Low Dropout Linear Regulator

Description

- The SL6206 series is a CMOS step-down voltage regulator characterized by high ripple rejection,low power consumption, low dropout, and features such as over current and short-circuit protection.
- These devices exhibit very low static bias current (6.0μA Type) and can provide an output current of 250mA with minimal input-to-output voltage differential, maintaining excellent regulation.
- Due to their low drop out and low static bias current, these regulators are particularly suited for battery-powered products aimed at extending battery life, including computers, consumer electronics, and industrial equipment.

Features

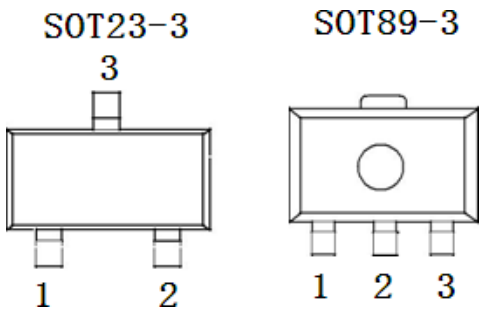
- High-precision output voltage：±2.5%
- Output voltage: 1.5V to 5.0V (in increments of 0.1V)
- Ultra-low static bias current(Type=6.0μA)
- Low temperature coefficient
- Good input stability: Type 0.03%/V
- The maximum input voltage can reach up to 6.5V
- Strong load capability: when V_{IN}=4.3V and V_{OUT}=3.3V, I_{OUT}=250mA
- Can be used as both a regulator and a reference voltage
- Package: SOT89-3, SOT23-3

Applications

- Battery power supply system
- Cordless telephone equipment
- Wireless control system
- Portable/ handheld computer
- Portable consumer device
- Portable instrument
- Automotive electronic device
- Voltage reference source

Package and pin description

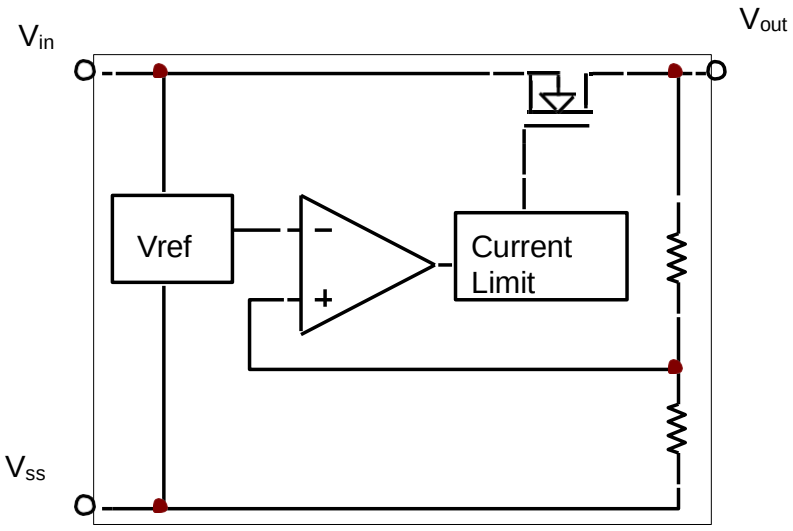
Pin numbers		Pin definition	Description
NR package	PR package		
SOT23-3	SOT89-3		
1	1	V_{SS}	chip ground
2	3	V_{OUT}	chip output
3	2	V_{IN}	startup input



Model selection

PN	Model	Maximum input voltage (V)	Output voltage (V)	Tolerances	Package
SL6206	6206	6.5	1.5，1.8，2.5， 2.7，3.0，3.3， 3.6，4.4，5.0	± 2.5%	SOT89-3 SOT23-3
Model selection instructions: The first "XX" is the output voltage value; NR is SOT23-3; PR is SOT89-3. For example: SL6206-30PR means 3.0V output voltage, SOT89-3 package.					

Functional block diagram



Absolute Maximum Ratings

Parameter	Symbol	Parameter		Value	Unit
Voltage	V_{in}	Input voltage		6.5	V
	V_{out}	Output voltage		V_{ss}-0.3 ~V_{out}+0.3	V
Current	I_{out}	Output current		300	mA
Power dissipation	P_D	SOT23	Maximum allowable power dissipation	300	mW
		SOT89-3		500	
Temperature	T_w	Operating temperature		-25～+80	℃
	T_c	Storage temperature		-40～+125	℃
	T_h	Soldering temperature		260	℃,10s

Electrical characteristics ($C_{in}=C_{out}=10uF, T_A=25°C$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	$V_{OUT}(E)$	I_{OUT}=1mA, V_{IN}= $V_{OUT}(T)$+1V	$V_{OUT}(T)$ *0.98	$V_{OUT}(T)$	$V_{OUT}(T)$* 1.02	V
Max. output current	I_{OUT} (max)	$V_{IN}=V_{OUT}(T)$+1V	100			mA
Dropout voltage	V_{drop}	I_{OUT} =50mA, 1.5V≤$V_{OUT}(T)$≤2.5V		200	280	mV
		I_{OUT} =50mA, 2.6V≤$V_{OUT}(T)$≤3.3V		160	240	
		I_{OUT} =50mA, 3.4V≤$V_{OUT}(T)$≤5.5V		120	200	
Static current	I_{SS}	V_{IN}= $V_{OUT}(T)$+1V		7		μ A
Load stability	ΔV_{OUT}	V_{IN}= $V_{OUT}(T)$+1V, 1mA≤I_{OUT}≤80mA		20		mV
Input stability	$\Delta V_{OUT}/(\Delta V_{IN} \cdot V_{OUT})$	I_{OUT} =1mA, $V_{OUT}(T)$+0.5V ≤V_{IN}≤5.5V		0.1	0.2	%/V
Output voltage temperature coefficient	$\Delta V_{OUT}/(\Delta T_a \cdot V_{OUT})$	V_{IN}= $V_{OUT}(T)$+1V, I_{OUT}=10mA -40°C≤T_a≤85°C		±100		ppm/°C
Input voltage	V_{IN}		1.8	--	8.0	V
Ripple suppression ratio	P_{SRR}	$V_{IN}=I_{OUT}$ [$V_{OUT}(T)$+1]V +1Vp-pAC =10mA, f=1kHz		40		dB
Short-circuit current	I_{short}	V_{IN}= $V_{OUT}(T)$+1.5V, $V_{OUT}=V_{ss}$		30		mA
Overcurrent protection current	I_{limt}	V_{IN}= $V_{OUT}(T)$+1.5V		380		mA

Note:

1、$V_{OUT}(T)$:Specified output voltage.

2、$V_{OUT}(E)$:Effective output voltage refers to the voltage output when I_{OUT} is maintained at a constant value and $V_{IN}=(V_{OUT}(T)+1.0V)$.

3、I_{OUT}(max): With $V_{IN}=V_{OUT}(T)$+1V, slowly increase the output current until the current value when the output voltage ≤ 95% of $V_{OUT}(E)$.

4、$V_{drop} = V_{IN1} - V_{OUT}(E)s$:

V_{IN1} = gradually decrease the input voltage until the output voltage drops to 98% of $V_{OUT}(E)1$.

$V_{OUT}(E)s=V_{OUT}(E)*98\%$.

$V_{OUT}(E)1$=When $V_{IN}=V_{OUT}(T)$+1V, I_{OUT}=The output voltage value at a specific numerical value of I_{OUT}.

Test circuit

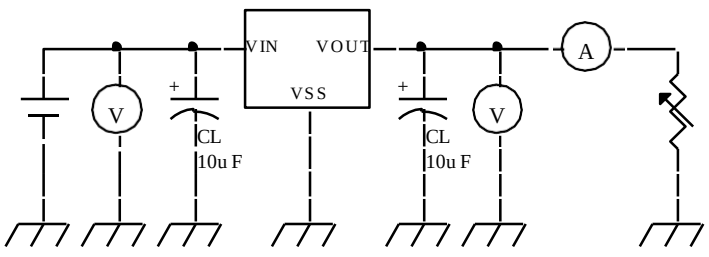


Fig.1

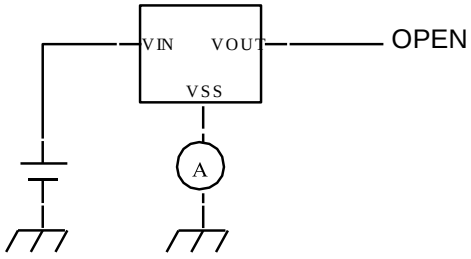
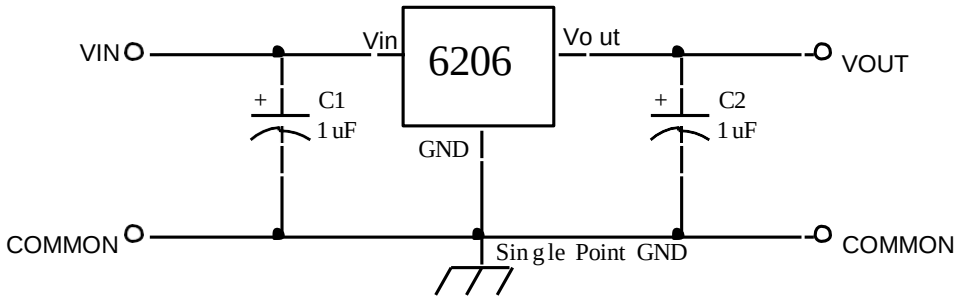


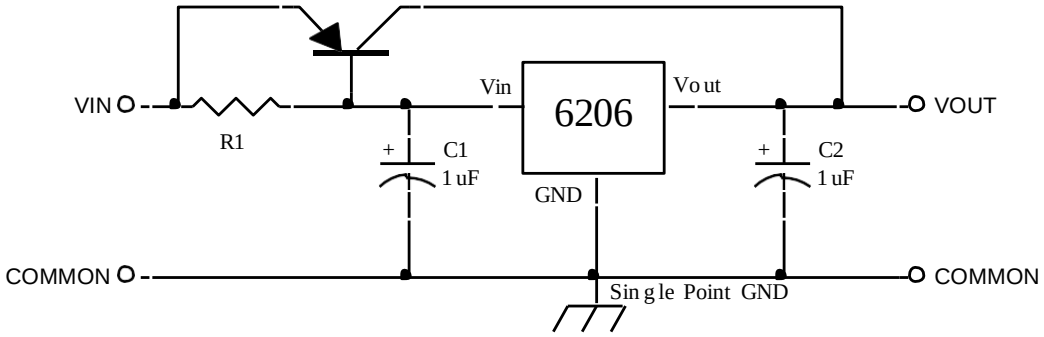
Fig.2

Application circuit

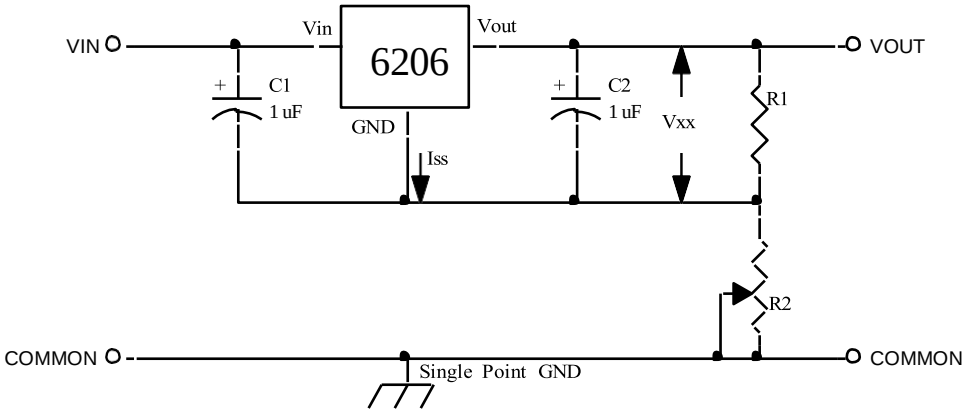
Basic Circuit



Large output current positive voltage regulator

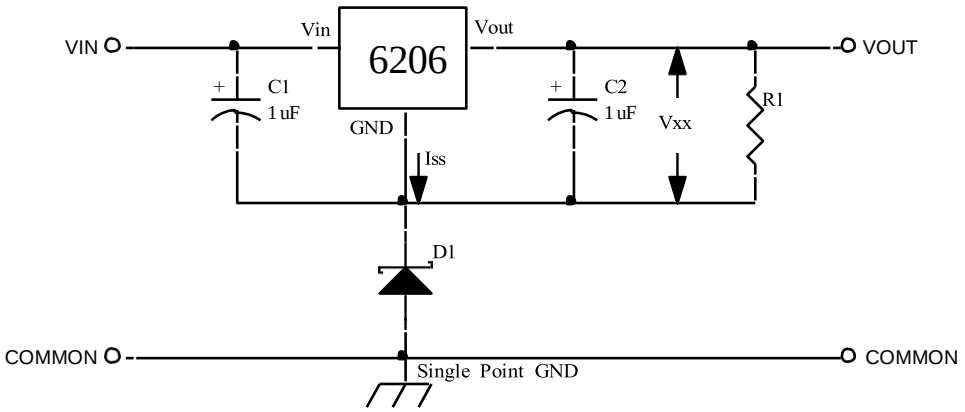


Boost circuit for increasing output voltage



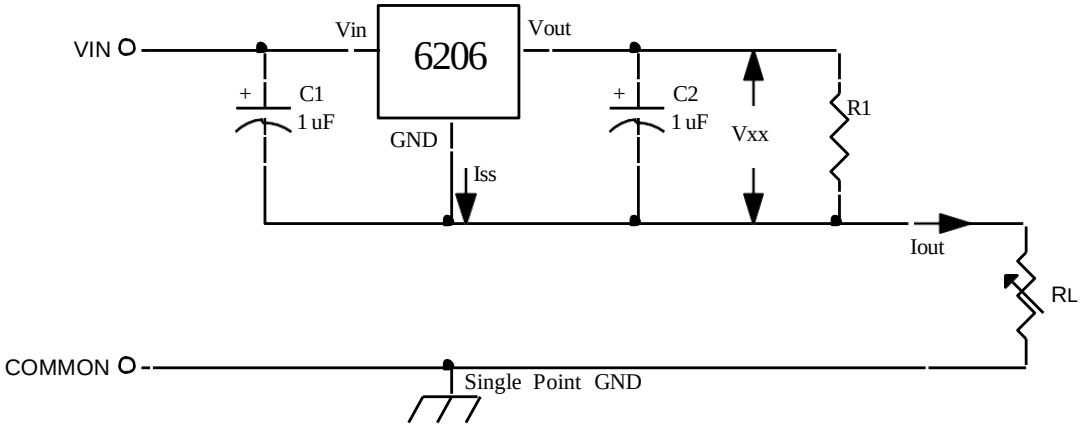
$V_{out}=V_{xx}(1+R2/R1)+I_{ss}R2$

Voltage Boost Circuit



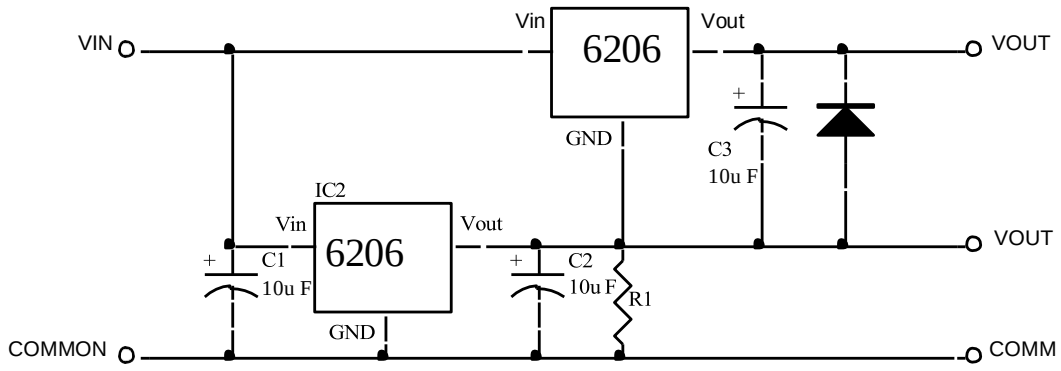
$V_{out}=V_{xx}+V_{D1}$

Constant current regulator



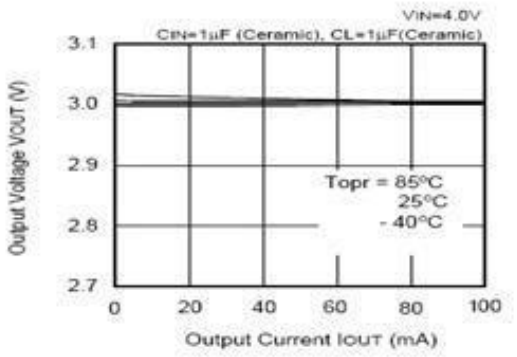
$I_{out}=V_{xx}/R_A+I_{ss}$

Dual output

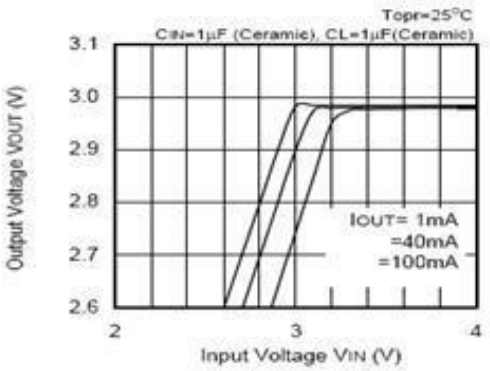


Characteristic curves

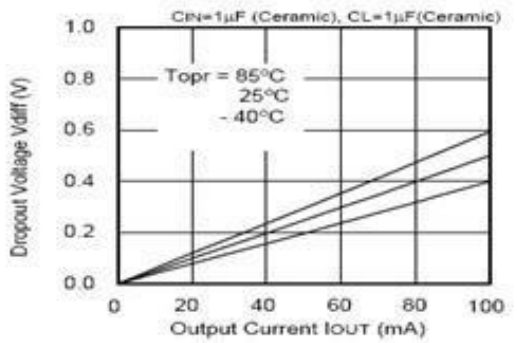
Output voltage vs. output current
(as load current increases)



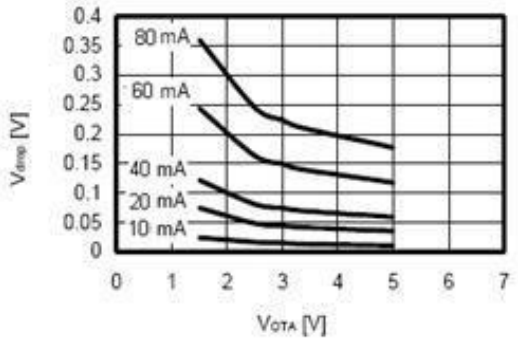
Output voltage vs. input voltage



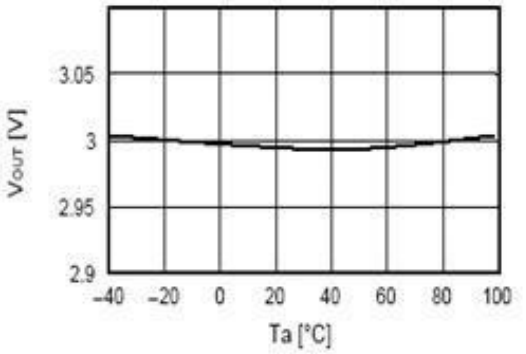
Dropout voltage vs. output current



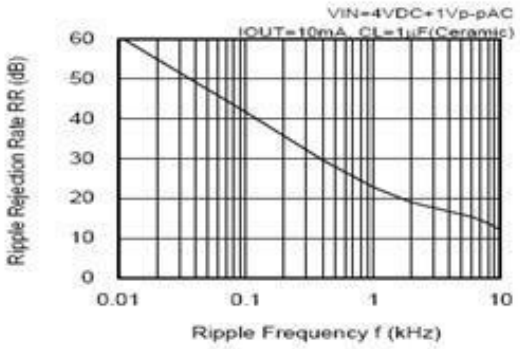
Dropout voltage vs. output voltage



Output voltage vs. temperature

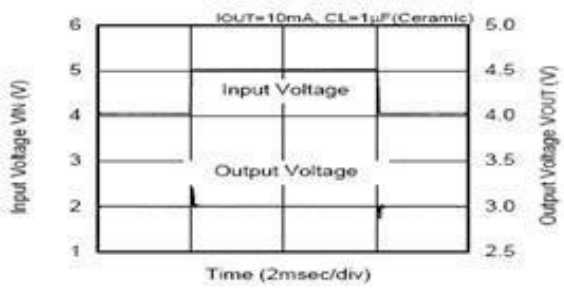


Ripple suppression

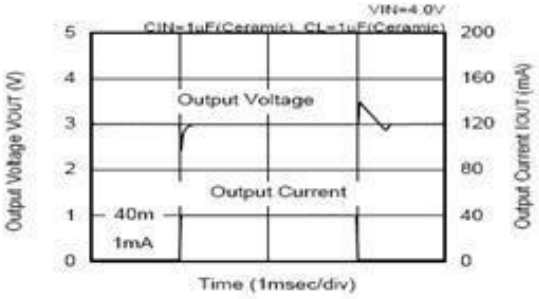


Transient response

Input transient response characteristics

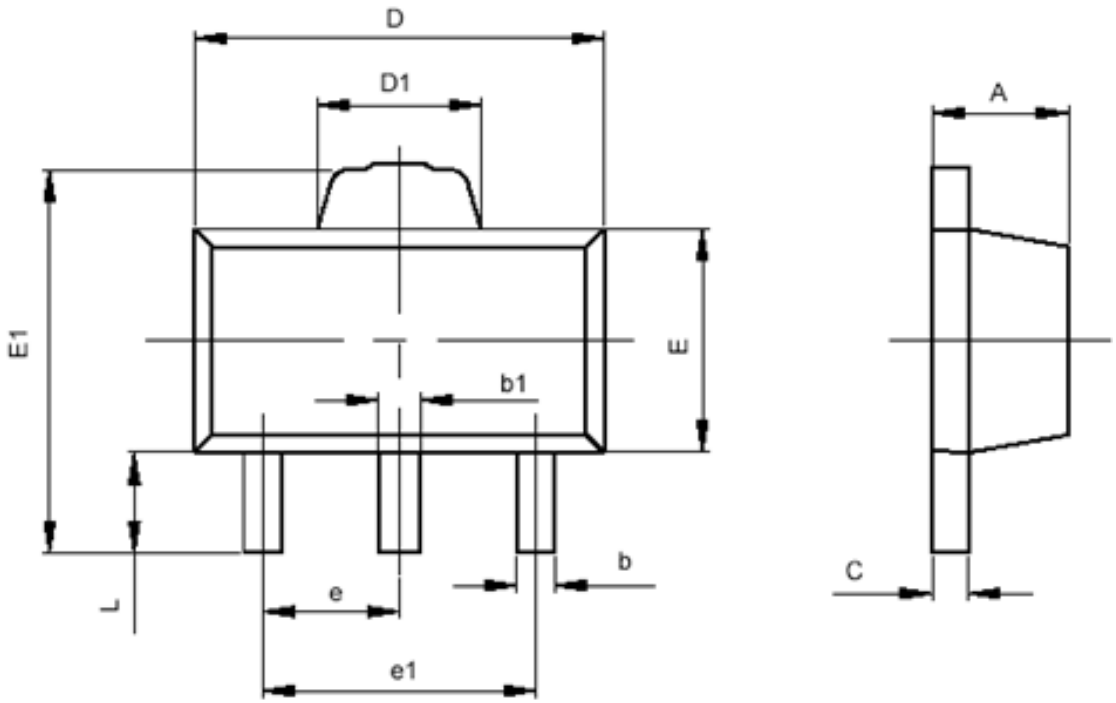


Load transient input response characteristics



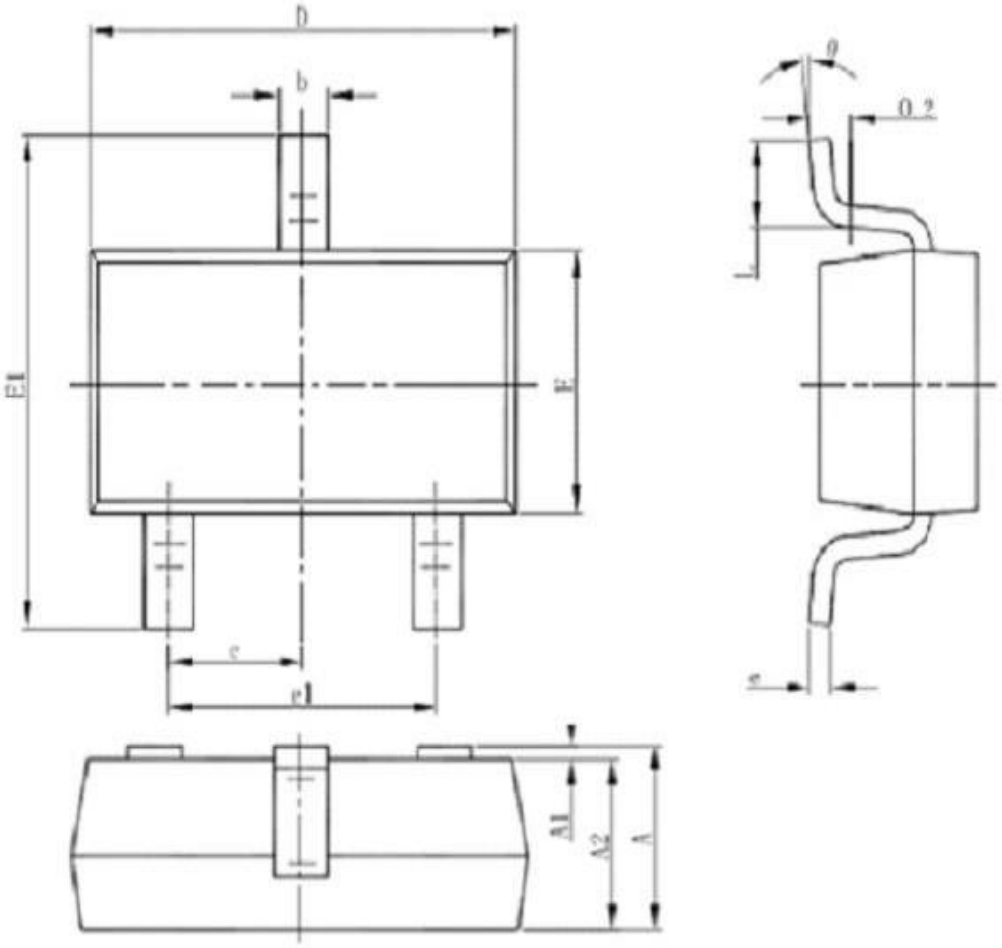
Package Description

SOT-89-3



Symbol	Min.(mm)	Max.(mm)
A	1.400	1.600
b	0.320	0.520
b1	0.360	0.560
c	0.350	0.440
D	4.400	4.600
D1	1.400	1.800
E	2.300	2.600
E1	3.940	4.250
e	1.500TYP	
e1	2.900	3.100
L	0.900	1.100

SOT-23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°