



LC1220

2A Low Consumption Linear Regulator

DESCRIPTION

LC1220 is a series of low power consumption, low dropout voltage regulator with a typical dropout voltage of 1.0V at 2A load current.

LC1220 can provide output value in the range of 1.1V~5.0V in 0.1V steps. It also can customized on command.

Other than every voltage version can be used as an adjustable voltage version, with which desired voltage can be achieved by setting the values of two external resistors of the application circuitry.

LC1220 has well load transient response and good temperature characteristic, And it uses trimming technique to guarantee output voltage accuracy within $\pm 2\%$.

LC1220 series is available in standard packages of SOT-223 and TO-252.

FEATURES

- Low Power Consumption: 2.0uA (Typ.)
- Maximum output current : 2A
- Maximum input voltage: 18V
- Line regulation: 0.2% (Typical)
- Output Voltage Range: 1.1V~5.0V (customized on command in 0.1V steps)
- Highly Accurate: $\pm 2\%$ ($\pm 1\%$ customized)
- Typical Dropout Voltage: 850mV@1.5A (Vout=3.3V)
- Operation environment Temperature: $-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$

APPLICATIONS

- Battery Charger
- Battery Powered equipment
- Post Regulators for Switching Supplies
- Reference Voltage Source Regulation after Switching Power

TYPICAL APPLICATION

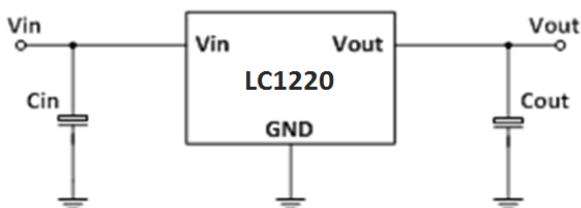
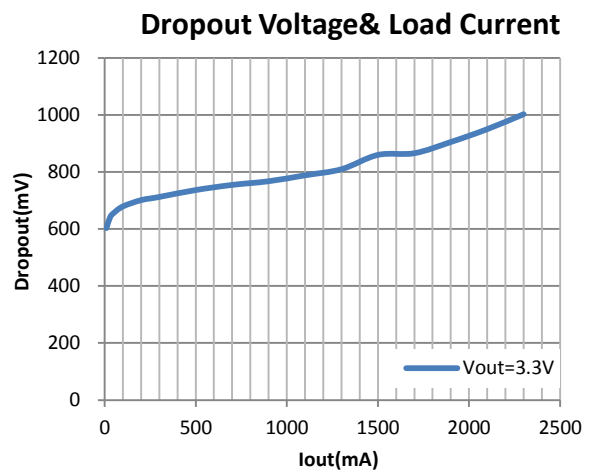


Fig1. LC1220 fixed voltage application circuit

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

ELECTRICAL CHARACTERISTICS



ORDERING INFORMATION

LC1220 [1](#) [2](#) [3](#) [4](#) [5](#)

Code	Description
1	Temperature&Rohs: C: -40~85°C, Pb Free Rohs Std.
2	Package type: L: SOT-223 O:TO-252
3	Packing type: TR: Tape&Reel (Standard)
4	Output voltage: e.g. 18=1.8V 33=3.3V 50=5.0V
5	Voltage accuracy: Blank(default):±2% 1: ±1%

ABSOLUTE MAXIMUM RATING

Parameter	Value
Max Input Voltage	20V
Operating Junction Temperature(Tj)	125°C
Ambient Temperature(Ta)	-40°C –85°C
Package	SOT-223
Thermal Resistance	TO-252
Storage Temperature(Ts)	-40°C -150°C
Lead Temperature & Time	260°C,10S

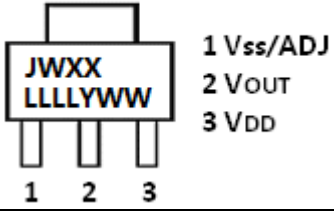
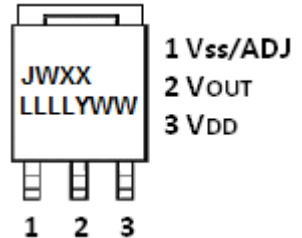
Note:

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.18V
Ambient Temperature	-40°C –85°C

PIN CONFIGURATION

Product Classification	LC1220CLTR□□
JW: Product Code	
XX: Output Voltage	
LLLL: Lot No.	
YWW: Date Code	
Product Classification	LC1220COTR□□
JW: Product Code	
XX: Output Voltage	
LLLL: Lot No.	
YWW: Date Code	

XX: Output voltage code, e.g. 12=1.2V, 25=2.5V, 33=3.3V;
Y: The Year of manufacturing, "1" stands for year 2011, "2" stands for year 2012, and "8" stands for year 2018.
WW: The week of manufacturing. "01" stands for week 1, "02" stands for week 02, "52" stands for week 52.

ELECTRICAL CHARACTERISTICS

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

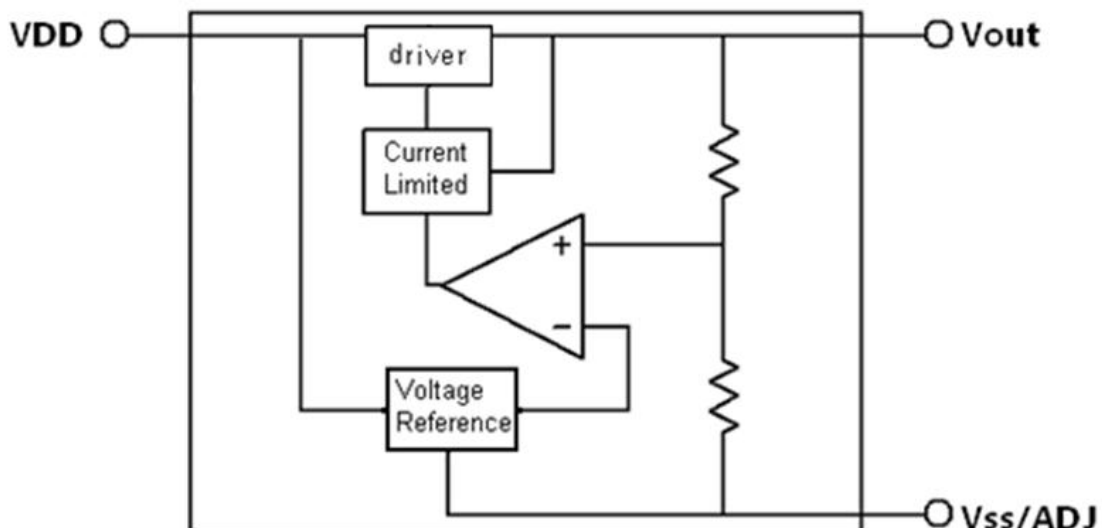
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{in}	Input Voltage					18	V
V_{out}	Output Voltage			$V_{out} \times 0.98$		$V_{out} \times 1.02$	V
$I_{out(Max.)}$	Maximum Output Current	$V_{in}-V_{out}=1.7V$	$V_{out} < 1.5V$	2			A
		$V_{in}-V_{out}=1.4V$	$1.5V \leq V_{out} < 2.0V$				
		$V_{in}-V_{out}=1V$	$V_{out} \geq 2.0V$				
Dropout Voltage	Input-Output Voltage Differential (note 3)	$I_{out} \leq 1.5A$	$V_{out} < 1.5V$			1600	mV
			$1.5V \leq V_{out} < 2.0V$		1000	1300	
			$V_{out} \geq 2.0V$		800	950	
$\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$	Line Regulation (note 1)	$I_{out}=10mA$ Set $V_{out}+1V \leq V_{in} \leq 18V$			0.1	0.3	%/V
ΔV_{out}	Load Regulation (note 1,2)	$1mA \leq I_{out} \leq 1.5A$	$V_{out} < 1.5V$		40	60	mV
			$1.5V \leq V_{out} < 2.0V$		20	40	
			$V_{out} \geq 2.0V$		10	30	
I_q	Quiescent Current	$V_{in} = \text{Set } V_{out} + 1V$			2.0	5.0	μA
$\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$	Output Voltage Temperature Coefficient	$I_{out}=100mA$			200		ppm/ $^\circ C$
θ_{JC}	Thermal Resistance junction to case	SOT-223			20		$^\circ C / W$
		TO-252			12		

Note1: Line Regulation and Load Regulation in Table1 are tested under constant junction temperature.

Note2: When load current varies between 0~2A and $V_{in}-V_{out}$ ranges from 1V~18V at constant junction temperature, the parameter is satisfied the criterion in table.

Note3: Dropout Voltage is the voltage difference between the input and output pin when the input voltage is minimum to maintain the lowest spec output voltage.

BLOCK DIAGRAM



DETAILED DESCRIPTION

LC1220 is a series of low dropout voltage and low power consumption regulator. Its application circuitry requires minimum number of external components. Both fixed voltage and adjustable voltage application circuits need input and output capacitors to assure output voltage stability. Any desired output voltage from fixed voltage to 18V can be achieved by assigning proper values to two external resistors in its application circuitry (as shown in Fig.3, as R1, R2 are the two external resistors.).

LC1220 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 LC1220's temperature coefficient within 100ppm/ $^{\circ}\text{C}$.

TYPICAL APPLICATION

LC1220 has fixed voltage and adjustable voltage application mode, Fig.4 shows their typical application circuitry.

A 1 μF ceramic capacitor connected between input and GND as bypass capacitor and a 1 μF ceramic capacitor between output and GND are recommended for all application.

Using a bypass capacitor (C_{Adj}) between the adjust terminal and ground can improve ripple rejection. The bypass capacitor prevents ripple from being amplified in case the output voltage is increased. The impedance of C_{Adj} should be less than the resistance of R_1 to prevent ripple from being amplified at any frequency. As R_1 is normally in the range of 1K Ω ~10K Ω , the value of C_{Adj} should satisfy the following condition:

$$1/(2\pi * \text{Frequency}_{\text{Ripple}} * C_{\text{adj}}) < R_1$$

A 0.1 μF ceramic capacitor is recommended.

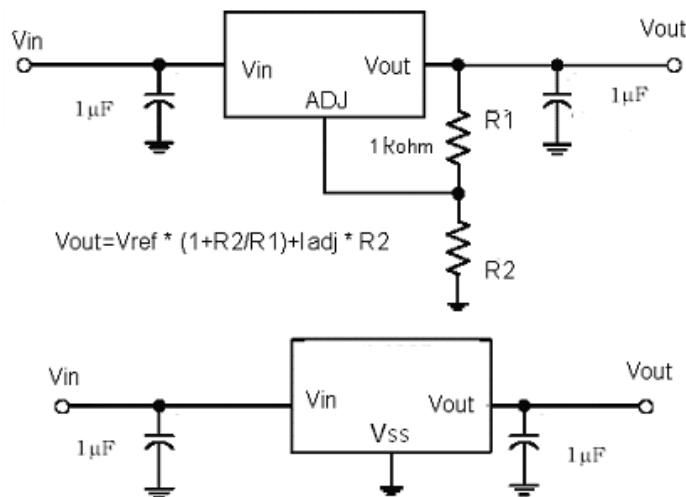


Fig 3. Typical Application of LC1220

EXPLANATION

The output voltage of adjustable application satisfies this followed equation:

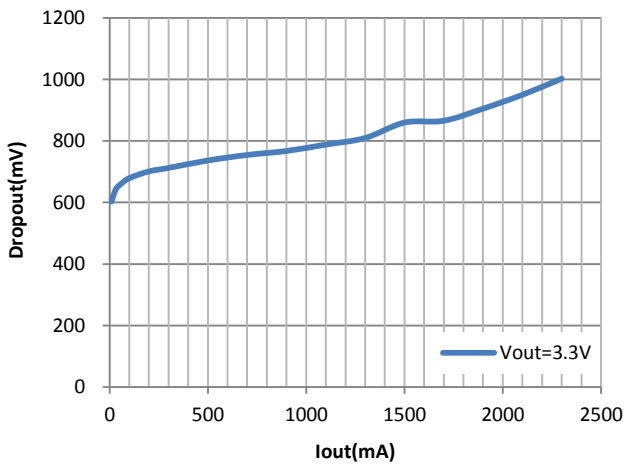
$$V_{\text{out}} = V_{\text{Ref}} \times (1 + R_2/R_1) + I_{\text{Adj}} \times R_2.$$

The second term $I_{\text{Adj}} \times R_2$ can be ignored since the adjustable pin current I_{Adj} ($\sim 2\mu\text{A}$) is much less than the current through R_1 ($\sim 1\text{mA}$).

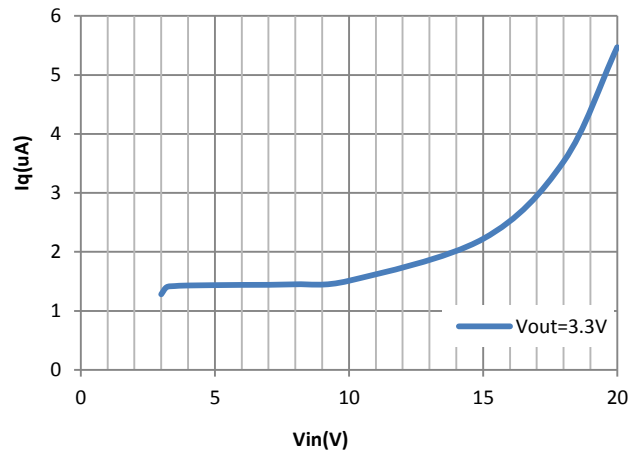
The value of R_1 is preferred in the range of 1K Ω ~10K Ω and the value of V_{Ref} is the output voltage of typical fixed voltage application circuit.

TYPICAL PERFORMANCE CHARACTERISTICS

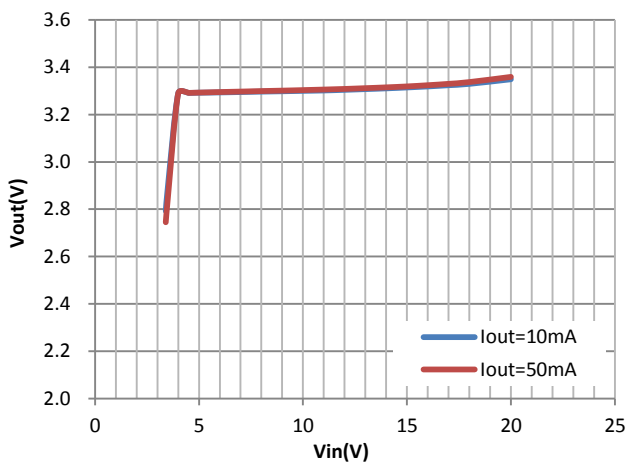
Dropout Voltage & Load Current



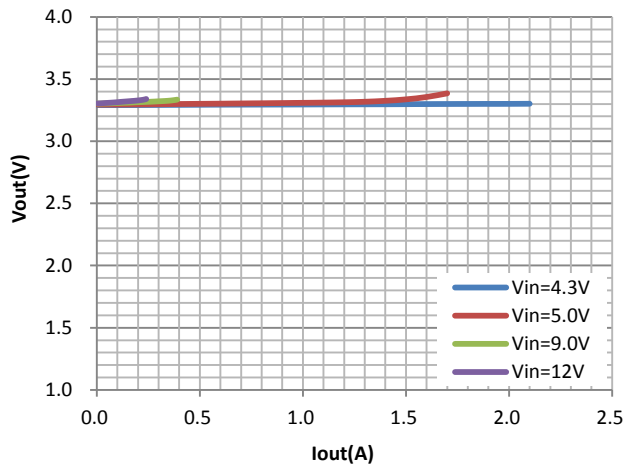
Iq vs. Vin Voltage



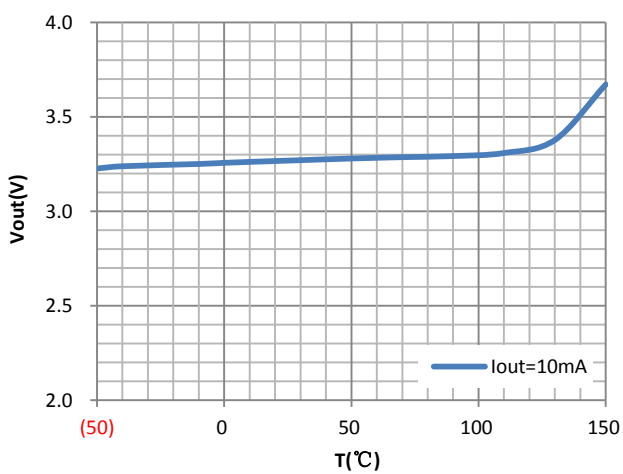
Line Regulation



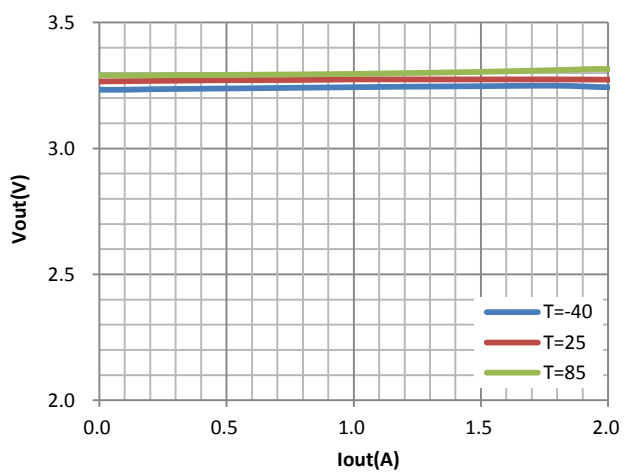
Load Regulation



Vout Voltage vs. Temperature

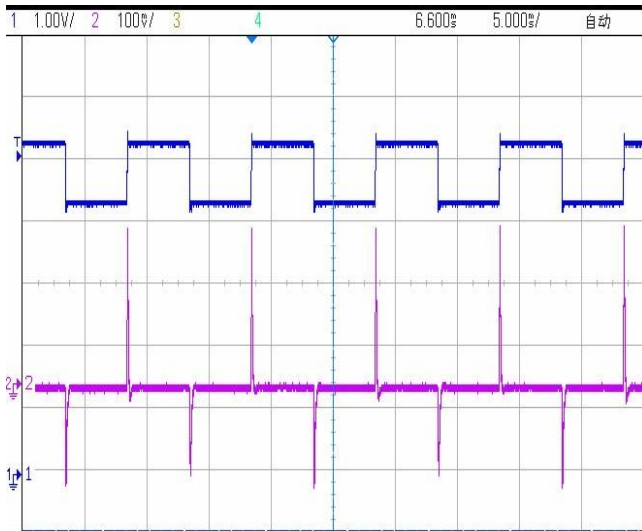


Vout Voltage vs. Iout Current



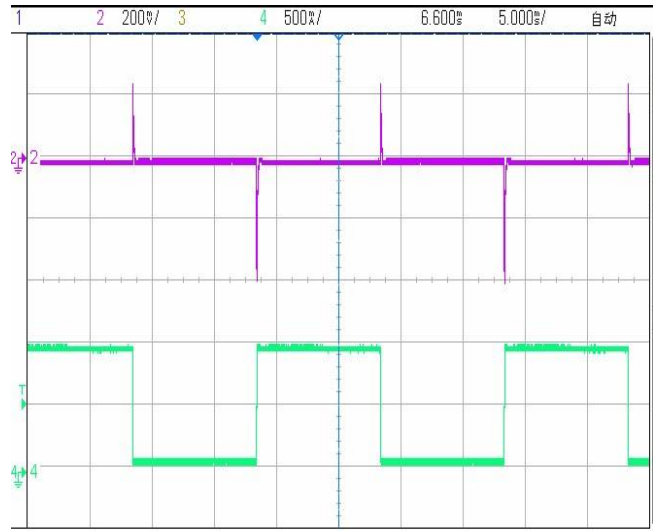
Line Transient Response

$I_{out}=10mA, V_{in}=4.3V \text{ to } 5.3V$



Load Transient Response

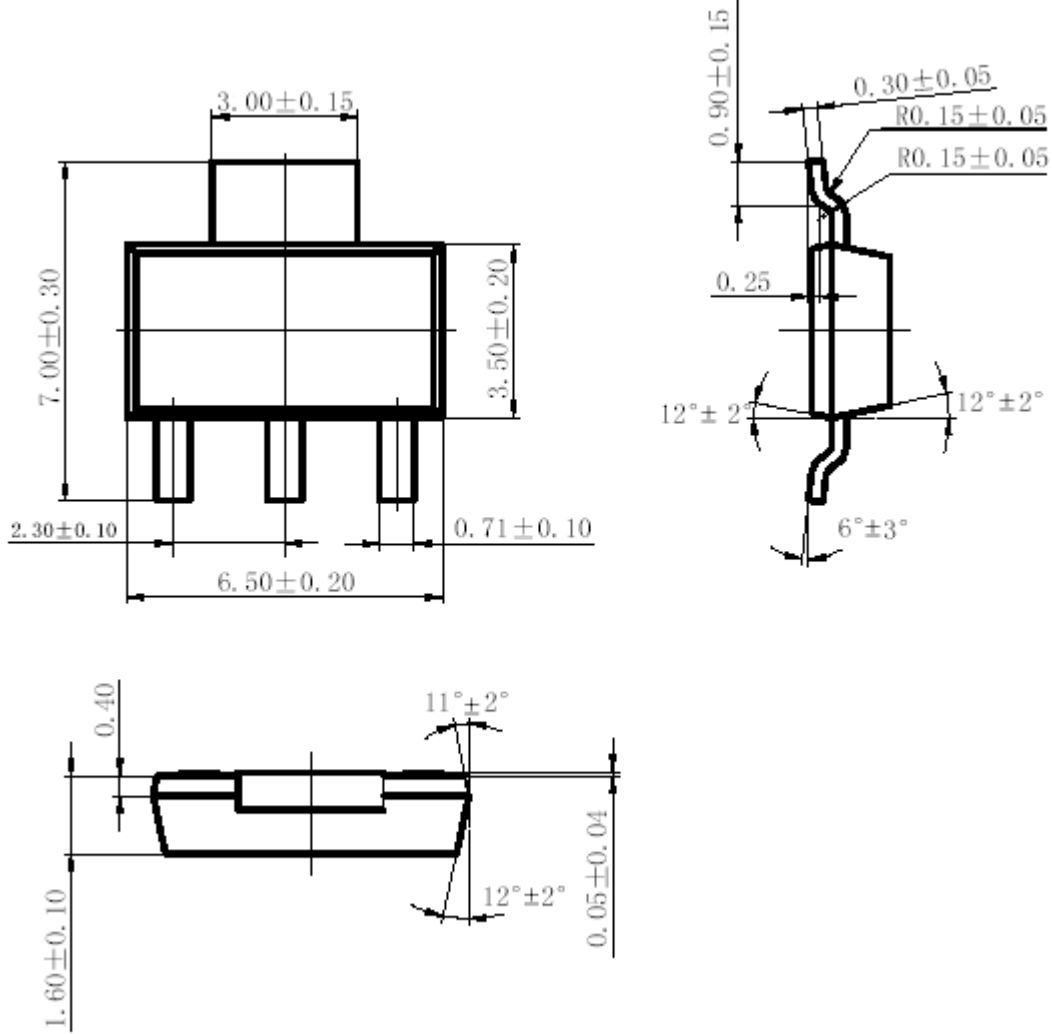
$V_{in}=5V, I_{out}=0.1A \text{ to } 1A$



PACKAGE LINE

Package	TO-252	Devices per reel	2500	Unit	mm
Package specification:					
COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)					
SYMBOL	MIN	NOM	MAX		
A	2.20	2.30	2.38		
A1	0	-	0.10		
A2	0.90	1.00	1.10		
b	0.77	-	0.89		
b1	0.76	0.81	0.86		
b2	0.77	-	1.10		
b3	5.23	5.33	5.43		
c	0.47	-	0.60		
c1	0.48	0.51	0.56		
c2	0.47	-	0.60		
D	6.00	6.10	6.20		
D1	5.25	-	-		
E	6.50	6.60	6.70		
E1	4.70	-	-		
e	2.28BSC				
H	9.80	10.10	10.40		
L	1.40	1.50	1.70		
L1	2.90REF				
L2	0.51BSC				
L3	0.90	-	1.25		
L5	0.90	-	1.50		
L6	1.80REF				
theta	0° - 8°				
theta 1	3° - 5° - 7°				
theta 2	1° - 3° - 5°				

LC1220

Package	SOT-223	Devices per reel	2500	Unit	mm
Package specification:					
 <p>The technical drawing illustrates the LC1220 SOT-223 package with the following dimensions:</p> <ul style="list-style-type: none">Top View: Total width is 6.50 ± 0.20 mm. The distance from the left edge to the center of the first lead is 2.30 ± 0.10 mm. The distance between the centers of the first and second leads is 0.71 ± 0.10 mm. The width of the top lead is 3.00 ± 0.15 mm. The height of the package body is 7.00 ± 0.30 mm, and the height of the top lead is 3.50 ± 0.20 mm.Side View: The height of the package body is 0.90 ± 0.15 mm. The thickness of the top lead is 0.30 ± 0.05 mm. The lead has a top radius of $R0.15 \pm 0.05$ mm and a bottom radius of $R0.15 \pm 0.05$ mm. The lead height is 0.25 mm. The lead is bent at an angle of $12^\circ \pm 2^\circ$ from the vertical. The bottom lead is bent at an angle of $6^\circ \pm 3^\circ$ from the horizontal.Perspective View: The height of the package body is 1.60 ± 0.10 mm. The thickness of the top lead is 0.40 mm. The lead is bent at an angle of $11^\circ \pm 2^\circ$ from the vertical. The bottom lead is bent at an angle of $12^\circ \pm 2^\circ$ from the vertical. The bottom lead height is 0.05 ± 0.04 mm.					

Siitek 代理商：深圳市琪远电子有限公司
电话：(0755)86228541 / 17727576605
更多产品请访问：www.siitek.com.cn