



# LC1212

## 200mA Low Consumption Linear Regulator

### DESCRIPTION

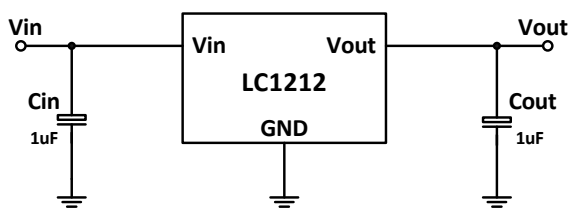
LC1212 series is a group of positive voltage output, low power consumption, low dropout voltage, three terminal regulator. It can provide 200mA output current when input / output voltage differential drops to 430mV ( $V_{out} = 2.8V$ ), The very low power consumption of LC1212 ( $I_q=1.0\mu A$ ) can greatly improve natural life of batteries.

LC1212 can provide output value in the range of 1.1V~5.5V in 0.1V steps. It also can be customized on command.

LC1212 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

LC1212 has well load transient response and good temperature characteristic, And it uses trimming technique to guarantee output voltage accuracy within  $\pm 1\%$ .

### TYPICAL APPLICATION



**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.

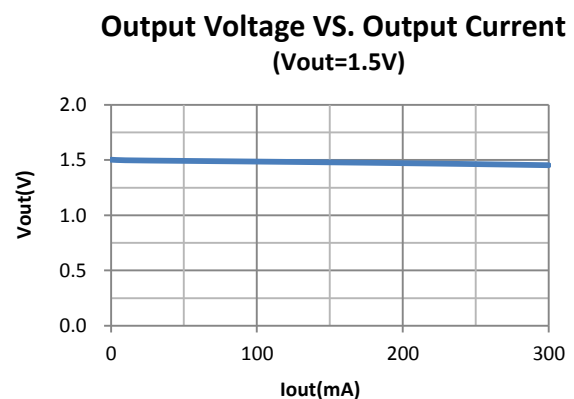
### FEATURES

- 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:  $\pm 1\%$
- Output Current Limit

### APPLICATIONS

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

### ELECTRICAL CHARACTERISTICS



## ORDERING INFORMATION

LC1212 [1](#) [2](#) [3](#) [4](#) [5](#)

Code	Description
<a href="#">1</a>	Temperature&Rohs: C:-40~85°C, Pb Free Rohs Std.
<a href="#">2</a>	Package type: B3: SOT-23-3 B3A: TSOT-23 C3: SOT-89-3 H: TO-92
<a href="#">3</a>	Packing type: TR: Tape&Reel (Standard) BG: Bag (TO-92)
<a href="#">4</a>	Output voltage: e.g. 11=1.1V 15=1.5V 55=5.5V
<a href="#">5</a>	Voltage accuracy: 1=±1% Blank(default)=±2%

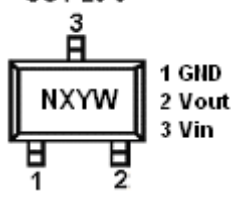
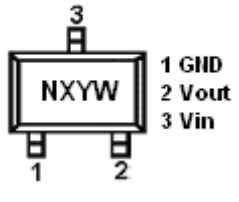
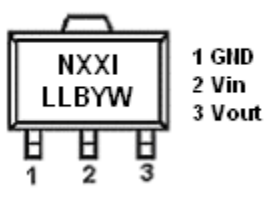
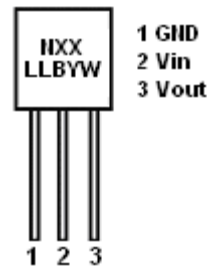
## MARKING DESRIPTON

Output Voltage Code

VOUT	Code	VOUT	Code	VOUT	Code
1.2V	2	3.0V	0	4.4V	4
1.3V	3	3.1V	1	4.5V	5
1.5V	5	3.2V	2	4.6V	6
1.8V	8	3.3V	3	4.7V	7
2.0V	0	3.4V	4	4.8V	8
2.1V	1	3.5V	5	4.9V	9
2.2V	2	3.6V	6	5.0V	0
2.3V	3	3.7V	7	5.1V	1
2.4V	4	3.8V	8	5.2V	2
2.5V	5	3.9V	9	5.3V	3
2.6V	6	4.0V	0	5.4V	4
2.7V	7	4.1V	1	5.5V	5
2.8V	8	4.2V	2		
2.9V	9	4.3V	3		

Y: The Year of manufacturing, "1" stands for year 2011, "2" stands for year 2012, and "8" stands for year 2018.  
W: The week of manufacturing. "A" stands for week 1, "Z" stands for week 26, "A" stands for week 27, "Z" stands for week 52.

## PIN CONFIGURATION

<b>Product Classification</b>		LC1212CB3TR□□
<b>Marking</b>		SOT-23-3 
NXYW	N:Product Code	
	X:Output Voltage	
	YW: Date Code	
<b>Product Classification</b>		LC1212CB3ATR□□
<b>Marking</b>		TSOT-23 
NXYW	N:Product Code	
	X:Output Voltage	
	YW: Date Code	
<b>Product Classification</b>		LC1212CC3TR□□
<b>Marking</b>		SOT-89-3 
NXX LLBYW	N:Product Code	
	XX:Output Voltage	
	LL:LOT NO.	
	B:FAB Code	
	YW:Date Code	
<b>Product Classification</b>		LC1212CHBG□□
<b>Marking</b>		TO-92 
NXX LLBYW	N:Product Code	
	XX:Output Voltage	
	LL:LOT NO.	
	B:FAB Code	
	YW:Date Code	
<b>GND</b>	Ground Pin	
<b>Vin</b>	Supply Voltage Input	
<b>Vout</b>	Output Voltage	

## ABSOLUTE MAXIMUM RATING

Parameter		Value
Max Input Voltage		8V
Operating Junction Temperature(Tj)		125°C
Ambient Temperature(Ta)		-40°C -85°C
Power Dissipation	SOT-23-3	250mW
	TSOT-23	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.

## RECOMMENDED WORK CONDITIONS

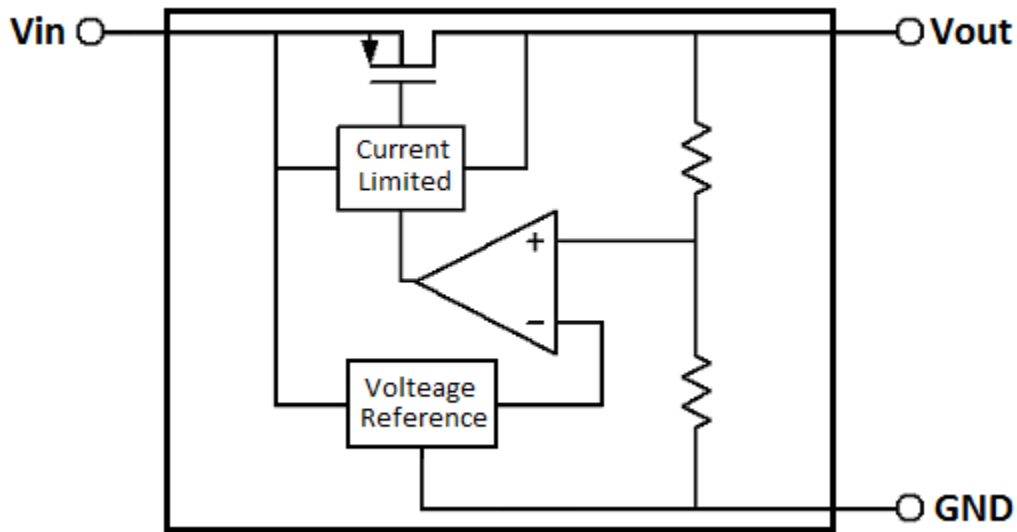
Item	Min	Recommended	Max.	Unit
Input Voltage Range			6	V
Ambient Temperature	-40		85	°C

## ELECTRICAL CHARACTERISTICS

(Test Conditions: Cin=1uF, Cout=1uF, TA=25°C, Unless Otherwise Specified)

Symbol	Parameter	Conditions	Min	Type	Max	Units
Vin	Input Voltage				6	V
Vout	Output Voltage		Vout x0.99		Vout X1.01	V
Iout(Max.)	Maximum Output Current	Vin-Vout=1V	200			mA
Dropout Voltage	Input-Output Voltage Differential	Iout=100mA	Vout ≤ 1.8V	600	1000	mV
			Vout ≥ 1.8V	300	600	
$\frac{\Delta V_{out}}{\Delta V_{in} \cdot V_{out}}$	Line Regulation	Iout=10mA 1.5V ≤ Vin ≤ 8V		0.2	0.3	%/V
$\Delta V_{out}$	Load Regulation	Vin=Set Vout+1V 1mA ≤ Iout ≤ 100mA		20	40	mV
Iq	Quiescent Current	Vin=Set Vout+1V		1.0	5.0	uA
$\frac{\Delta V_{out}}{\Delta T \cdot V_{out}}$	Output Voltage Temperature Coefficient	Iout=10mA		100		ppm/°C

## BLOCK DIAGRAM



## EXPLANATION

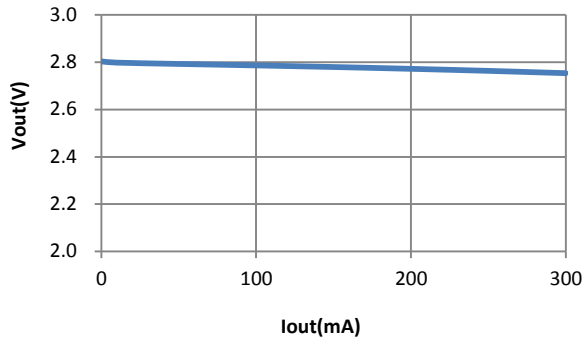
LC1212 is a series of low dropout voltage and low power consumption three pins regulator. Its application circuit is very simple, which only needs two outside capacitors. It is composed of these modules: high accuracy voltage reference, current limit circuit, error amplifier, output driver and power transistor.

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

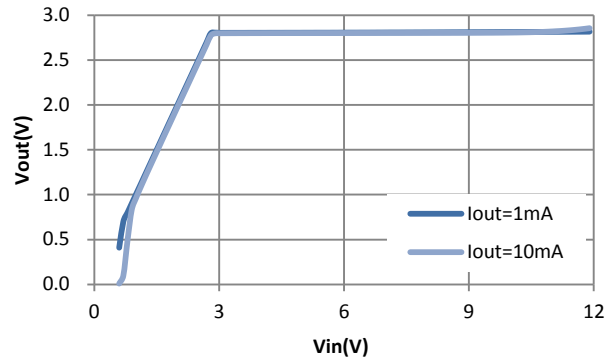
LC1212 uses trimming technique to assure the accuracy of output value within  $\pm 1\%$ , at the same time, temperature compensation is elaborately considered in this chip, which makes LC1212's temperature coefficient within 100ppm/ $^{\circ}\text{C}$ .

## TYPICAL PERFORMANCE CHARACTERISTICS

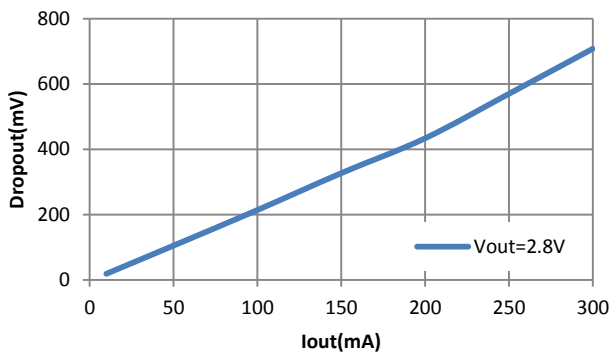
**Load regulation (Vin=4V)**



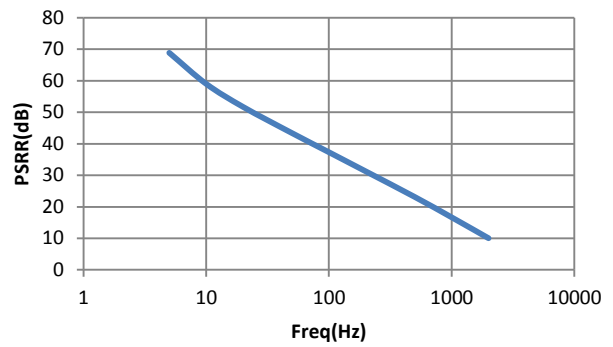
**Line regulation**



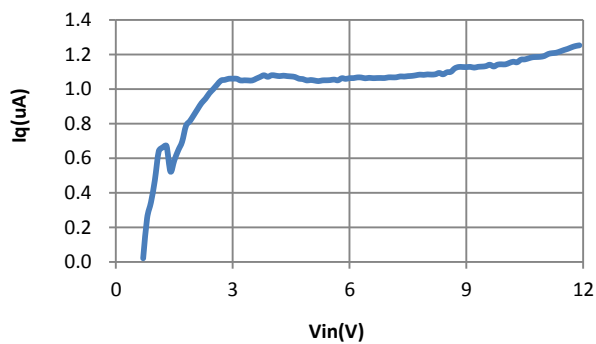
**Dropout Voltage**



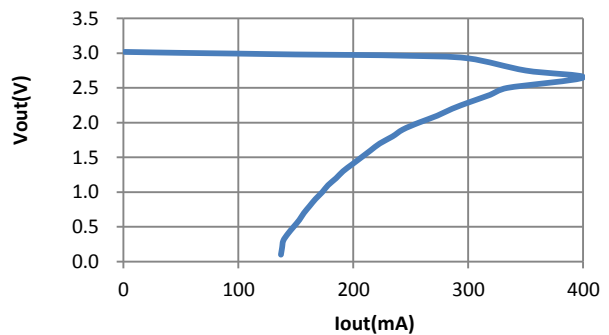
**PSRR**



**Iq (Vout=2.8V)**

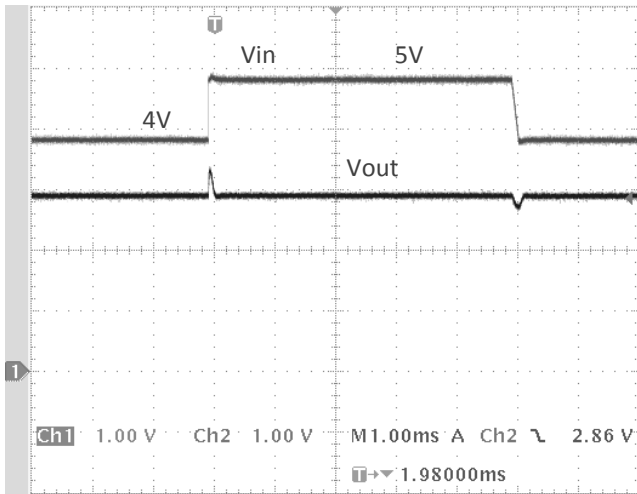


**Current limit**

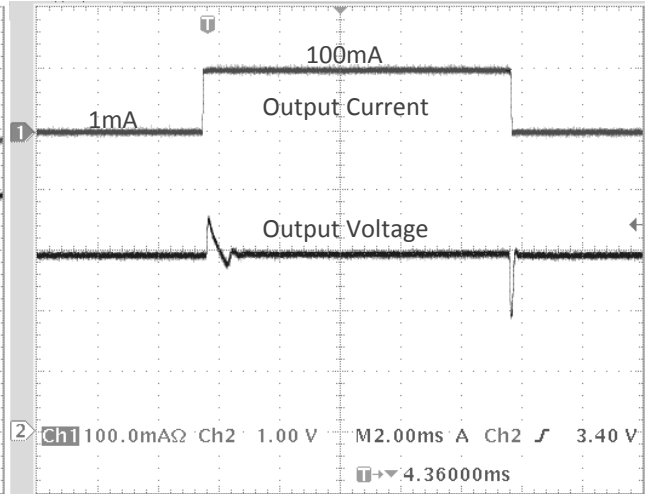


## TYPICAL PERFORMANCE CHARACTERISTICS continued

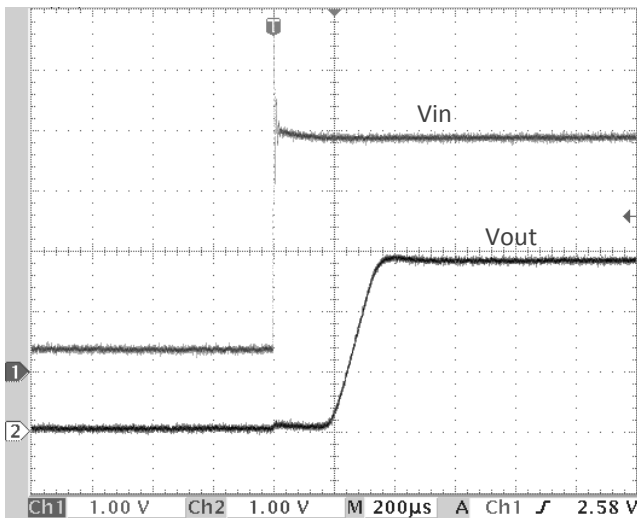
**Line transient response**  
Cin=Cout=1uF Iout=10mA vout=2.8V



**Load transient response**  
Cin=Cout=1uF Vin=4V Vout=2.8V

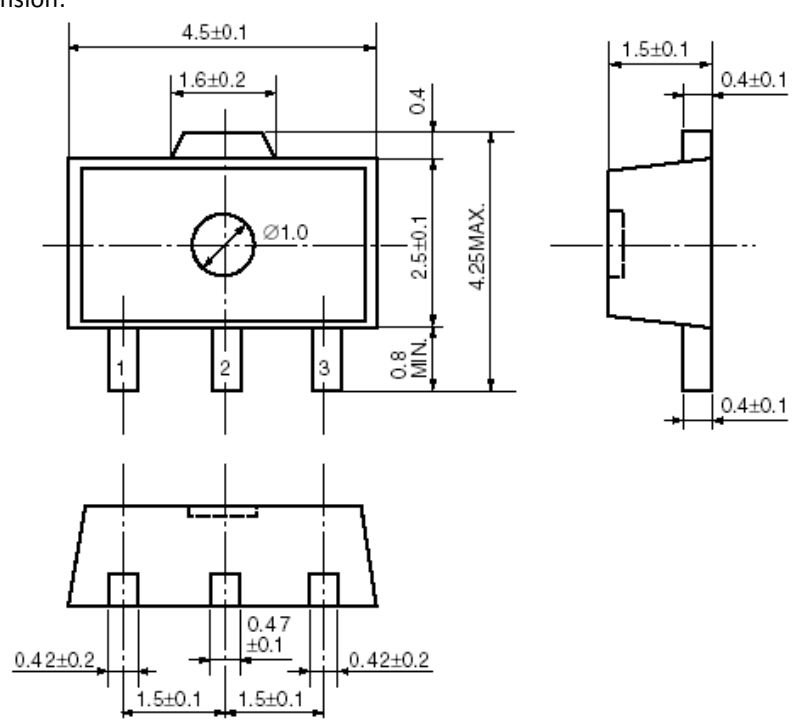


**Start up**



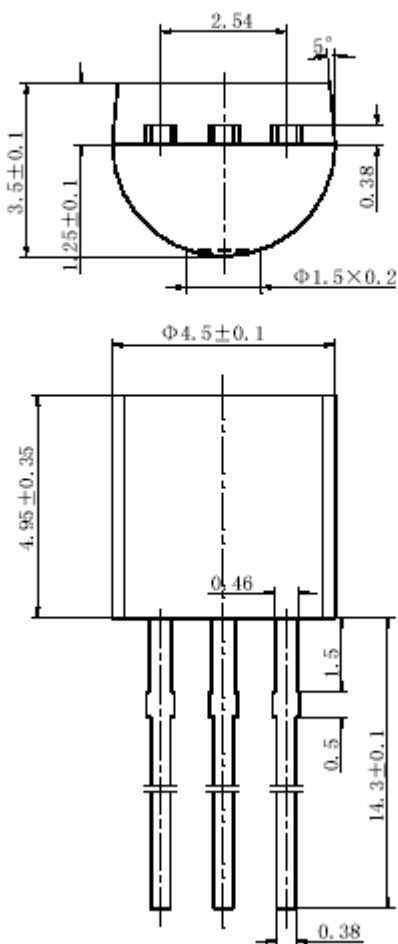
## PACKAGE LINE

Package	TSOT-23	Devices per reel	3000Pcs	Unit	mm
<p>Package dimension:</p> <p>Technical drawing of the TSOT-23 package. It includes three views: a top view, a side view, and a cross-sectional view. The top view shows a rectangular body with a central notch of width 0.400 ± 0.03 mm and a total width of 1.900 ± 0.05 mm. The side view shows a height of 2.400 ± 0.05 mm and a body width of 2.900 ± 0.05 mm. The cross-sectional view shows a lead height of 0.080 ± 0.02 mm and a lead thickness of 0.100<sup>+0.05</sup><sub>-0.01</sub> mm. Other dimensions include 0.550 ± 0.05 mm, 1.300 ± 0.05 mm, 0.400 ± 0.03 mm, 4 × R0.1 MAX, 2 × 7, 0-0.1, 0.2 MIN, and R0.08.</p>					
Package	SOT-23-3	Devices per reel	3000Pcs	Unit	mm
<p>Technical drawing of the SOT-23-3 package. It includes three views: a top view, a side view, and a cross-sectional view. The top view shows a rectangular body with a central notch of width 0.4 ± 0.1 mm and a total width of 2.9 ± 0.2 mm. The side view shows a height of 2.8 ± 0.3 mm and a body width of 1.9 ± 0.2 mm. The cross-sectional view shows a lead height of 0.2 MIN mm and a lead thickness of 0.16<sup>+0.1</sup><sub>-0.06</sub> mm. Other dimensions include 1.4 MAX, 1.1<sup>+0.2</sup><sub>-0.1</sub>, 0.8, 0 to 0.1, and (0.95).</p>					

Package	SOT-89-3	Devices per reel	1000Pcs	Unit	mm
Package Dimension:  <p>             The technical drawing illustrates the SOT-89-3 package in three views:             <ul style="list-style-type: none"> <li><b>Top View:</b> Shows a rectangular body with a width of <math>4.5 \pm 0.1</math> mm and a length of <math>2.5 \pm 0.1</math> mm. A central circular feature has a diameter of <math>\varnothing 1.0</math> mm. A trapezoidal feature on top has a width of <math>1.6 \pm 0.2</math> mm and a height of <math>0.4</math> mm. Three leads are located at the bottom, with a minimum height of <math>0.8</math> mm. Lead 1 is <math>0.42 \pm 0.2</math> mm from the left edge, lead 2 is <math>1.5 \pm 0.1</math> mm from the left edge, and lead 3 is <math>0.42 \pm 0.2</math> mm from the right edge.</li> <li><b>Side View:</b> Shows the profile of the package with a top width of <math>1.5 \pm 0.1</math> mm and a bottom width of <math>0.4 \pm 0.1</math> mm.</li> <li><b>Bottom View:</b> Shows the lead layout with a central spacing of <math>0.47 \pm 0.1</math> mm between leads 1 and 2, and <math>1.5 \pm 0.1</math> mm between leads 2 and 3.</li> </ul> </p>					



# LC1212

Package	TO-92	Devices per Bag	1000Pcs	Unit	mm
Package Dimension:					
<b>TO-92</b>					
 <p>The technical drawing shows two views of the TO-92 package. The top view is a semi-circular shape with a diameter of <math>\Phi 1.5 \times 0.2</math>. It features three leads extending from the top edge, with a total width of 2.54 mm. The distance from the center to the top edge is <math>3.5 \pm 0.1</math> mm, and the distance from the center to the bottom edge is <math>1.25 \pm 0.1</math> mm. The bottom edge has a thickness of 0.38 mm. The side view shows a cylindrical body with a diameter of <math>\Phi 4.5 \pm 0.1</math> mm and a height of <math>4.95 \pm 0.35</math> mm. The leads are spaced 0.46 mm apart. The distance from the top of the body to the top of the leads is 1.5 mm, and the distance from the top of the body to the bottom of the leads is 0.5 mm. The total length of the leads is <math>14.3 \pm 0.1</math> mm, and the distance from the top of the body to the bottom of the leads is 0.38 mm.</p>					



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