

300mA Low Dropout CMOS Voltage Regulators

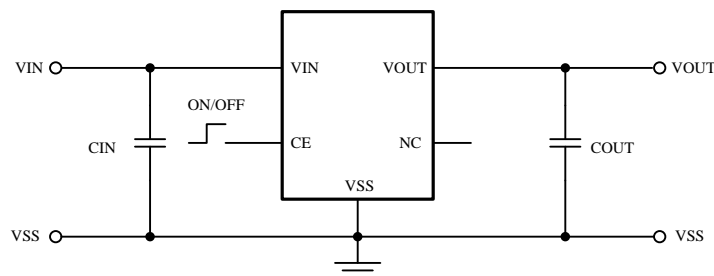
■ General Description

The LN1132 series are highly precise, low power consumption, positive voltage regulators manufactured using CMOS and laser trimming technologies. The series provides large currents with a significantly small dropout voltage. The LN1132 consists of a current limiter circuit, a driver transistor, a precision reference voltage and an error amplifier. Output voltage is selectable in 0.1V steps between 1.3V ~ 6.0V. SOT-23 and SOT-89 packages are available.

■ Applications

- Mobile phones
- Cordless phones
- Cameras, video recorders
- Portable games
- Portable AV equipment
- Reference voltage
- Battery powered equipment

■ Typical Application Circuit



■ Features

- Output Voltage Range: 1.2V to 6.0V (selectable in 100mV steps)
- Highly Accurate: $\pm 2\%$
- Dropout Voltage : 180mV @ 100mA (3.0V type)
- Low Power Consumption : 5.0 μ A (TYP.)
- Maximum Output Current : 300mA ($V_{in} \geq V_{out} + 1V$)
- Internal protector: current limiter and short protector
- Maximum Operating voltage: 7V
- Small packages: SOT89-3L, SOT-23 and other required

■ Package

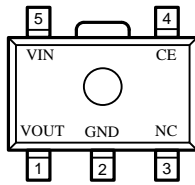
- SOT89-3L
- SOT23-3L
- SOT23-3B
- SOT23-5L
- SOT89-5L

■ Ordering Information

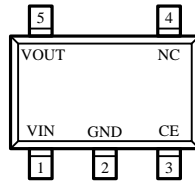
LN1132 P ①②③④⑤-⑥

Designator	Symbol	Description	Designator	Symbol	Description
①②	12-60	Output Voltage: e.g. 30:3.0V; 50:5.0V	④	P	SOT89-3L
				N	SOT23-5L
③	1/2	Output Voltage Accuracy 1: ±1%; 2: ±2%		R	SOT89-5L
④	M	SOT23-3L	⑤	R	Embossed Tape :Standard Feed
	V	SOT23-3B		L	Embossed Tape :Reverse Feed
				⑥	G

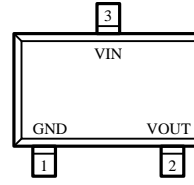
■ Pin Configuration



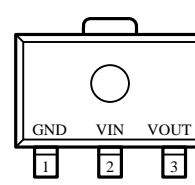
SOT89-5L
(TOP VIEW)



SOT23-5L
(TOP VIEW)



SOT23-3L/B
(TOP VIEW)

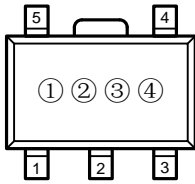


SOT89-3L
(TOP VIEW)

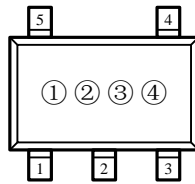
引脚号				引脚名	功能
SOT23-3L/B	SOT89-5L	SOT23-5L	SOT89-3L		
3	5	1	2	VIN	Supply Power
1	2	2	1	VSS	Ground
-	3	4	-	NC	No connect
-	4	3	-	CE	Chip enable
2	1	5	3	VOUT	Voltage Pin

■ Marking Rule

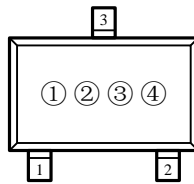
- SOT89-3L, SOT89-5L, SOT23-3L/B, SOT23-5L



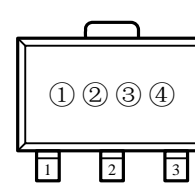
SOT89-5L
(TOP VIEW)



SOT23-5L
(TOP VIEW)



SOT23-3L/B
(TOP VIEW)



SOT89-3L
(TOP VIEW)

- ① Represents the product name

Symbol	Product Name
H	LN1132◆◆◆◆◆

- ② Represents the range of output voltage

Output Voltage Range(V)	0.1~3.0	3.1~6.0	6.1~9.0
Symbol	R	S	T

- ③ Represents the Output Voltage

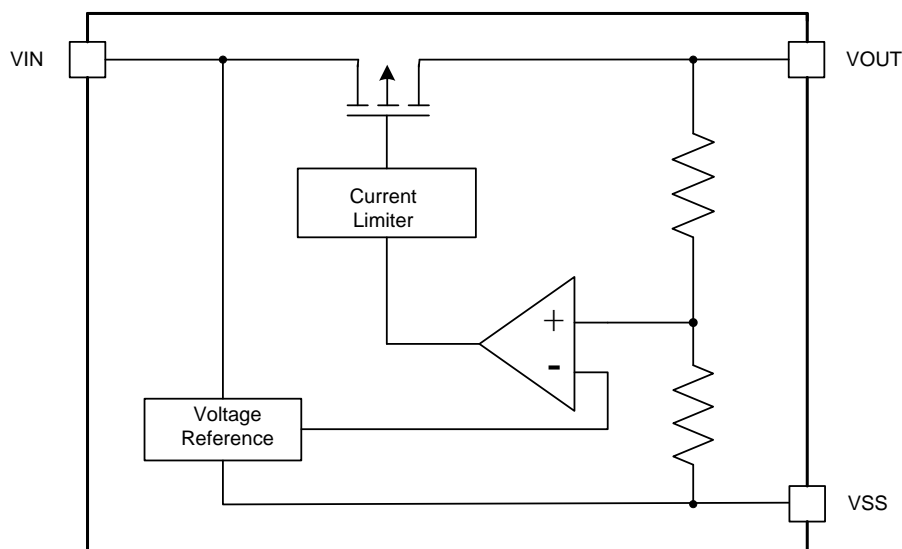
Symbol	Output Voltage(V)			Symbol	Output Voltage(V)		
0	-	3.1	-	F	1.6	4.6	-
1	-	3.2	-	H	1.7	4.7	-
2	-	3.3	-	K	1.8	4.8	-
3	-	3.4	-	L	1.9	4.9	-
4	-	3.5	-	M	2	5.0	-
5	-	3.6	-	N	2.1	5.1	-

Symbol	Output Voltage(V)			Symbol	Output Voltage(V)		
6	-	3.7	-	P	2.2	5.2	-
7	-	3.8	-	R	2.3	5.3	-
8	-	3.9	-	S	2.4	5.4	-
9	-	4	-	T	2.5	5.5	-
A	-	4.1	-	U	2.6	5.6	-
B	1.2	4.2	-	V	2.7	5.7	-
C	1.3	4.3	-	X	2.8	5.8	-
D	1.4	4.4	-	Y	2.9	5.9	-
E	1.5	4.5	-	Z	3	6.0	-

④ Represents the assembly lot no.

0~9, A~Z repeated (G, I, J, O, Q, W excepted)

■ Function Block Diagram



■ Absolute Maximum Ratings

Parameter	Symbol	Maximum Rating		Unit
Input Voltage	V _{IN}	V _{SS} -0.3~V _{SS} +10		V
Output Current	V _{OUT}	V _{SS} -0.3~V _{IN} +0.3		
Power Dissipation	P _D	SOT23-3	250	mW
		SOT-89-3	500	
Operating Ambient Temperature	Topr	-40~+85		°C
Storage Temperature	Tstg	-40~+125		

Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

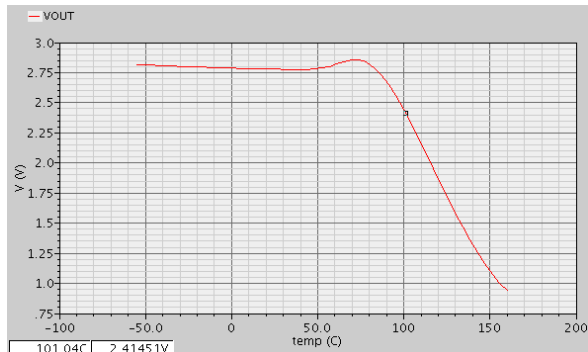
■ Electrical Characteristics

(TA=25°C unless otherwise noted)

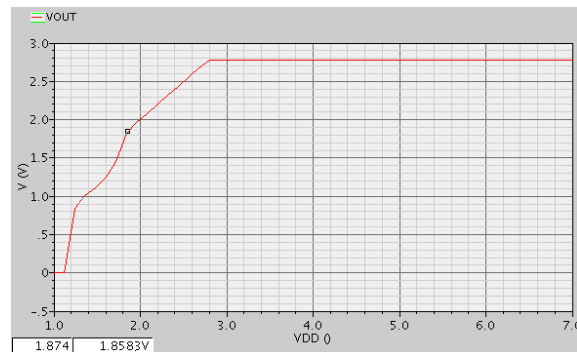
Item	Symbol	Condition		Min	Typ	Max	Unit	Circuit
Output Voltage	$V_{OUT(E)}$	$V_{IN} = V_{OUT(S)} + 1.0 \text{ V}, I_{OUT} = 40 \text{ mA}$		$V_{OUT(S)} \times 0.98$	$V_{OUT(S)}$	$V_{OUT(S)} \times 1.02$	V	1
Output Current	I_{OUT}	$V_{IN} \geq V_{OUT(S)} + 1.0 \text{ V}$		300	—	—	mA	1
Dropout Voltage	V_{drop}	$I_{OUT} = 100 \text{ mA}$	$2.2 \text{ V} \leq V_{OUT(S)} \leq 2.5 \text{ V}$	—	0.20	0.28	V	1
			$2.6 \text{ V} \leq V_{OUT(S)} \leq 3.3 \text{ V}$	—	0.18	0.24		
			$3.4 \text{ V} \leq V_{OUT(S)} \leq 5.5 \text{ V}$	—	0.12	0.20		
Line Regulations	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	$V_{OUT(S)} + 0.5 \text{ V} \leq V_{IN} \leq 7 \text{ V}$ $I_{OUT} = 80 \text{ mA}$		—	0.1	0.3	%/V	
Input Voltage	ΔV_{OUT2}	$V_{IN} = V_{OUT(S)} + 1.0 \text{ V}$ $1.0 \text{ mA} \leq I_{OUT} \leq 80 \text{ mA}$		—	20	40	mV	
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_a \bullet V_{OUT}}$	$V_{IN} = V_{OUT(S)} + 1.0 \text{ V},$ $I_{OUT} = 10 \text{ mA}$ $-40^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$		—	± 100	—	ppm/°C	
Supply Current	I_{SS1}	$V_{IN} = V_{OUT(S)} + 1.0 \text{ V}$		—	5	6.5	μA	2
Input Voltage	V_{IN}	—		1.8	—	7	V	—
Ripple-Rejection	RR	$V_{IN} = V_{OUT(S)} + 1.0 \text{ V}, f = 1.0 \text{ kHz}$ $V_{rip} = 0.5 \text{ V}_{rms}, I_{OUT} = 80 \text{ mA}$		—	50	—	dB	1
Short current	I_{short}	$V_{IN} = V_{OUT(S)} + 1.5 \text{ V},$		—	60	—	mA	1
Current Limiter	I_{lim}	$V_{IN} = V_{OUT(S)} + 1.5 \text{ V},$		—	380	—	mA	1

Typical Performance Characteristics (3.0V output)

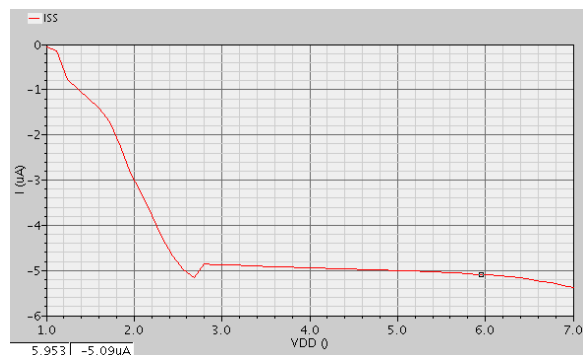
Output Voltage vs Temperature



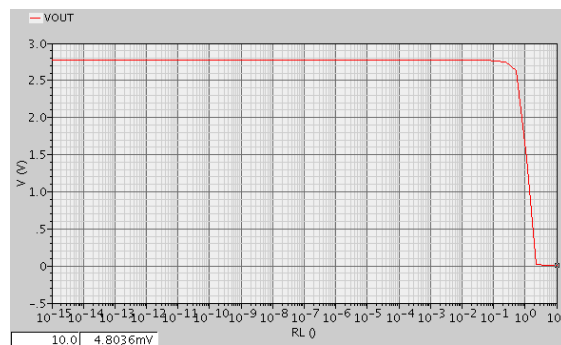
Output Voltage vs Input Voltage



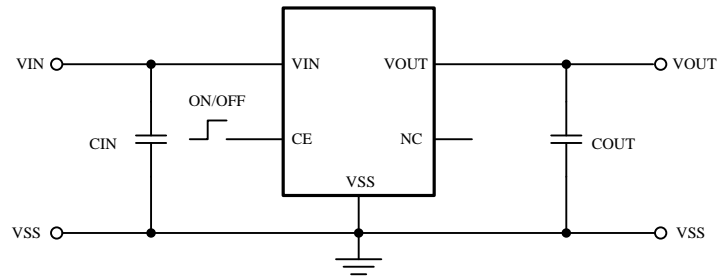
ISS vs Input Voltage



Output Current vs Output Voltage



■ Application information



● Setting the Input Capacitor and the Output Capacitor

Input capacitors (C1) and output capacitors (C2) are recommended to use more than 1 μ F, which can ensure the stability of the system.

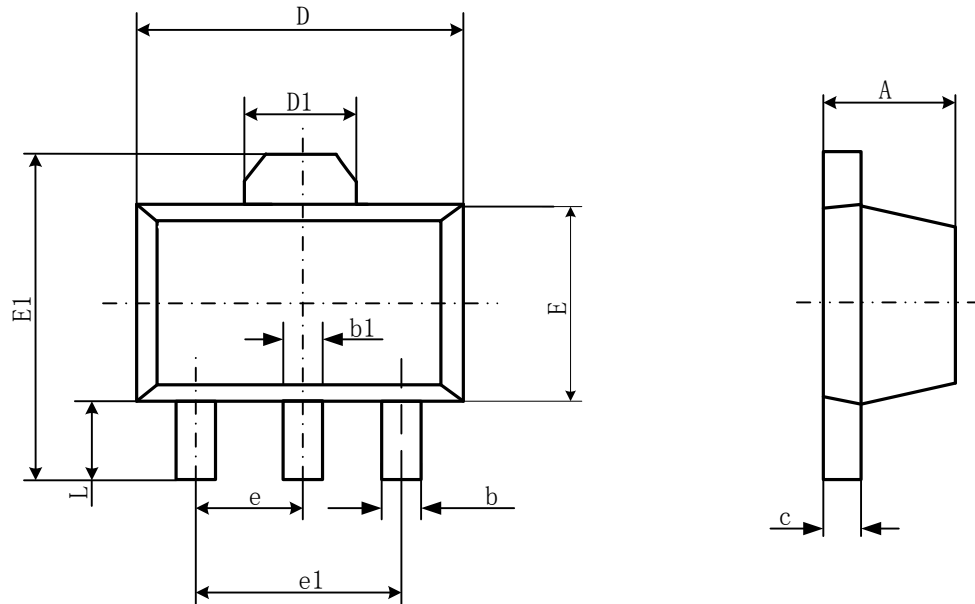
● PCB Layout

In order to get better use effect, the main points for attention of PCB layout are as follows:

- The input and output capacitors are as close as possible to the chip pins.
- The wiring of VIN and VOUT should be as thick as possible to reduce the wiring resistance and improve the load performance.
- The route from VSS(pin) to VSS uses a dedicated channel to prevent parasitic resistance from introducing into the charge path, which results in incorrect feedback ratio and output error.

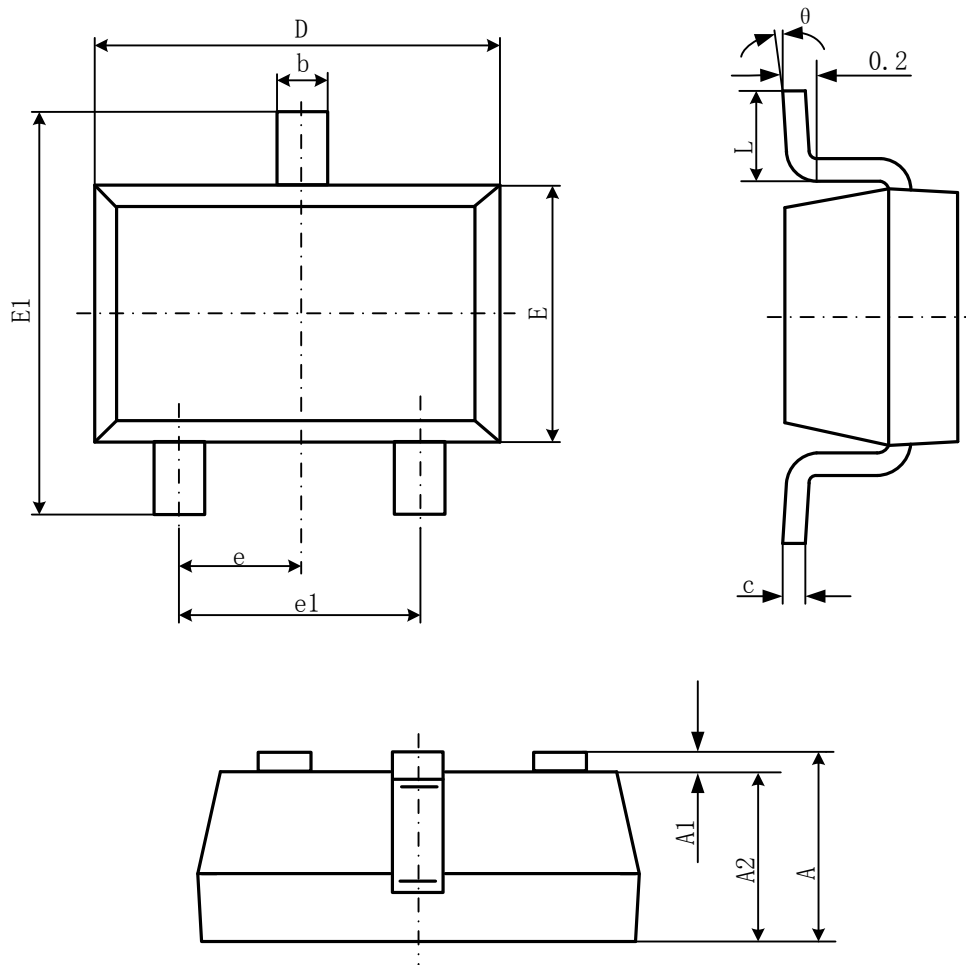
■ Package Information

● SOT89-3L



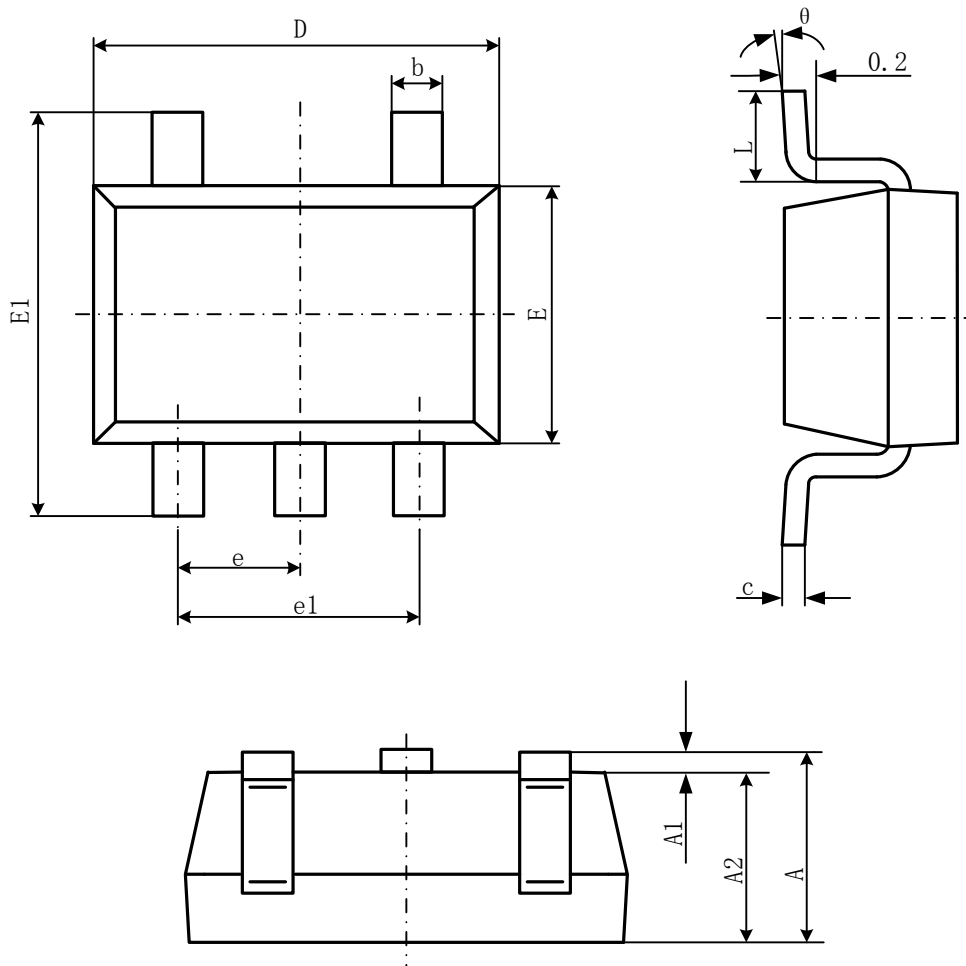
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.400	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550REF.		0.061REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	3.000TYP		0.118TYP	
L	0.900	1.200	0.035	0.047

● SOT23-3L



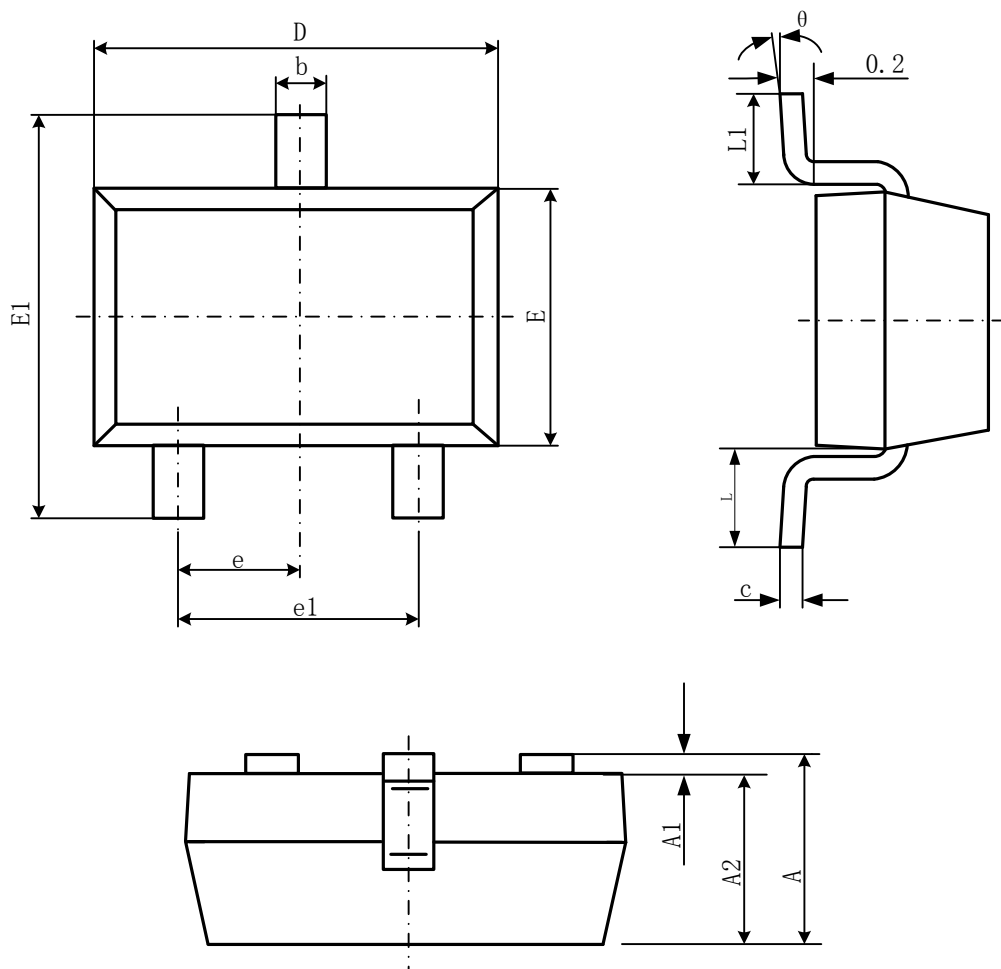
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

● SOT23-5L



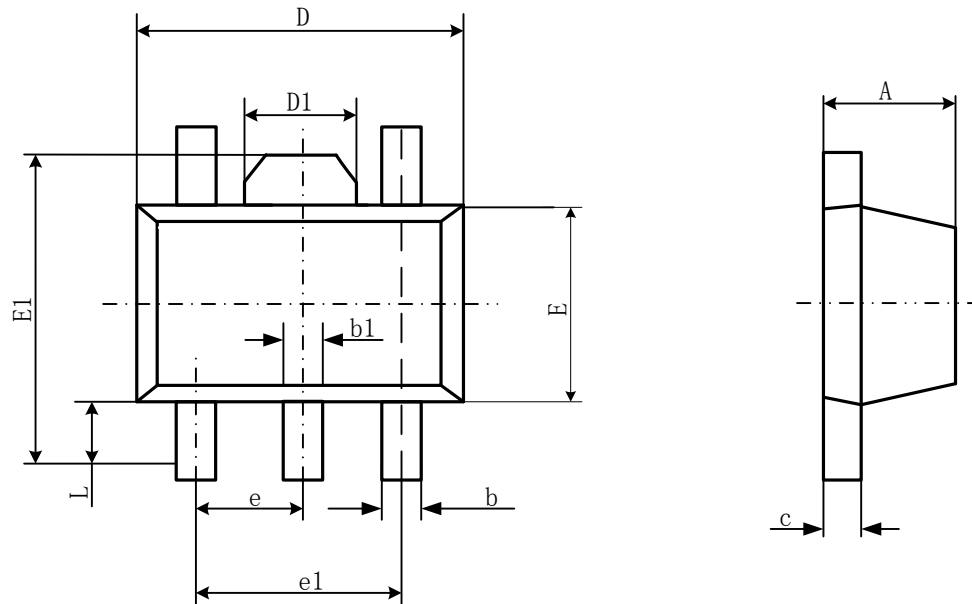
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

● SOT23-3B



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
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°

● SOT89-5L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.360	0.560	0.014	0.022
c	0.350	0.400	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.400	1.800	0.055	0.071
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043