

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 ($T_A = 25^\circ\text{C}$)

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 _{P-P}
Typical Supply Current	Normal	$V_{IN} = 4.2\text{V}$
	Sleep	$V_{IN} = 4.2\text{V}$
	Shutdown	$V_{IN} = 4.2\text{V}$, $I_{th}/\text{Run}=0\text{V}$
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).

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 623

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.

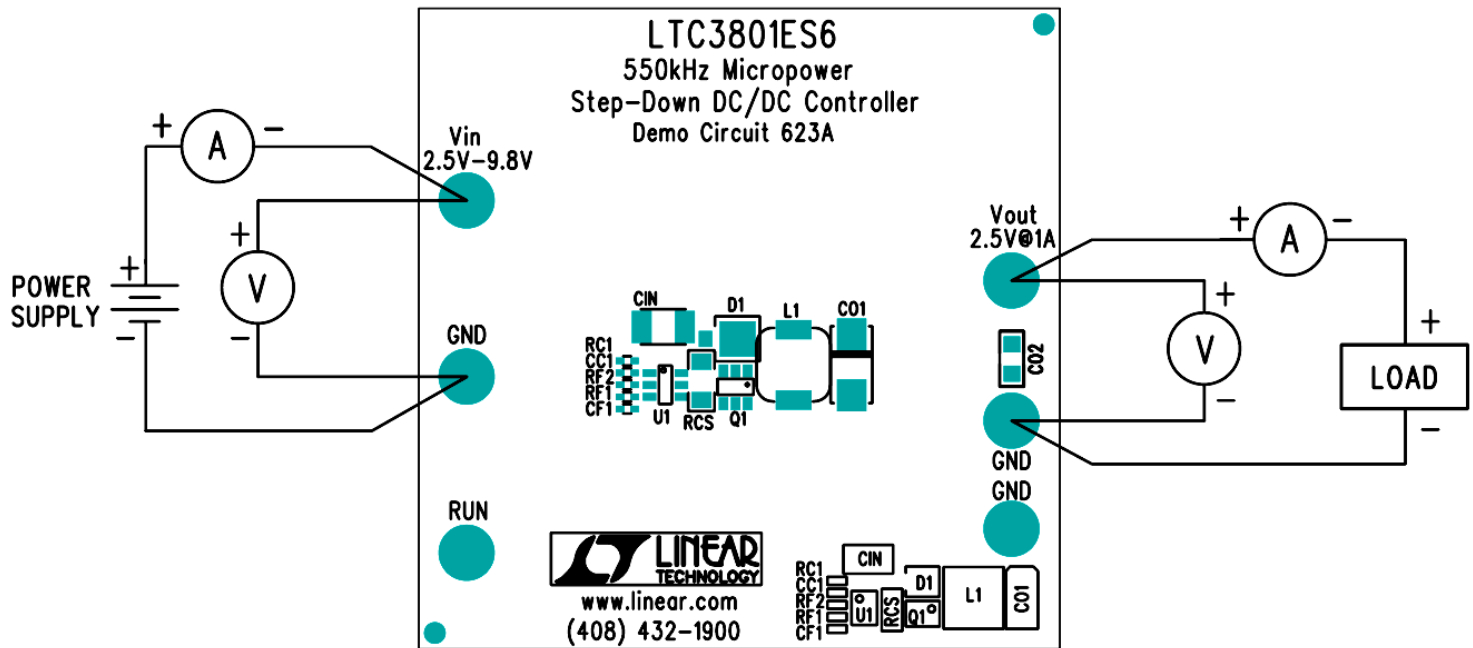


Figure 1. Proper Measurement Equipment Setup

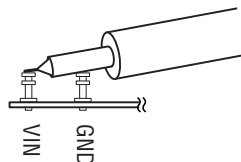


Figure 2. Measuring Input or Output Ripple

