



PRELIMINARY

LT1121-5

## Micropower Low Dropout Regulator

April 1992

### FEATURES

- 0.4V Dropout Voltage
- 150mA Output Current
- 30 $\mu$ A Quiescent Current
- 5V Trimmed Output Voltage
- Controlled Quiescent Current in Dropout
- Shutdown Available in 8-Pin Pkg.
- 16 $\mu$ A Quiescent Current in Shutdown
- Stable With 0.33 $\mu$ F Output Capacitor
- Reverse Battery Protection
- No Reverse Output Current

### APPLICATIONS

- Low Current Regulator
- Regulator for Battery Powered Systems
- Post Regulator for Switching Supplies

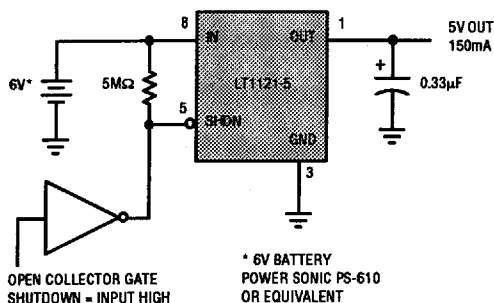
### DESCRIPTION

The LT1121-5 is a Micropower Low Dropout Regulator with shutdown. The device is capable of supplying over 150 milliamps of output current with a dropout voltage of 0.4V at maximum output. For use in battery powered systems the low quiescent current, 30 microamps operating and 16 microamps in shutdown, makes it an ideal choice. Also the quiescent current does not rise in dropout as it does with many other low dropout PNP regulators.

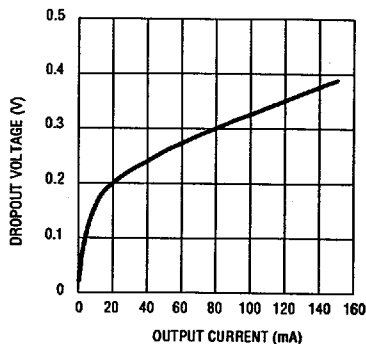
Other features of the LT1121-5 include the ability to operate with very small output capacitors. It is stable with only 0.33  $\mu$ F on the output while most older devices require between 1 $\mu$ F and 100 $\mu$ F for stability. Small ceramic capacitors can be used, enhancing manufacturability. Also the input may be connected to ground or a reverse voltage without reverse current flow from output to input. This makes the LT1121-5 ideal for back-up power situations where the output is held high and the input is at ground or reversed. Only 16 $\mu$ A will flow from the output pin to ground.

### TYPICAL APPLICATION

5V BATTERY POWERED SUPPLY  
WITH SHUTDOWN



Dropout Voltage



**ABSOLUTE MAXIMUM RATINGS**

Input Voltage .....±20V  
 Shutdown Input Voltage\* ..... +5.5V, -0.6V  
 Output Short Circuit Duration ..... Indefinite  
 Operating Junction Temperature Range  
     LT1121M ..... -55°C to 125°C  
     LT1121C ..... 0°C to 100°C  
 Storage Temperature Range ..... -65°C to 150°C  
 Lead Temperature (Soldering, 10 sec.) ..... 300°C

\* LOW IMPEDANCE SOURCE

**PACKAGE/ORDER INFORMATION**

<p>TOP VIEW</p> <p>J8 PACKAGE CERAMIC DIP                  N8 PACKAGE PLASTIC DIP                  S8 PACKAGE PLASTIC SO</p>	<p>ORDER PART NUMBER</p> <p>LT1121MJ8-5                  LT1121CJ8-5                  LT1121CN8-5                  LT1121CS8-5</p>
	<p>S8 PART MARKING</p> <p>12105</p>
<p>BOTTOM VIEW</p> <p>Z PACKAGE TO-92 PLASTIC</p>	<p>LT1121CZ-5</p>

**ELECTRICAL CHARACTERISTICS**

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Regulated Output Voltage	$V_{IN} = 5.5V, T_J = 25^\circ C$	4.925	5.000	5.075	V
	$6V < V_{IN} < 20V, 1mA < I_{OUT} < 100mA$	● 4.850		5.100	V
	$6V < V_{IN} < 20V, 1mA < I_{OUT} < 150mA$	● 4.800		5.100	V
Line Regulation	$\Delta V_{IN} = 5.5V \text{ to } 20V, I_{OUT} = 1mA$	●	1	10	mV
Load Regulation	$\Delta I_{load} = 1mA \text{ to } 150mA, T_J = 25^\circ C$	●	-0.005	-0.007	%/mA
	$\Delta I_{load} = 1mA \text{ to } 150mA$	●	-0.008	-0.012	%/mA
Dropout Voltage	$I_{load} = 50mA$	●	0.30	0.50	V
	$I_{load} = 100mA$	●	0.37	0.60	V
	$I_{load} = 150mA$	●	0.42	0.70	V
Ground Pin Current	$I_{load} = 0mA, V_{IN} = 5V$	●	30	45	μA
	$I_{load} = 1mA, V_{IN} = 5V$	●	90	130	μA
	$I_{load} = 50mA, V_{IN} = 5V$	●	2.0	2.5	mA
	$I_{load} = 100mA, V_{IN} = 5V$	●	5.0	8.0	mA
	$I_{load} = 150mA, V_{IN} = 5V$	●	10.0	15.0	mA
Input Pin Reverse Leakage Current	$V_{IN} = -20V, V_{OUT} = 0V$	●		1.0	mA
Reverse Output Current	$V_{IN} = 0V, V_{OUT} = 5V$		16	25	μA
Shutdown Threshold	$V_{OUT} = \text{off to on}$	●	1.2	3.0	V
	$V_{OUT} = \text{on to off}$	●	0.2	0.75	V
Shutdown Pin Current	$V_{SHDN} = 0V$	●	6	10	μA
Quiescent Current in Shutdown	$V_{IN} = 6V, V_{SHDN} = 0V$	●	16	25	μA
Ripple Rejection	$V_{IN} = 6V, I_{load} = 0.1A, V_{RIPPLE} = 0.5Vp-p$	●	50	58	dB
Current Limit	$V_{IN} - V_{OUT} = 7V$		220	500	mA

The ● denotes specifications which apply over the operating temperature range.