# 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（Vout = 2.8V）, The very low power consumption of LC1212（Iq=1.0uA）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±1%.

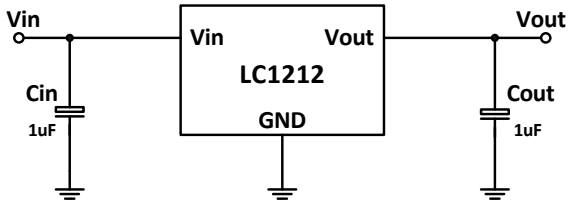
## FEATURES

- Low Power Consumption:1.0uA（Typ.）
- Maximum Output Current:200mA
- Small Dropout Voltage
- 210mV@100mA（Vout=2.8V)
- 430mV@200mA（Vout=2.8V)
- Input Voltage Range:1.5V~6V
- Output Voltage Range:1.1V~5.5V (customized on command in 0.1V steps)
- Highly Accurate:±1%
- Output Current Limit

## APPLICATIONS

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

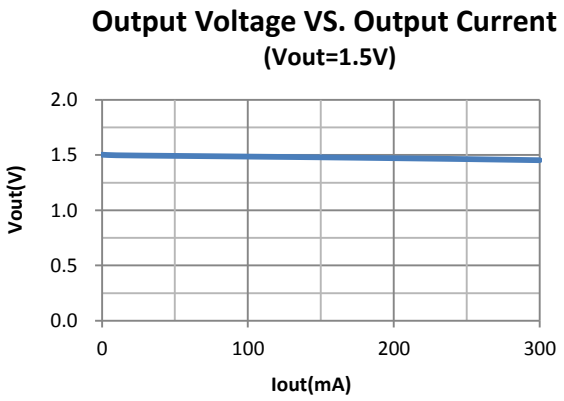
## TYPICAL APPLICATION




***Note1:*** *Input capacitor (Cin=1uF) is recommended in all application circuit. Ceramic capacitor is recommended.*

***Note2:****Output capacitor (Cout=1uF) is recommended in all application to assure the stability of circuit. Ceramic capacitor is recommended.*

## ELECTRICAL CHARACTERISTICS



## ORDERING INFORMATION

LC1212 ①②③④⑤

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

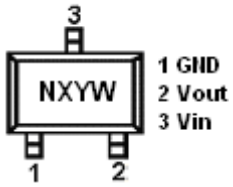
## MARKING DESCRIPTON

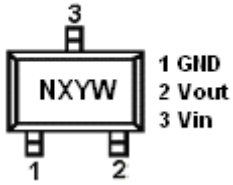
Output Voltage Code

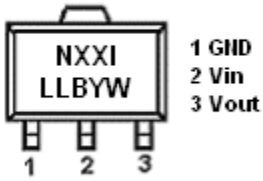
| VOUT | Code | VOUT | Code | VOUT | Code |
|---|---|---|---|---|---|
| 1.2V | 2 | 3.0V | 0 | 4.4V | 4 |
| 1.3V | 3 | 3.1V | 1 | 4.5V | 5 |
| 1.5V | 5 | 3.2V | 2 | 4.6V | 6 |
| 1.8V | 8 | 3.3V | 3 | 4.7V | 7 |
| 2.0V | 0 | 3.4V | 4 | 4.8V | 8 |
| 2.1V | 1 | 3.5V | 5 | 4.9V | 9 |
| 2.2V | 2 | 3.6V | 6 | 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 | | |

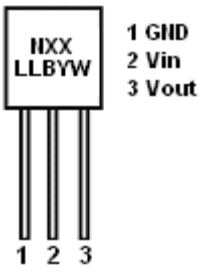
*Y: The Year of manufacturing,"1" stands for year 2011, "2" stands for year 2012, and "8" stands for year 2018.*
*W: The week of manufacturing. "A" stands for week 1,"Z" stands for week 26," A " stands for week 27," Z " stands for week 52.*

## PIN CONFIGURATION

| Product Classification | LC1212CB3TR□□ |
|---|---|
| Marking | SOT-23-3 |
| NXYW: N:Product Code; X:Output Voltage; YW: Date Code |  |

| Product Classification | LC1212CB3ATR□□ |
|---|---|
| Marking | TSOT-23 |
| NXYW: N:Product Code; X:Output Voltage; YW: Date Code |  |

| Product Classification | LC1212CC3TR□□ |
|---|---|
| Marking | SOT-89-3 |
| NXX LLBYW: N:Product Code; XX:Output Voltage; LL:LOT NO.; B:FAB Code; YW:Date Code |  |

| Product Classification | LC1212CHBG□□ |
|---|---|
| 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 |

## 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

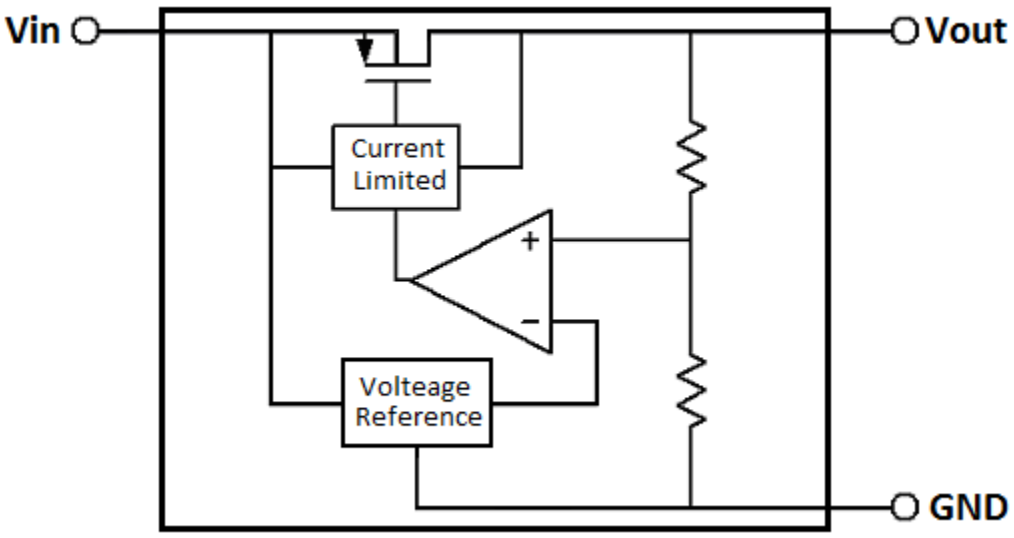
| Item | Min | Recommended | Max. | Unit |
|---|---|---|---|---|
| Input Voltage Range | | | 6 | V |
| Ambient Temperature | -40 | | 85 | °C |

## 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 | |
| $\frac{\Delta Vout}{\Delta Vin \cdot Vout}$ | Line Regulation | Iout=10mA<br>1.5V≤Vin≤8V | | | 0.2 | 0.3 | %/V |
| $\Delta Vout$ | Load Regulation | Vin=Set Vout+1V<br>1mA≤Iout≤100mA | | | 20 | 40 | mV |
| Iq | Quiescent Current | Vin=Set Vout+1V | | | 1.0 | 5.0 | uA |
| $\frac{\Delta Vout}{\Delta T \cdot Vout}$ | Output Voltage Temperature Coefficient | Iout=10mA | | | 100 | | ppm/°C |

## BLOCK DIAGRAM




## EXPLANATION

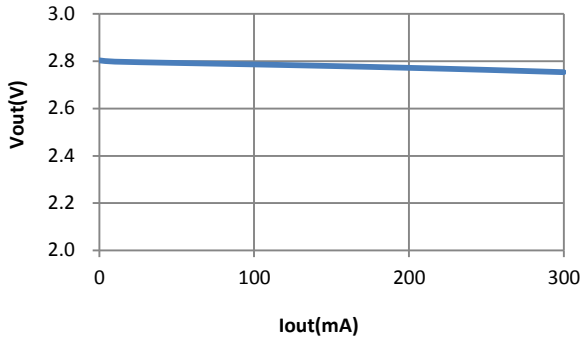
LC1212 is a series of low dropout voltage and low power consumption three pins regulator. Its application circuit is very simple, which only needs two outside capacitors. It is composed of these modules: high accuracy voltage reference, current limit circuit, error amplifier, output driver and power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

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

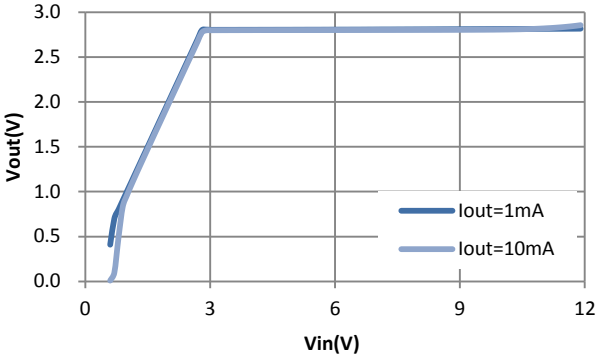
LC1212 uses trimming technique to assure the accuracy of output value within±1%, at the same time, temperature compensation is elaborately considered in this chip, which makes LC1212's temperature coefficient within 100ppm/°C。

## TYPICAL PERFORMANCE CHARACTERISTICS

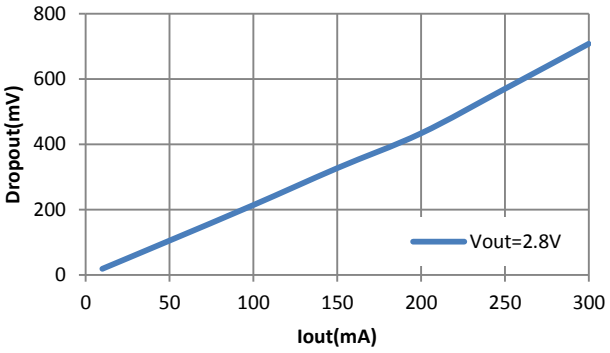
**Load regulation (Vin=4V)**



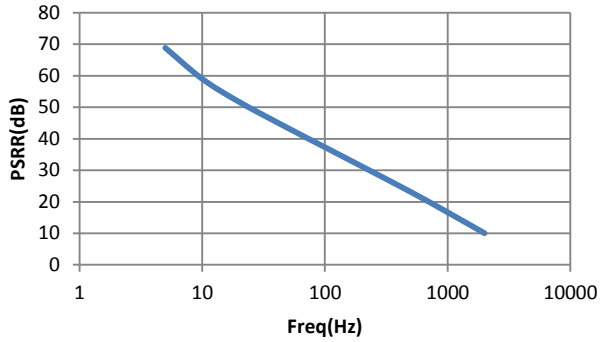

**Line regulation**



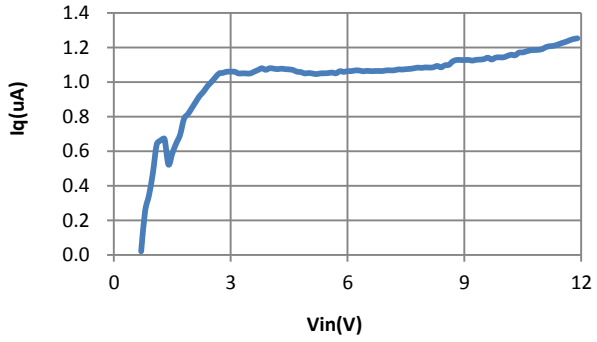

**Dropout Voltage**



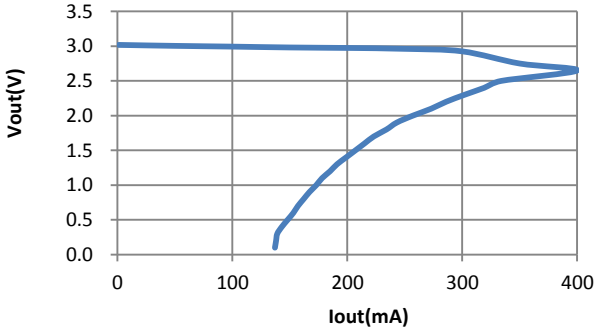

**PSRR**




**Iq (Vout=2.8V)**



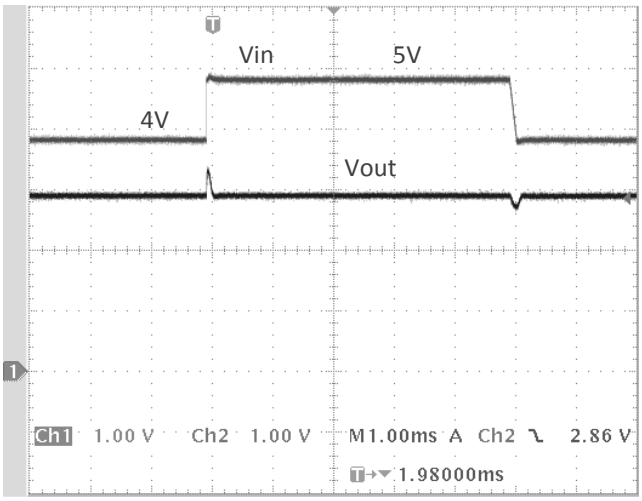

**Current limit**



## TYPICAL PERFORMANCE CHARACTERISTICS continued

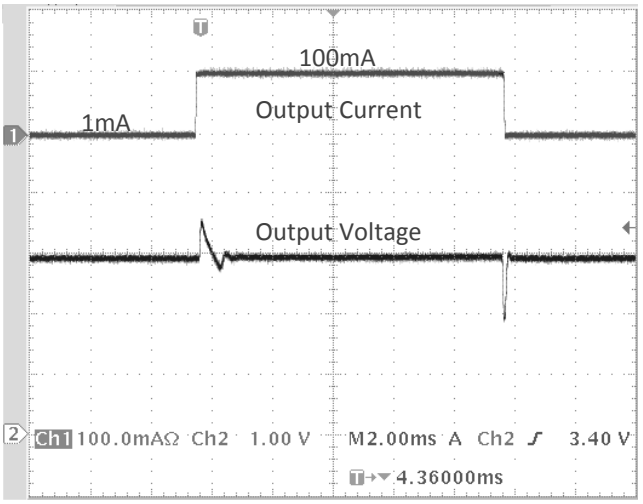
**Line transient response**

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

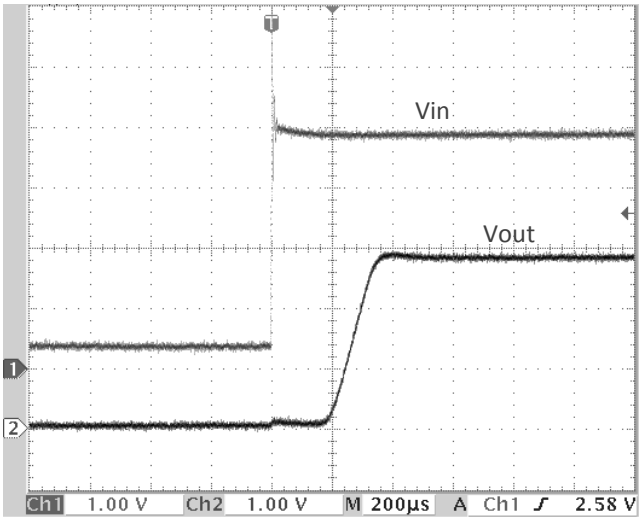



**Load transient response**

**Cin=Cout=1uF Vin=4V Vout=2.8V**



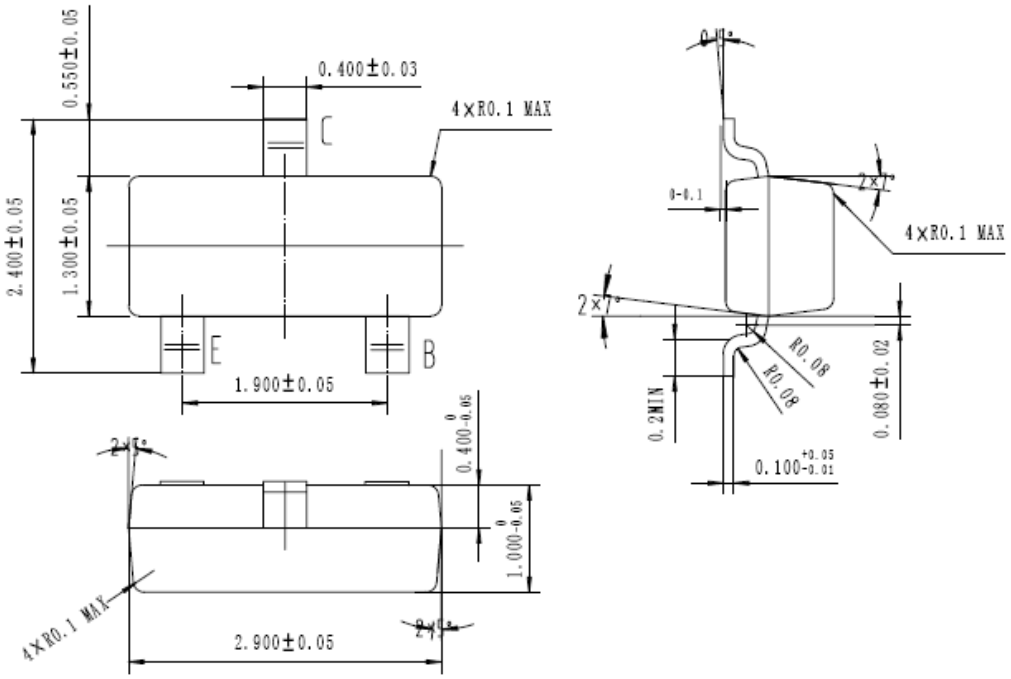

**Start up**



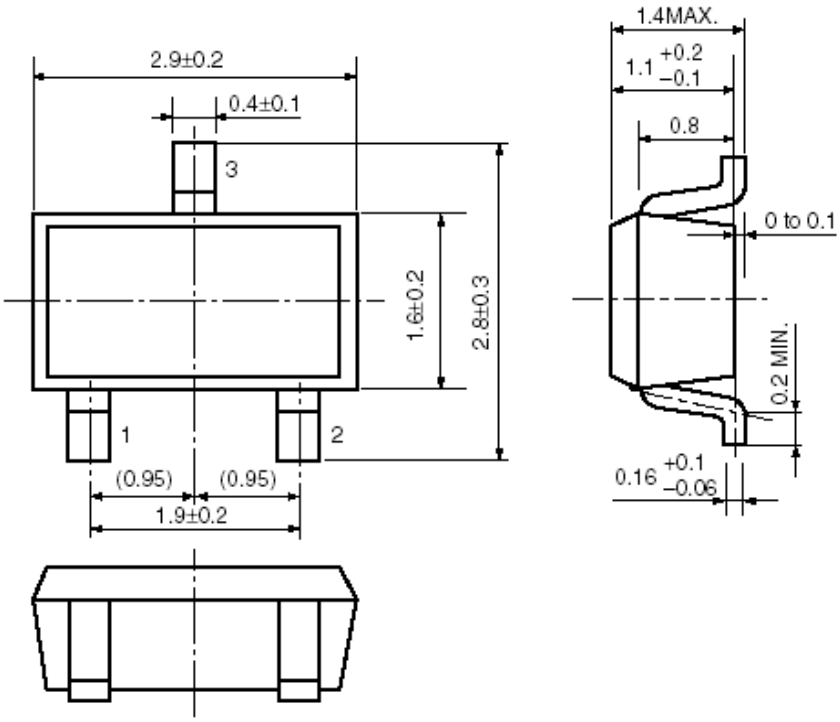
## PACKAGE LINE

| Package | TSOT-23 | Devices per reel | 3000Pcs | Unit | mm |
|---|---|---|---|---|---|

Package dimension：

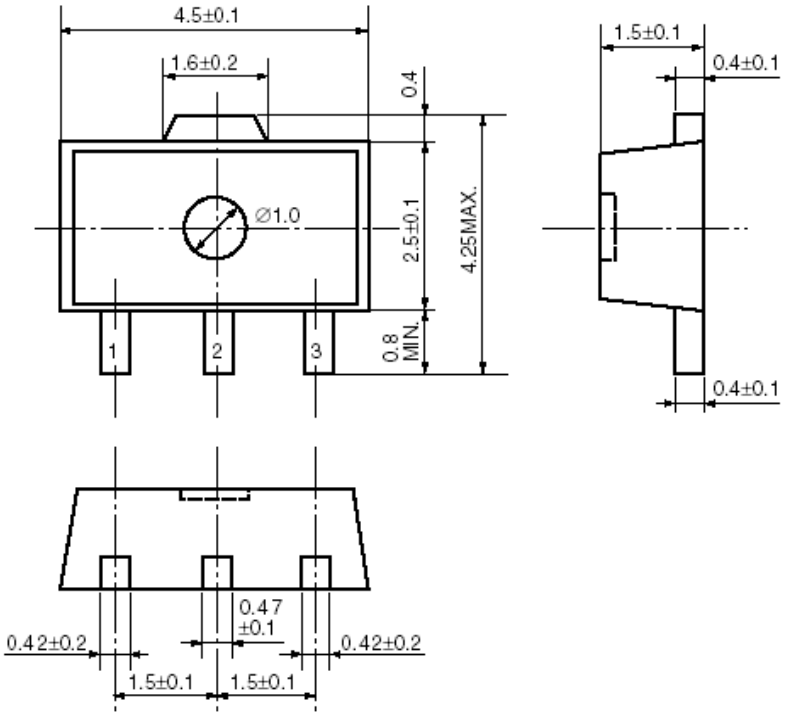



| Package | SOT-23-3 | Devices per reel | 3000Pcs | Unit | mm |
|---|---|---|---|---|---|



| Package | SOT-89-3 | Devices per reel | 1000Pcs | Unit | mm |
|---|---|---|---|---|---|

Package Dimension:



| Package | TO-92 | Devices per Bag | 1000Pcs | Unit | mm |
|---|---|---|---|---|---|

Package Dimension:

TO-92