



LC1208

REV1.0-Revised DEC 2009

200mA Low Consumption Linear Regulator

DESCRIPTION

LC1208 series is a group of positive voltage output, low power consumption, low dropout voltage, three terminal regulator. It can provide 200mA output current when input / output voltage differential drops to 430mV ($V_{out}=2.8V$), The very low power consumption of LC1208 ($I_q=1.0\mu A$) can greatly improve natural life of batteries.

LC1208 can provide output value in the range of 1.1V~5.5V in 0.1V steps. It also can customized on command.

LC1208 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

LC1208 has well load transient response and good temperature characteristic, And it uses trimming technique to guarantee output voltage accuracy within $\pm 2\%$.

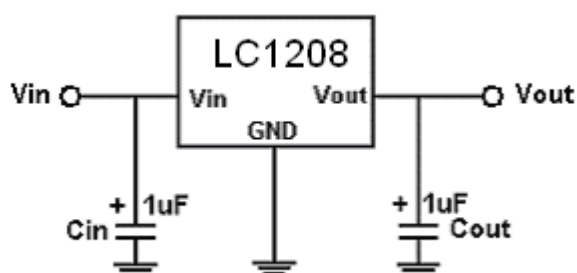
FEATURES

- Low Power Consumption: $1.0\mu A$ (Typ.)
- Maximum Output Current: 200mA
- Small Dropout Voltage
210mV@100mA ($V_{out}=2.8V$)
430mV@200mA ($V_{out}=2.8V$)
- Input Voltage Range: 1.5V~6V
- Output Voltage Range: 1.1V~5.5V (customized on command in 0.1V steps)
- Highly Accurate: $\pm 2\%$ ($\pm 1\%$ customized)
- Output Current Limit

APPLICATIONS

- Battery Powered equipment
- Power Management of MP3、PDA、DSC、Mouse、PS2 Games
- Reference Voltage Source Regulation after Switching Power

TYPICAL APPLICATION



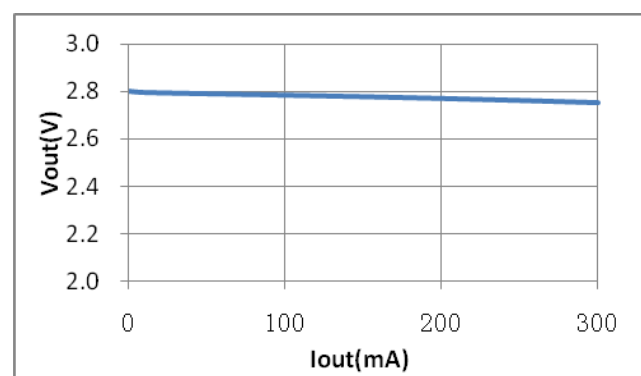
APPLICATION HINTS

NOTE1: Input capacitor ($C_{in}=1\mu F$) is recommended in all application circuit. Ceramic capacitor is recommended.

NOTE2: Output capacitor ($C_{out}=1\mu F$) is recommended in all application to assure the stability of circuit. Ceramic capacitor is recommended.

ELECTRICAL CHARACTERISTICS

Output Voltage VS. Output Current ($V_{out}=2.8V$)



ORDERING INFORMATION

LC1208 [1](#) [2](#) [3](#) [4](#) [5](#)

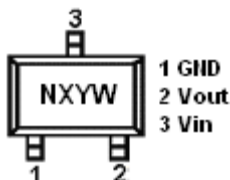
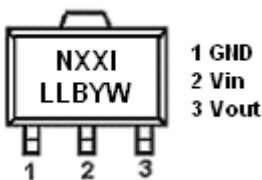
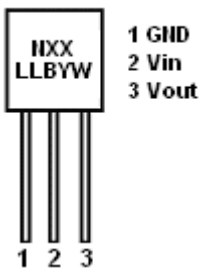
Code	Description
1	Temperature&RoHS: C:-40~85°C ,Pb Free RoHS Std.
2	Package type: B3:SOT-23-3 C3:SOT-89-3 H:TO-92
3	Packing type: TR:Tape&Reel (Standard) BG:Bag (TO-92)
4	Output voltage: e.g. 11=1.1V 15=1.5V 55=5.5V
5	Voltage accuracy: 1=±1% Blank(default)=±2%

ABSOLUTE MAXIMUM RATING

Parameter	Value								
Max Input Voltage	8V								
Operating Junction Temperature(Tj)	125°C								
Ambient Temperature(Ta)	-40°C -85°C								
Power Dissipation	<table> <tr> <td>SOT-23-3</td><td>250mW</td></tr> <tr> <td>SOT-23-5</td><td>250mW</td></tr> <tr> <td>SOT-89-3</td><td>500mW</td></tr> <tr> <td>TO-92</td><td>500mW</td></tr> </table>	SOT-23-3	250mW	SOT-23-5	250mW	SOT-89-3	500mW	TO-92	500mW
SOT-23-3	250mW								
SOT-23-5	250mW								
SOT-89-3	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.

PIN CONFIGURATION

Product Classification		LC1208CB3TR□□□
Marking		SOT-23-3 
NXYW	N:Product Code	
	X:Output Voltage	
	YW: Date Code	
Product Classification		LC1208CC3TR□□□
Marking		SOT-89-3 
NXX LLBYW	N:Product Code	
	XX:Output Voltage	
	LL:LOT NO.	
	B:FAB Code	
	YW:Date Code	
Product Classification		LC1208CHBG□□□
Marking		TO-92 
NXX LLBYW	N:Product Code	
	XX:Output Voltage	
	LL:LOT NO.	
	B:FAB Code	
	YW:Date Code	
GND	Ground Pin	
Vin	Supply Voltage Input	
Vout	Output Voltage	

RECOMMENDED WORK CONDITIONS

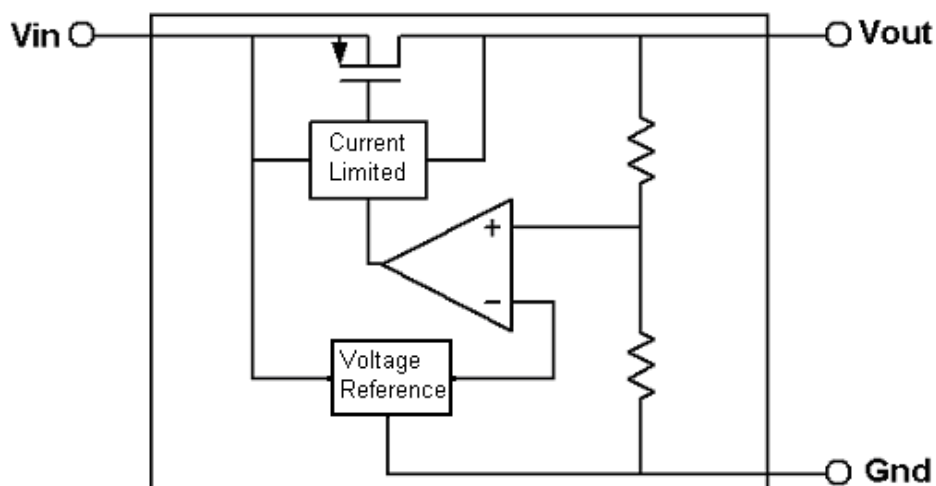
Item	Min	Recommended	Max.	Unit
Input Voltage Range			6	V
Ambient Temperature	-40		85	°C

ELECTRICAL CHARACTERISTICS

(Test Conditions: $C_{in}=1\mu F$, $C_{out}=1\mu F$, $T_A=25^{\circ}C$, Unless Otherwise Specified)

Symbol	Parameter	Conditions	Min	Type	Max	Units
V_{in}	Input Voltage				6	V
V_{out}	Output Voltage		$V_{out} \times 0.98$		$V_{out} \times 1.02$	V
$I_{out(Max.)}$	Maximum Output Current	$V_{in}-V_{out}=1V$	200			mA
Dropout Voltage	Input-Output Voltage Differential	$I_{out}=100mA$		600	1000	mV
		$V_{out} \leq 1.8V$		300	600	
$\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$	Line Regulation	$I_{out}=10mA$ $1.5V \leq V_{in} \leq 8V$		0.2	0.3	%/V
ΔV_{out}	Load Regulation	$V_{in} = Set$ $V_{out}+1V$ $1mA \leq I_{out} \leq 100mA$		20	40	mV
I_q	Quiescent Current	$V_{in} = Set$ $V_{out}+1V$		1.0	5.0	μA
$\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$	Output Voltage Temperature Coefficient	$I_{out}=10mA$		100		ppm/°C

BLOCK DIAGRAM



Explanation

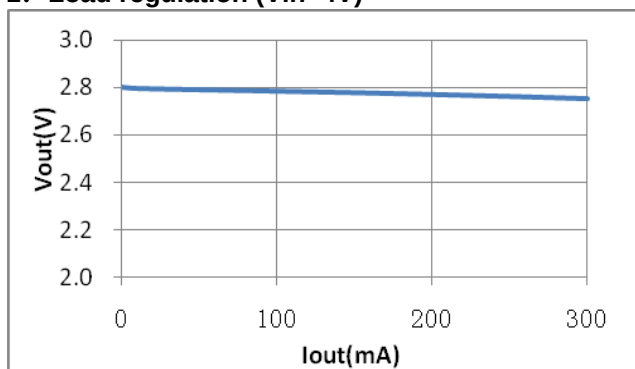
LC1208 is a series of low dropout voltage and low power consumption three pins regulator. Its application circuit is very simple, which only needs two outside capacitors. It is composed of these modules: high accuracy voltage reference, current limit circuit, error amplifier, output driver and power transistor.

Current Limit module can keep chip and power system away from danger when load current is more than 200mA.

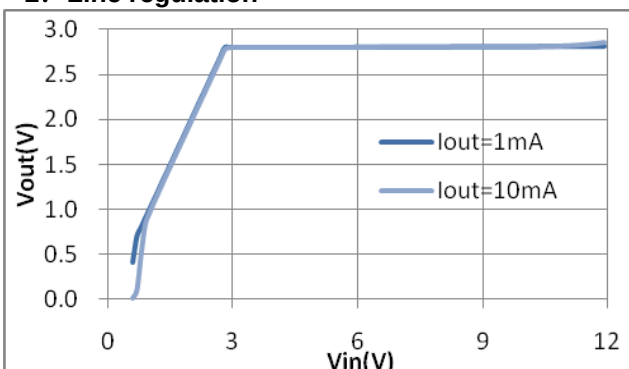
LC1208 uses trimming technique to assure the accuracy of output value within $\pm 2\%$, at the same time, temperature compensation is elaborately considered in this chip, which makes LC1208's temperature coefficient within 100ppm/ $^{\circ}\text{C}$ 。

TYPICAL PERFORMANCE CHARACTERISTICS

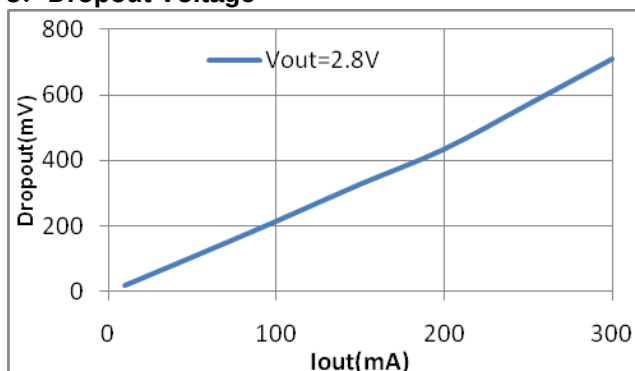
1. Load regulation ($V_{in}=4V$)



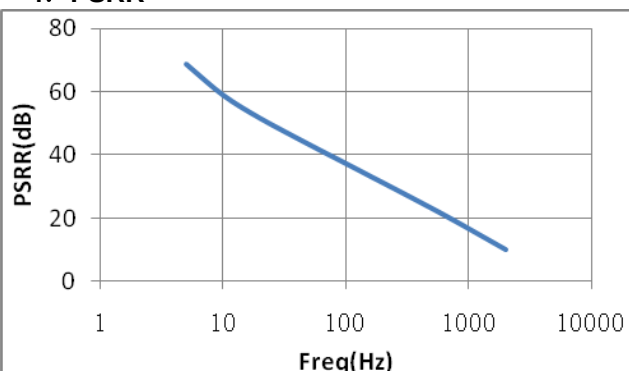
2. Line regulation



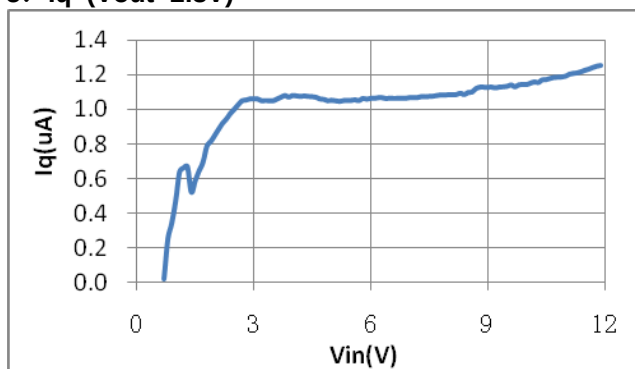
3. Dropout Voltage



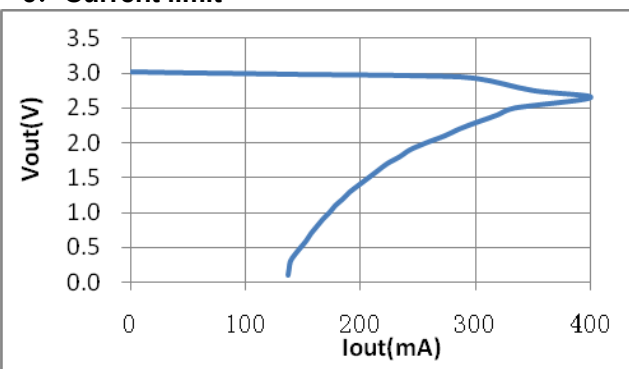
4. PSRR



5. I_q ($V_{out}=2.8V$)

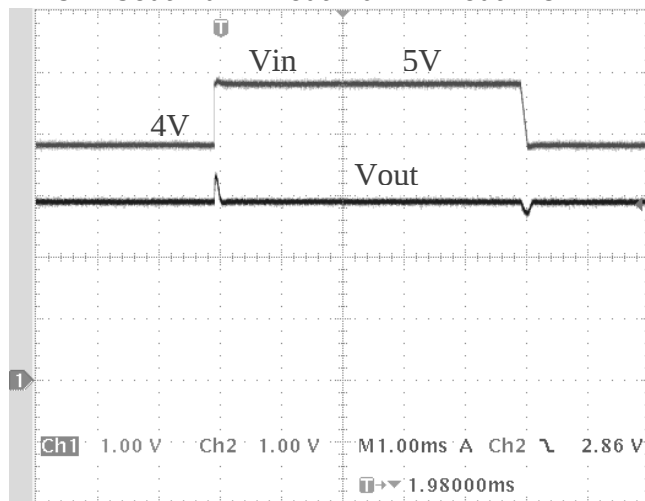


6. Current limit



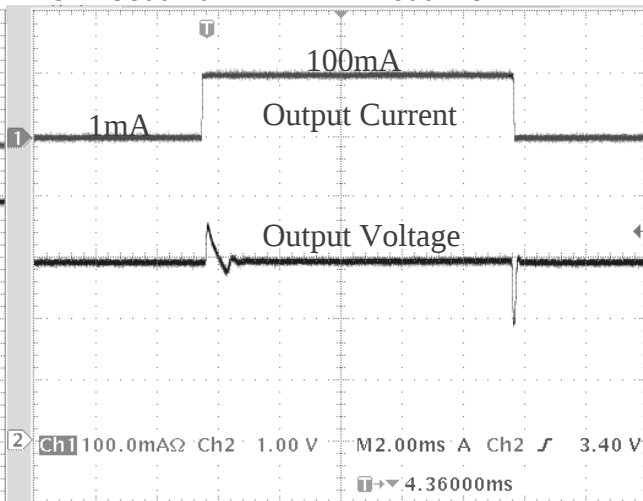
7. Line transient response

$C_{in}=C_{out}=1\mu F$ $I_{out}=10mA$ $V_{out}=2.8V$

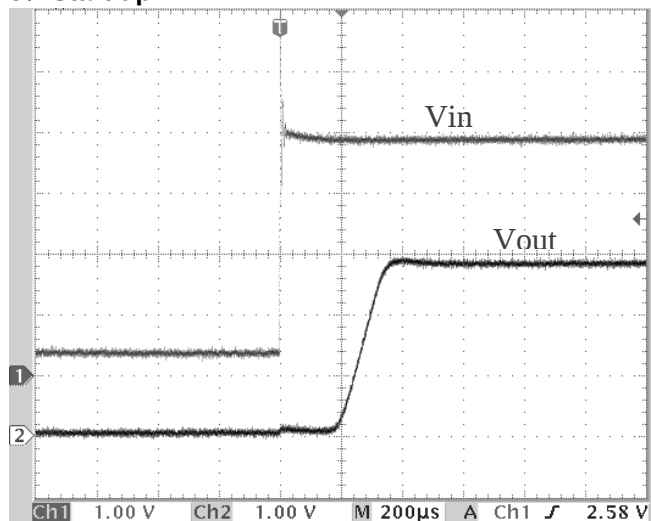


8. Load transient response

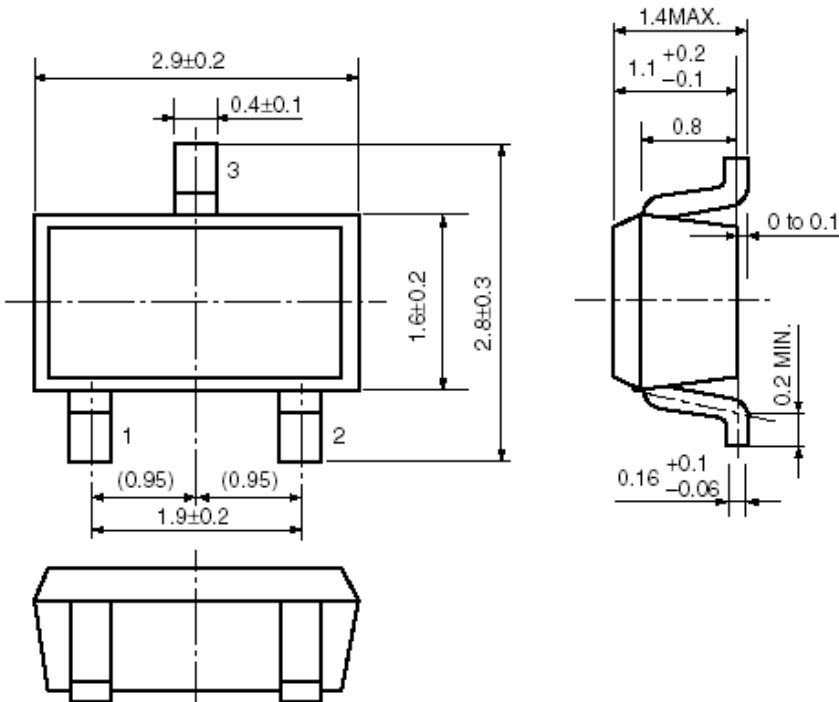
$C_{in}=C_{out}=1\mu F$ $V_{in}=4V$ $V_{out}=2.8V$

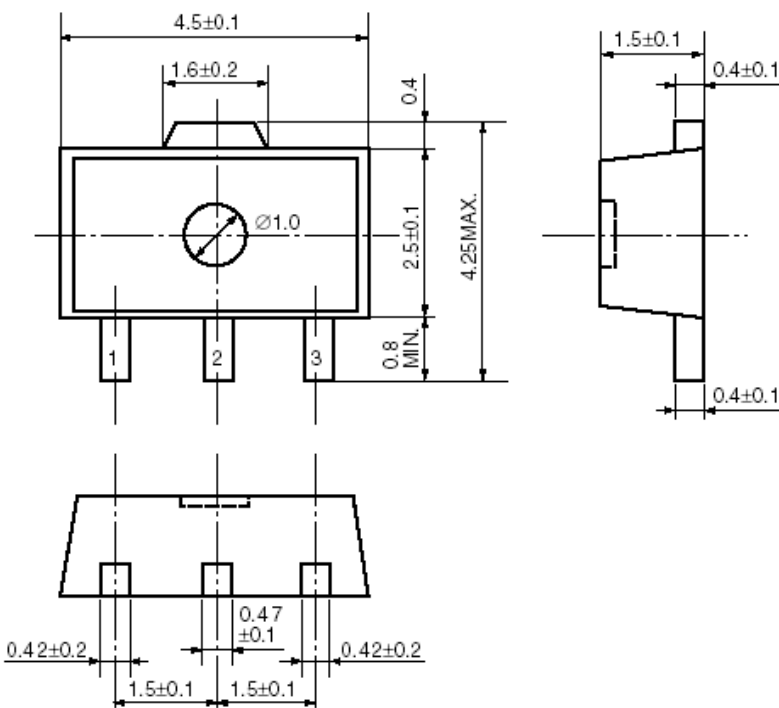


9. Start up



PACKAGE LINE

Package	SOT-23-3	Devices per reel	3000Pcs	Unit	mm
Package dimension:  The drawing shows three views of the SOT-23-3 package. The top view shows a rectangular body with a width of 2.9 ± 0.2 mm and a length of 1.9 ± 0.2 mm. The distance between the two side leads is 0.95 mm, and the distance between the two bottom leads is 1.9 ± 0.2 mm. The side view shows a maximum height of 1.4 mm, with a lead height of $1.1^{+0.2}_{-0.1}$ mm and a lead width of 0.8 mm. The bottom view shows a width of 1.6 ± 0.2 mm and a height of 2.8 ± 0.3 mm. The bottom leads are labeled 1, 2, and 3.					

Package	SOT-89-3	Devices per reel	1000Pcs	Unit	mm
Package Dimension:  The drawing shows three views of the SOT-89-3 package. The top view shows a rectangular body with a width of 4.5 ± 0.1 mm and a length of 1.6 ± 0.2 mm. The distance between the two side leads is 0.4 mm, and the distance between the two bottom leads is 1.5 ± 0.1 mm. The side view shows a maximum height of 4.25 mm, with a lead height of 1.5 ± 0.1 mm and a lead width of 0.4 ± 0.1 mm. The bottom view shows a width of 1.5 ± 0.1 mm and a height of 2.5 ± 0.1 mm. The bottom leads are labeled 1, 2, and 3. The bottom view also shows a circular hole with a diameter of $\varnothing 1.0$ mm.					

Package	TO-92	Devices per Bag	1000Pcs	Unit	mm
Package Dimension: TO-92 