



LC1251

REV1.0-Revised DEC 2007

Wide input 150mA Low Consumption Linear Regulator

DESCRIPTION

LC1251 series is a group of positive voltage output, high voltage input, low power consumption, low dropout voltage regulator. It can afford 150mA output current when input-output voltage differential drops to 900mV.

LC1251 can provide output value in the range of 2.5V~12V every 0.1V step. It also can be customized on command.

LC1251 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

LC1251 has well load transient response and good temperature characteristic, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within $\pm 2\%$.

LC1251 is available in SOT-89-5 with EN Pin and TO-92, SOT-89-3 without EN Pin packages which is lead free.

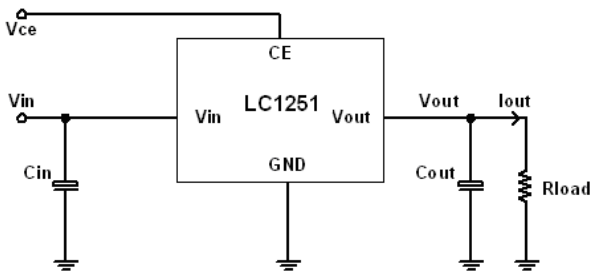
FEATURES

- Low Power Consumption: 9uA (Typ.)
- High Output Current: 150mA
- Small Input-Output Differential: 900mV@150mA (Vout=3.3V)
- High input voltage (up to 24V)
- Highly Accuracy: $\pm 2\%$
- Output Current Limit

APPLICATIONS

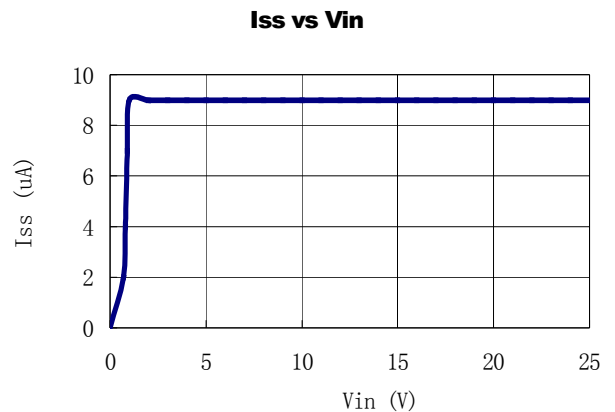
- Battery Powered equipment
- Communication equipment
- Audio/Video equipment

TYPICAL APPLICATION



NOTE: Input capacitor ($C_{in}=1\mu F$) and Output capacitor ($C_{out}=1\mu F$) are recommended in all application circuit. Tantalum capacitor is recommended.

ELECTRICAL CHARACTERISTICS



ORDERING INFORMATION

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Code	Description
1	Temperature&RoHS: C:-40~85°C ,Pb Free RoHS Std.
2	Package type: C3:SOT-89-3 C5:SOT-89-5 H:TO-92
3	Packing type: TR:Tape&Reel (Standard) BG:Bag(TO-92)
4	Output voltage: e.g. 25=2.5V 50=5.0V 12=12V
5	Voltage accuracy: Blank(default)= ± 2%

ABSOLUTE MAXIMUM RATING

Parameter	Value	
Max Input Voltage	26V	
Operating Junction Temperature(Tj)	125°C	
Output Current	150mA	
Ambient Temperature(Ta)	-40°C ~85°C	
Power Dissipation	SOT-89-3	500mW
	SOT-89-5	500mW
	TO-92	500mW
Storage Temperature(Ts)	-40°C -150°C	
Lead Temperature & Time	260°C,10S	

Note:

Exceed these limits to damage to the device.
Exposure to absolute maximum rating conditions may affect device reliability.

RECOMMENDED WORK CONDITIONS

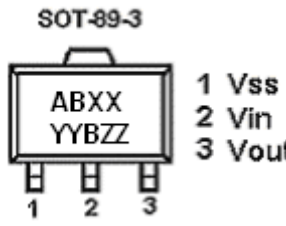
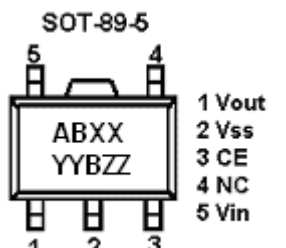
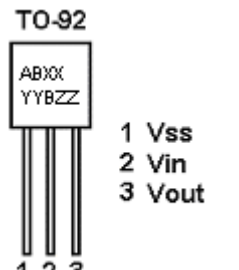
Parameter	Value
Input Voltage Range	Max.24V
Ambient Temperature	-40°C ~85°C

ELECTRICAL CHARACTERISTICS

(Test Conditions: Cin=1uF,Cout=1uF,TA=25°C, Unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
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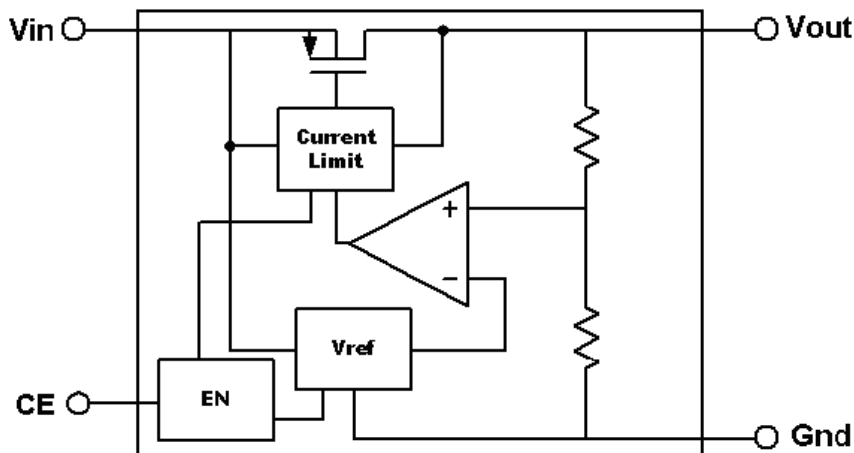
PIN CONFIGURATION

Product Classification		LC1251CC3TR□□	
Marking			
ABXX	AB:Product Code		
YYBZZ	XX: Output Voltage		
	YY:Data Code		
	B:Fab Code		
	ZZ:Data Code		
Product Classification		LC1251CC5TR□□	
ABXX	AB:Product Code		
	YYBZZ		XX: Output Voltage
			YY:Data Code
			B:Fab Code
	ZZ:Data Code		
Product Classification		LC1251CHBG□□	
ABXX	AB:Product Code		
	YYBZZ		XX: Output Voltage
			YY:Data Code
			B:Fab Code
	ZZ:Data Code		
Vss	Ground Pin		
Vin	Supply Voltage Input		
Vout	Output Voltage		
CE	Chip Enable		
NC	No Connection		

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Vin	Input Voltage				24	V
Vout	Output Voltage	Vin=Vout+2.0V	x0.98		x1.02	V
Iout(Max.)	Maximum Output Current	Vin-Vout=1.5V	150			mA
Dropout Voltage	Input-Output Voltage Differential	Iout=20mA		270	500	mV
		Iout=150mA		900	1200	
$\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$	Line Regulation	Iout=20mA Vout+1V ≤ Vin ≤ 24V		0.2	0.3	%/V
ΔV_{out}	Load Regulation	Vin-Vout=2.0V 1mA ≤ Iout ≤ 40mA		30	60	mV
Iq	Quiescent Current	Vin-Vout=2.0V Vin=VCE		9	15	uA
Ilim	Current Limit	Vin-Vout=2.0V	250			mA
VCEH	CE "H" Input Voltage		1.5		Vin	V
VCEL	CE "L" Input Voltage		0.0		0.3	V

BLOCK DIAGRAM



Explanation

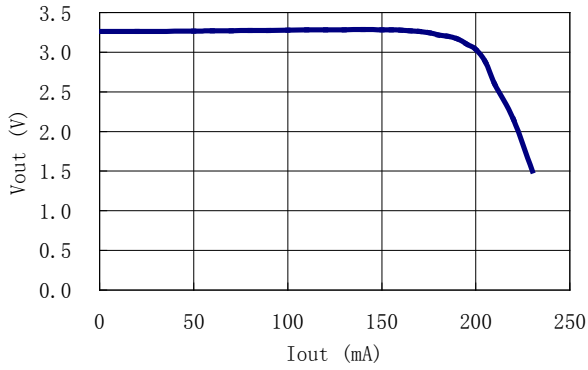
LC1251 is a series of low dropout voltage and low power consumption regulator. Its application circuit is very simple, which only needs two outside capacitors. It is composed of these modules: high accuracy voltage reference, current limit circuit, error amplifier, output driver and power transistor.

Current Limit module can keep chip and power system away from danger when load current is more than 150mA.

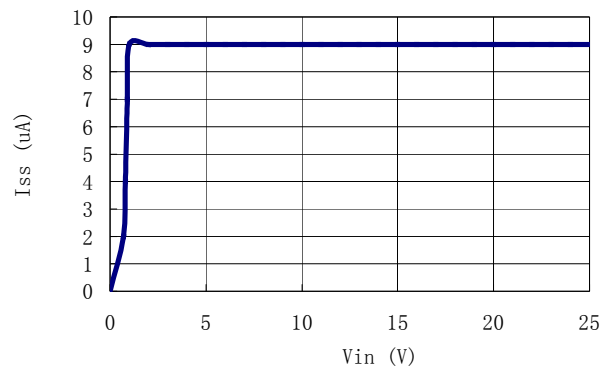
LC1251 uses trimming technique to assure the accuracy of output value within $\pm 2\%$.

TYPICAL PERFORMANCE CHARACTERISTICS

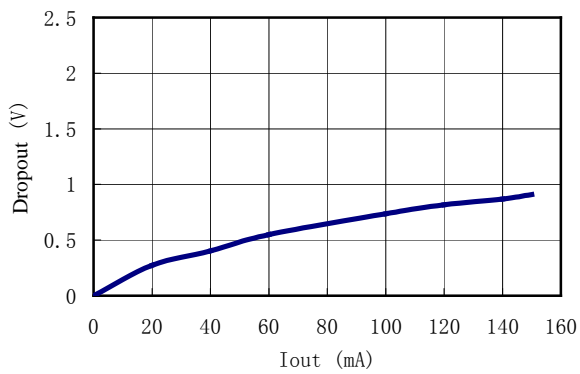
Vout vs Iout



Iss vs Vin



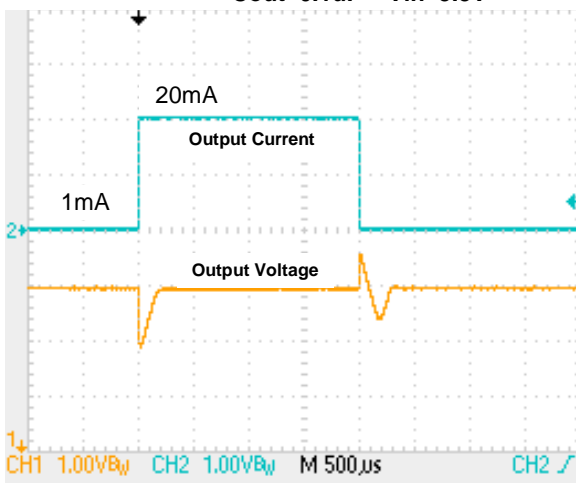
Dropout vs Iout



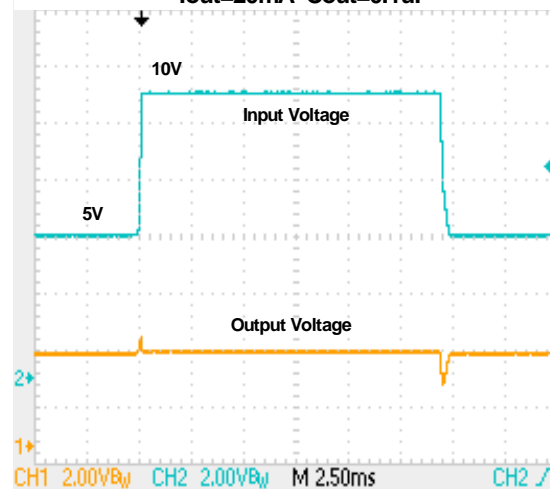
Load Transient Response

Input Transient Response

Cout=0.1uF Vin=5.3V



Iout=20mA Cout=0.1uF

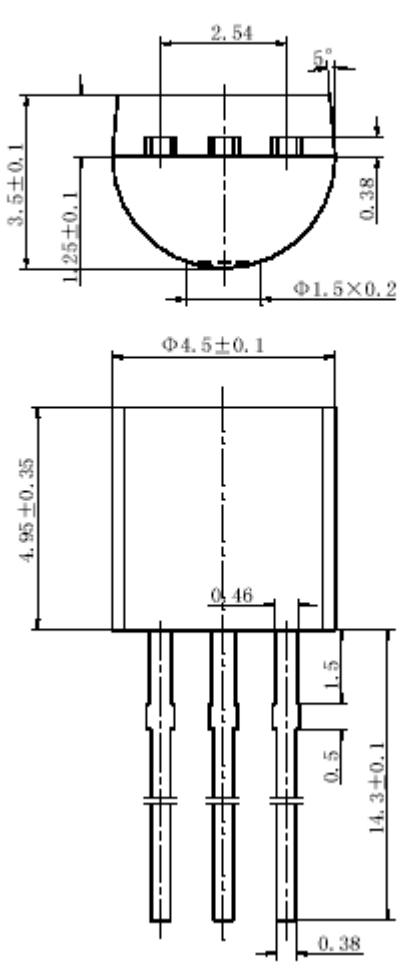


PACKAGE LINE

Package	SOT-89-3	Devices per reel	1000Pcs	Unit	mm
<p>Package Dimension:</p> <p>The drawing shows three views of the SOT-89-3 package. The top view shows a rectangular body with a central circular hole of diameter $\varnothing 1.0$. The overall width is 4.5 ± 0.1 mm. The distance from the center of the hole to the top edge of the package is 2.5 ± 0.1 mm. The total height of the package is 4.25 mm MAX. The top flange has a width of 1.6 ± 0.2 mm and a height of 0.4 mm. The three leads are labeled 1, 2, and 3. The distance from the center of the hole to the center of lead 2 is 1.5 ± 0.1 mm. The distance from the center of the hole to the center of lead 1 is 0.42 ± 0.2 mm. The distance from the center of the hole to the center of lead 3 is 0.42 ± 0.2 mm. The height of the leads is 0.8 mm MIN. The bottom view shows the lead spacing: 1.5 ± 0.1 mm between leads 1 and 2, and 1.5 ± 0.1 mm between leads 2 and 3. The lead width is 0.47 ± 0.1 mm. The side view shows the package height and the lead height of 0.4 ± 0.1 mm.</p>					

Package	SOT-89-5	Devices per reel	1000Pcs	Unit	mm
<p>Package dimension:</p> <p>The drawing shows three views of the SOT-89-5 package. The top view shows a rectangular body with a central circular hole of diameter $\varnothing 1.0$. The overall width is 4.5 ± 0.1 mm. The distance from the center of the hole to the top edge of the package is 2.5 ± 0.1 mm. The total height of the package is $4.5 + 0.5 - 0.3$ mm. The top flange has a width of 1.6 ± 0.2 mm and a height of 0.4 mm. The two leads on the top are labeled 4 and 5. The distance from the center of the hole to the center of lead 4 is 0.42 ± 0.1 mm. The three leads at the bottom are labeled 1, 2, and 3. The distance from the center of the hole to the center of lead 2 is 1.5 ± 0.1 mm. The distance from the center of the hole to the center of lead 1 is 0.42 ± 0.2 mm. The distance from the center of the hole to the center of lead 3 is 0.42 ± 0.2 mm. The height of the leads is 0.9 mm MIN. The bottom view shows the lead spacing: 1.5 ± 0.1 mm between leads 1 and 2, and 1.5 ± 0.1 mm between leads 2 and 3. The lead width is 0.47 ± 0.1 mm. The side view shows the package height and the lead height of 0.4 ± 0.1 mm.</p>					

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Package	TO-92	Devices per Bag	1000Pcs	Unit	mm
Package Dimension:					
TO-92					
 <p>The technical drawing shows two views of a TO-92 package. The top view is a semi-circle with a diameter of $\Phi 1.5 \times 0.2$. The width of the top flat surface is 2.54 mm. The total height from the top surface to the bottom of the semi-circle is 3.5 ± 0.1 mm. The height of the top flat surface is 1.25 ± 0.1 mm. The bottom edge of the semi-circle has a 5° chamfer. The side view shows a cylindrical body with a diameter of $\Phi 4.5 \pm 0.1$ mm and a height of 4.95 ± 0.35 mm. The distance from the top of the cylinder to the top of the leads is 0.46 mm. The leads are spaced 1.5 mm apart. The length of the leads is 14.3 ± 0.1 mm. The width of the lead base is 0.38 mm. The lead thickness is 0.5 mm.</p>					

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