LC1210

200mA Low Consumption Linear Regulator

DESCRIPTION

LC1210 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), And it also provides foldback short-circuit protection and output current limit function. The very low power consumption of LC1210(Iq=1.0uA) can greatly improve natural life of batteries.

LC1210 can provide output value in the range of 1.1V~5.5V in 0.1V steps. It also can customized on command.

LC1210 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

LC1210 has well load transient response and good temperature characteristic, And it uses trimming technique to guarantee output voltage accuracy within ± 2%.

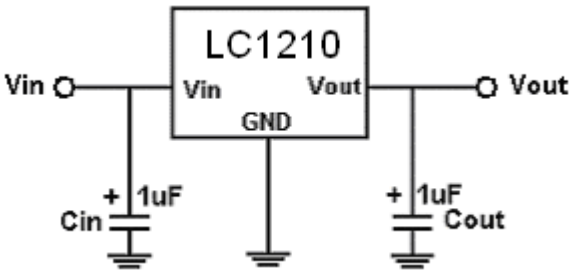
FEATURES

- 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~12V
- Output Voltage Range:1.1V~5.5V
  (customized on command in 0.1V steps)
- Highly Accurate:±2%(±1% customized)
- Output Current Limit
  420mA@Vout=2.8V
- Foldback Short-circuit Current
  90mA@Vout=2.8V

APPLICATIONS

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

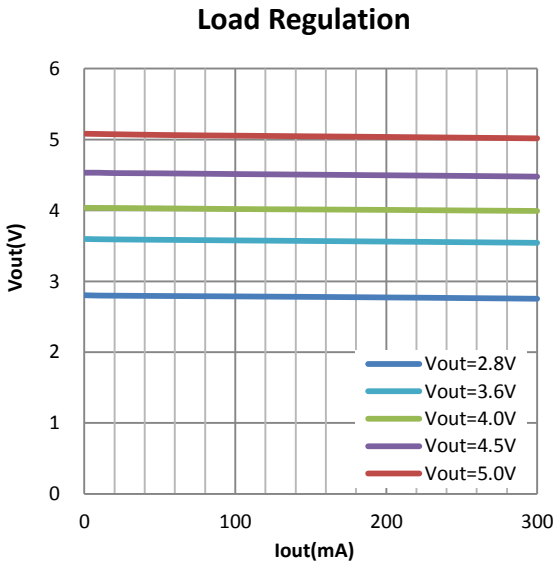
TYPICAL APPLICATION



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

LC1210 ①②③④⑤

Code	Description
①	Temperature&Rohs: C: -40~85°C , Pb Free Rohs Std. H: -40~85°C, Halogen Free
②	Package type: B3:SOT-23-3 B5:SOT-23-5 C3:SOT-89-3 C3B:SOT-89-3(B) HA:TO-92 HB:TO-92
③	Packing type: TR:Tape&Reel (Standard) BG:Bag (TO-92) PT:Reel (TO-92)
④	Output voltage: e.g. 11=1.1V 15=1.5V 55=5.5V
⑤	Voltage accuracy: 1=±1% Blank(default)=±2%

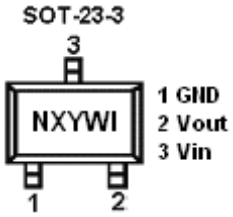
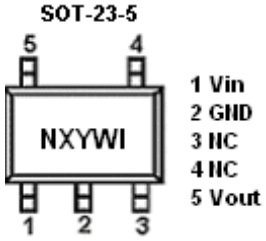
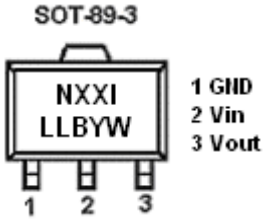
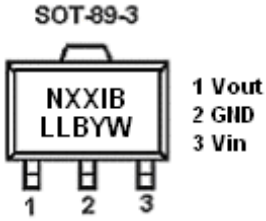
MARKING DESCRIPTON

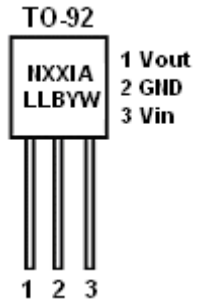
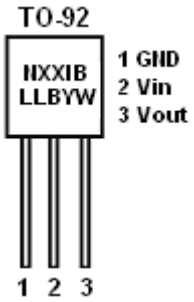
N: Product Code
X: Output Voltage
Output Voltage Code

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	LC1210CB3TR□□□	
Marking		
NXYWI	N:Product Code	
	X:Output Voltage	
	YW：Date Code	
Product Classification	LC1210CB5TR□□□	
Marking		
NXYWI	N: Product Code	
	X: Output Voltage	
	YW: Date Code	
Product Classification	LC1210CC3TR□□□	
Marking		
NXXI LLBYW	N:Product Code	
	XX:Output Voltage	
	LL:LOT NO.	
	B:FAB Code	
	YW:Date Code	
Product Classification	LC1210CC3BTR□□□	
Marking		
NXXIB LLBYW	N:Product Code	
	XX:Output Voltage	
	LL:LOT NO.	
	B:FAB Code	
	YW:Date Code	

Product Classification	LC1210CHABG□□□ LC1210CHAPT□□□	
Marking		
NXXIA LLBYW	N:Product Code	
	XX:Output Voltage	
	LL:LOT NO.	
	B:FAB Code	
	YW:Date Code	
Product Classification	LC1210CHBBG□□□ LC1210CHBPT□□□	
Marking		
NXXIB 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		14V
Operating Junction Temperature(Tj)		125°C
Ambient Temperature(Ta)		-40°C -85°C
Power Dissipation	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.

RECOMMENDED WORK CONDITIONS

Item	Min	Recommended	Max.	Unit
Input Voltage Range			12	V
Ambient Temperature	-40		85	°C

ELECTRICAL CHARACTERISTICS

LC1210□□□TR□□
(Test Conditions: Cin=1uF, Cout=1uF, TA=25°C, Unless Otherwise Specified)

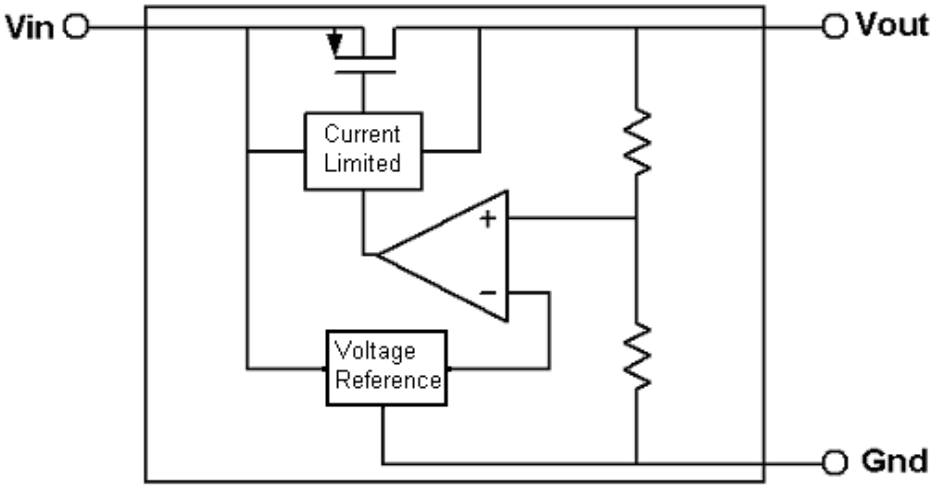
Symbol	Parameter	Conditions		Min	Type	Max	Units
Vin	Input Voltage					12	V
Vout	Output Voltage			Vout x0.98		Vout X1.02	V
Iout(Max.)	Maximum Output Current	Vin-Vout=1V		200			mA
Dropout Voltage	Input-Output Voltage Differential	Iout=100mA	Vout ≤ 1.8V		600	1000	mV
			Vout ≥ 1.8V		300	600	
$\frac{\Delta Vout}{\Delta Vin \cdot Vout}$	Line Regulation	Iout=10mA, 1.5V≤Vin≤8V			0.2	0.3	%/V
$\Delta Vout$	Load Regulation	Vin=Set Vout+1V 1mA≤Iout≤100mA			20	40	mV
Iq	Quiescent Current	Vin=Set Vout+1V			1.0	5.0	uA
$\frac{\Delta Vout}{\Delta T \cdot Vout}$	Output Voltage Temperature Coefficient	Iout=10mA			100		ppm/°C

LC1210□□□TR36
(Test Conditions: Cin=1uF, Cout=1uF, TA=25°C, Unless Otherwise Specified)

Symbol	Parameter	Conditions	Min	Type	Max	Units
Vin	Input Voltage				12	V
Vout	Output Voltage		3.528	3.6	3.672	V
Iout(Max.)	Maximum Output Current	Vin-Vout=1V	200			mA

Dropout Voltage	Input-Output Voltage Differential	Iout=100mA		210	600	mV
$\frac{\Delta Vout}{\Delta Vin \cdot Vout}$	Line Regulation	Iout=10mA, 4V≤Vin≤8V		0.2	0.3	%/V
$\Delta Vout$	Load Regulation	Vin=Set Vout+1V 1mA≤Iout≤100mA		20	40	mV
Iq	Quiescent Current	Vin=Set Vout+1V		1.0	5.0	uA
$\frac{\Delta Vout}{\Delta T \cdot Vout}$	Output Voltage Temperature Coefficient	Iout=10mA		100		ppm/°C

BLOCK DIAGRAM



EXPLANATION

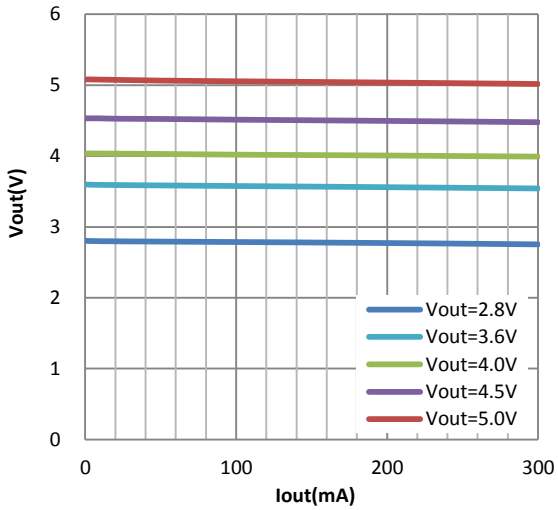
LC1210 is a series of low dropout voltage and low power consumption three pins regulator. Its application circuit is very simple, which only needs two outside capacitors. It is composed of these modules: high accuracy voltage reference, current limit circuit, error amplifier, output driver and power transistor.

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

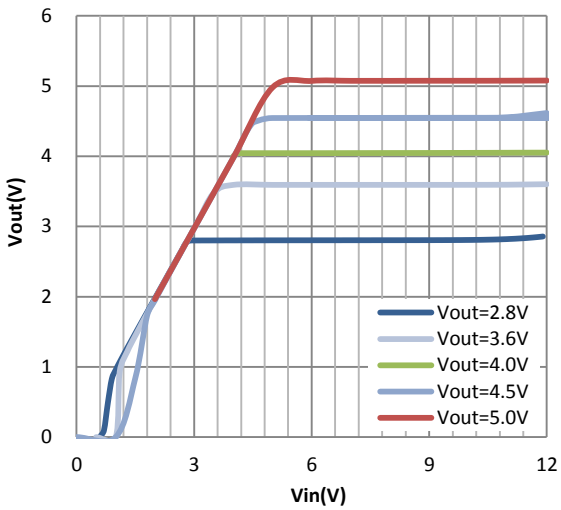
LC1210 uses trimming technique to assure the accuracy of output value within±2%, at the same time, temperature compensation is elaborately considered in this chip, which makes LC1210's temperature coefficient within 100ppm/℃。

TYPICAL PERFORMANCE CHARACTERISTICS

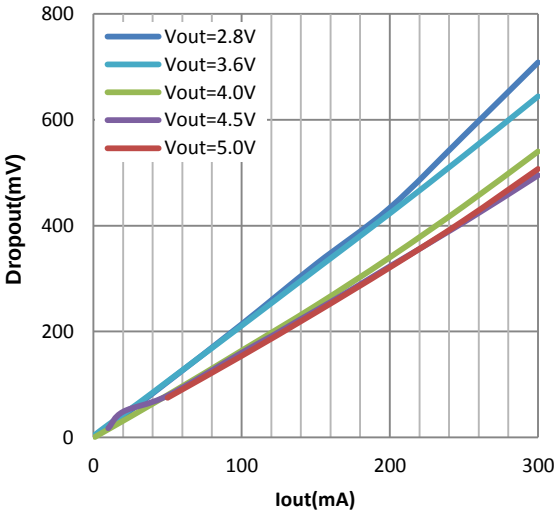
Load Regulation



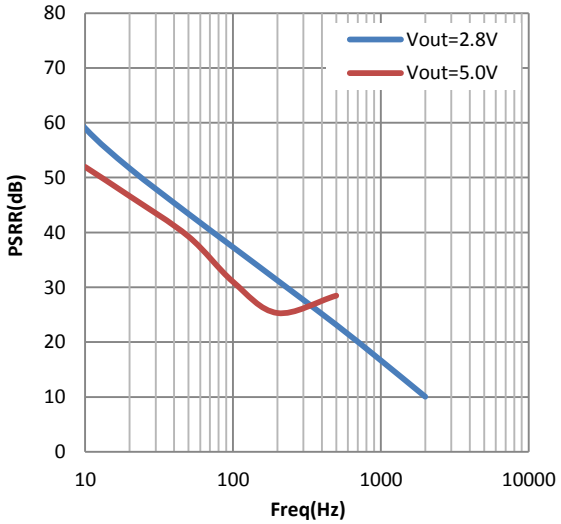
Line Regulation



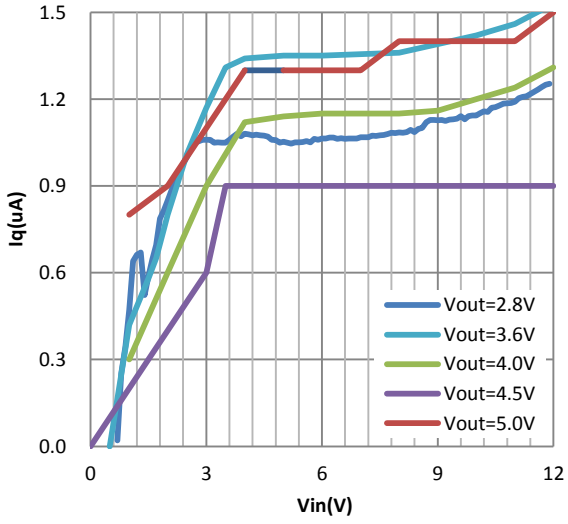
Dropout



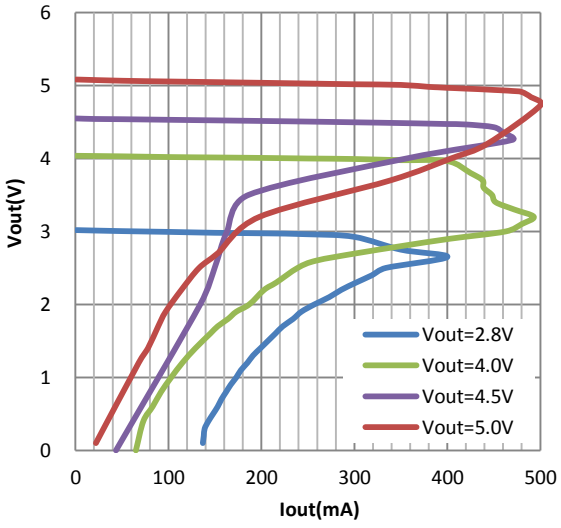
PSRR



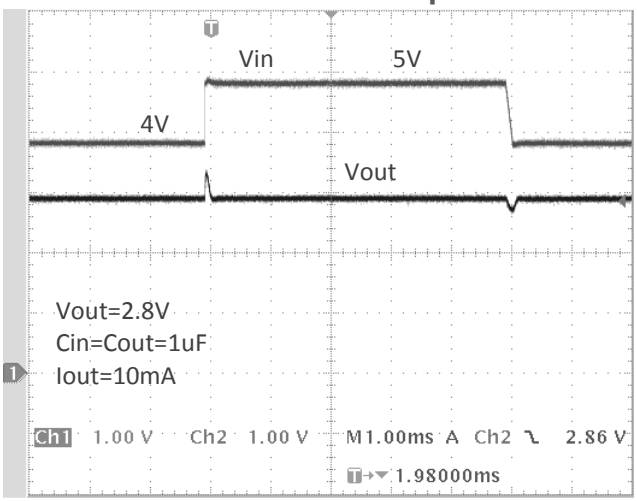
Iq



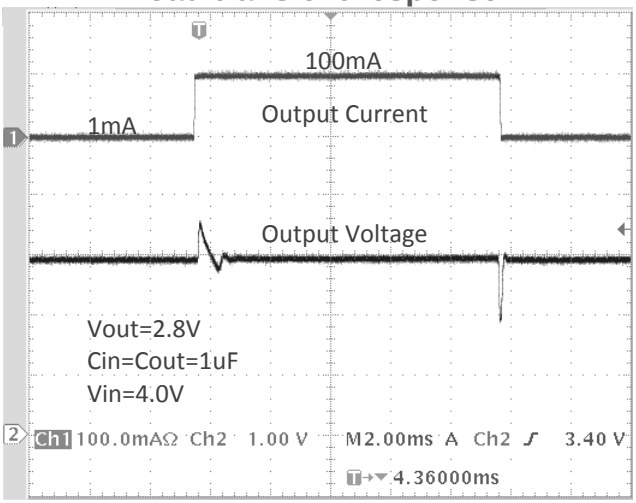
Current Limit



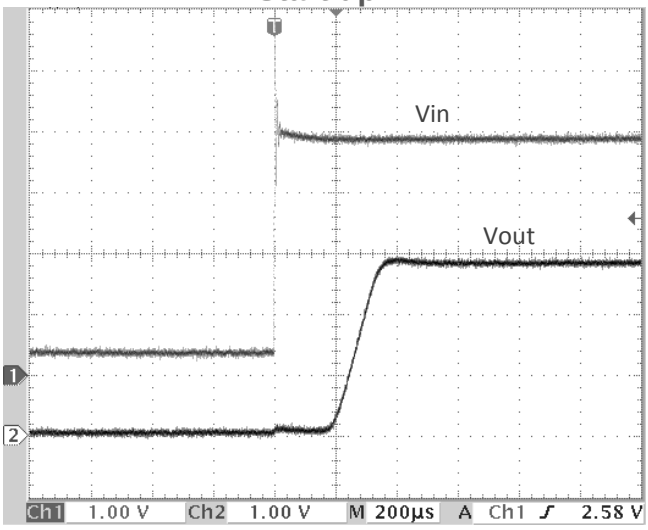
Line transient response



Load transient response



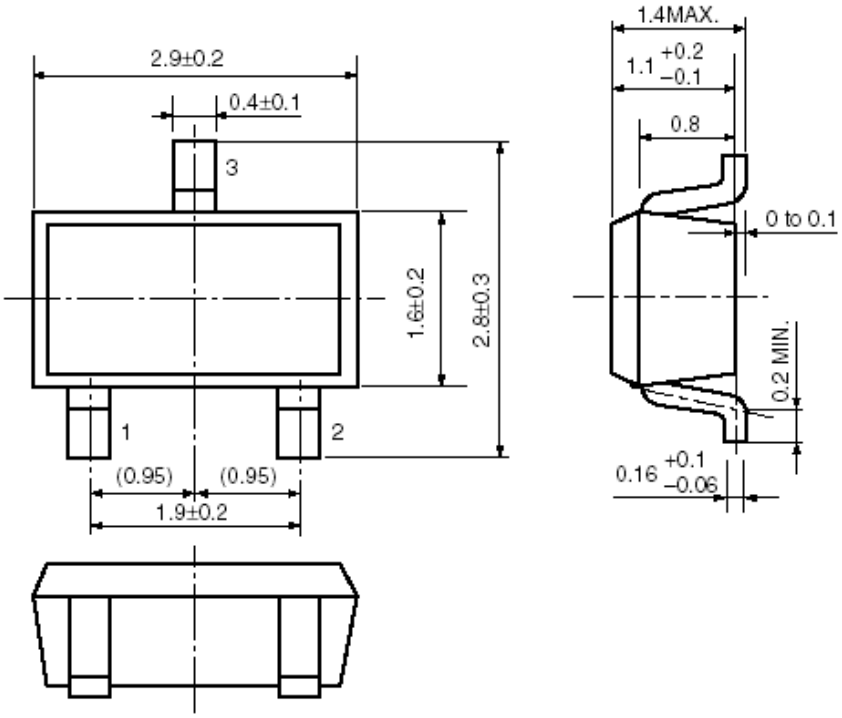
Start up



PACKAGE LINE

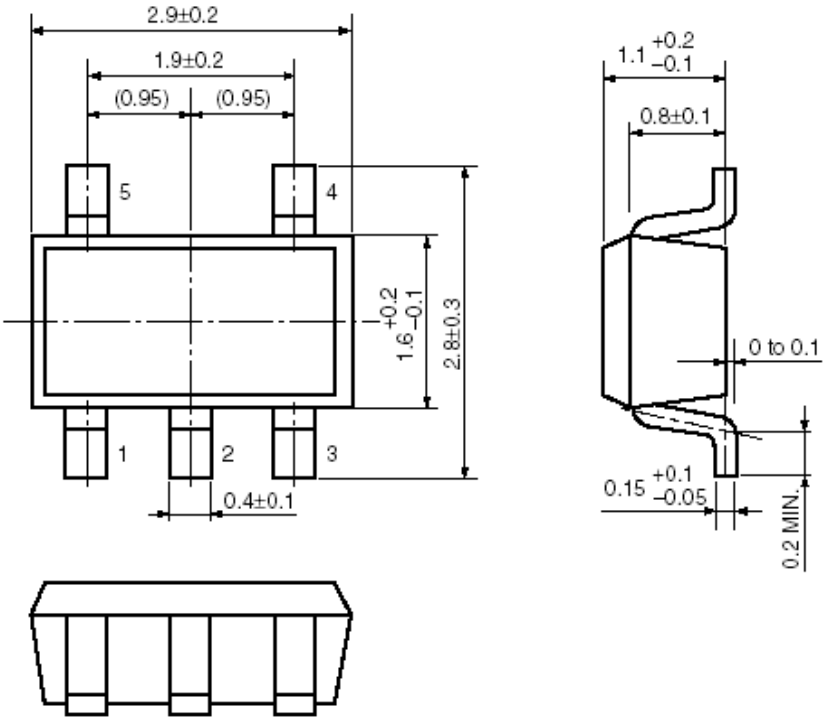
Package	SOT-23-3	Devices per reel	3000Pcs	Unit	mm

Package dimension：



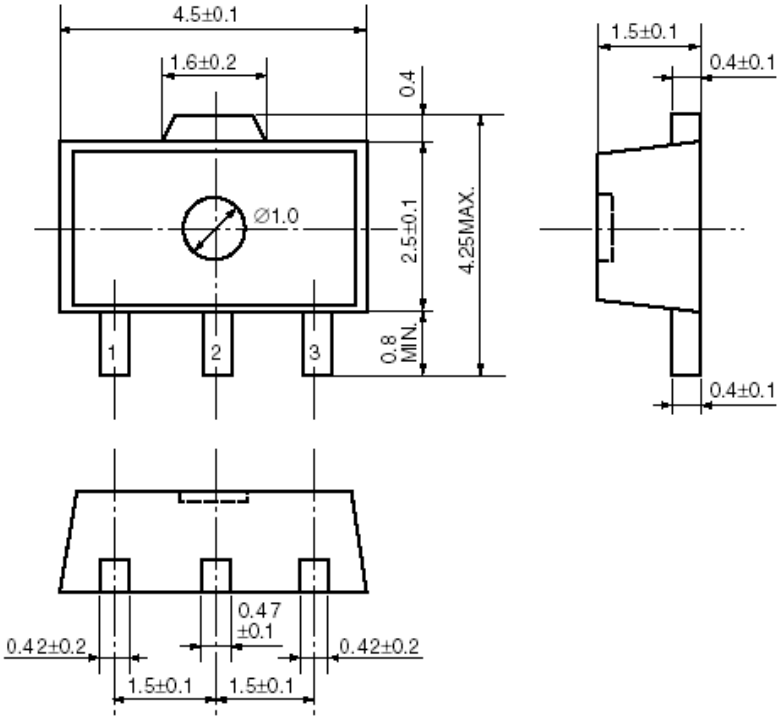
Package	SOT-23-5	Devices per reel	3000Pcs	Unit	mm

Package Dimension:



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

Package Dimension:



Package	TO-92	Devices per Bag	1000Pcs	Unit	mm
		Devices per reel	2000Pcs		

Package Dimension:

TO-92