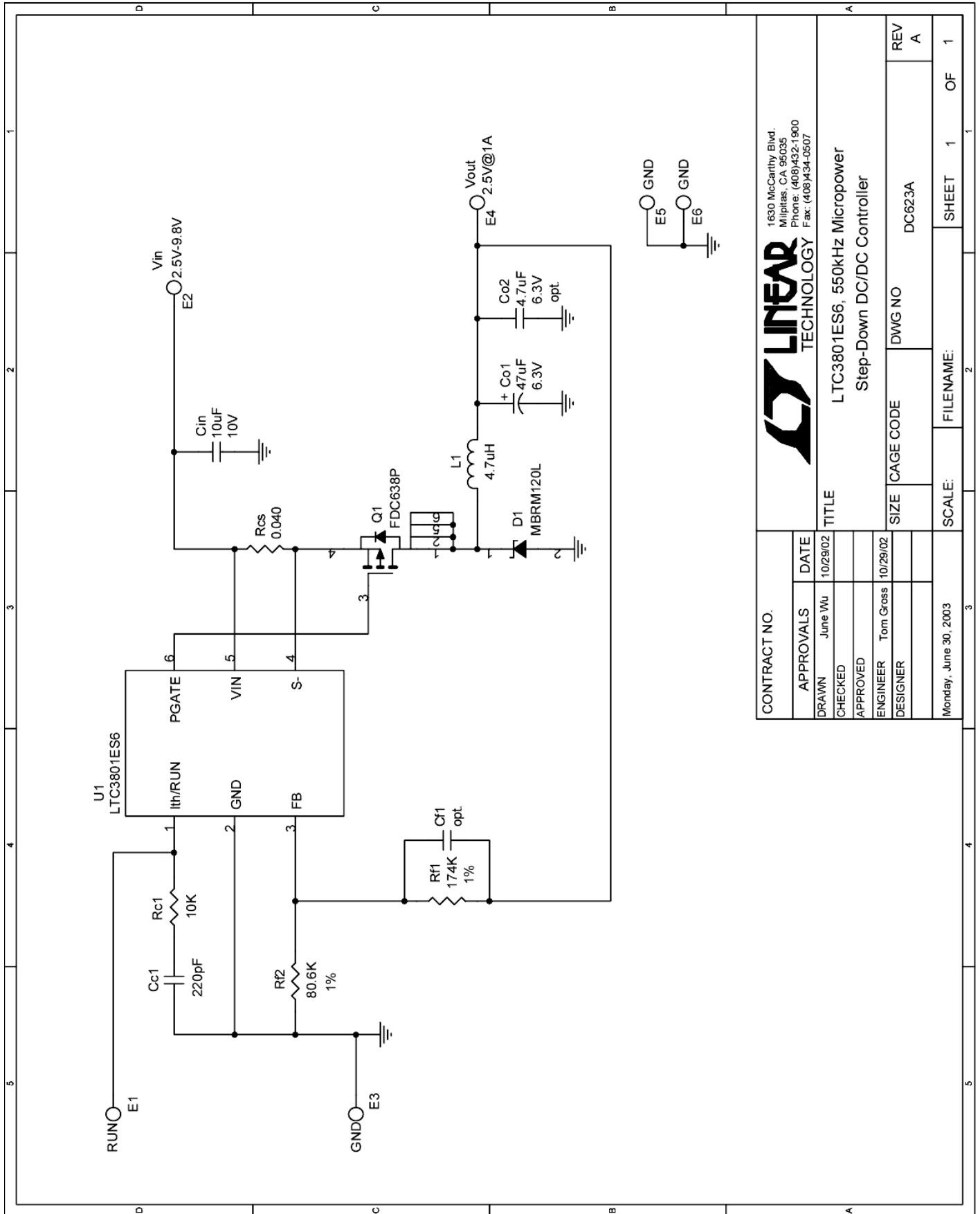


Figure 2. Measuring Input or Output Ripple

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 623

550KHZ MICROPOWER STEP-DOWN DC/DC CONTROLLER



CONTRACT NO.		DATE	
APPROVALS	June Wu	10/29/02	
DRAWN	June Wu	10/29/02	
CHECKED			
APPROVED	Tom Gross	10/29/02	
ENGINEER	Tom Gross		
DESIGNER			
Monday, June 30, 2003		SCALE:	FILENAME:
		SHEET	OF
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		1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408)432-1900 Fax: (408)434-0507	
TITLE		LTC3801ES6, 550kHz Micropower Step-Down DC/DC Controller	
SIZE	CAGE CODE	DWG NO	REV
		DC623A	A