General Description

The JTM6382 Series are synchronous PFM step-up DC-DC converters with very low ripple noise due to the high operating frequency, and the maximum operating frequency is 300KHz .

The output voltages of The JTM6382 Series can be programmable from 2.5V to 3.6V in 0.1V steps.

JTM6382 has high efficiency up to 95%.

An enable pin (EN) is provided so that the circuit can be powered down.

Only three components are required to realize the voltage step-up conversion.

Features

- High Efficiency: Up to 95%
- 300KHz Maximum Operating Frequency
- Low static current: 15uA
- Output Voltage can be set: 2.5V~3.6V
- Output Voltage Accuracy: ±2.5%
- Wide Input Voltage Range: 0.9V~3.6V
- Low Ripple and Low Noise

Applications

- Power Source for applications where a voltage higher than the battery voltage is required
- One to Three Cell Battery Devices

Typical Application

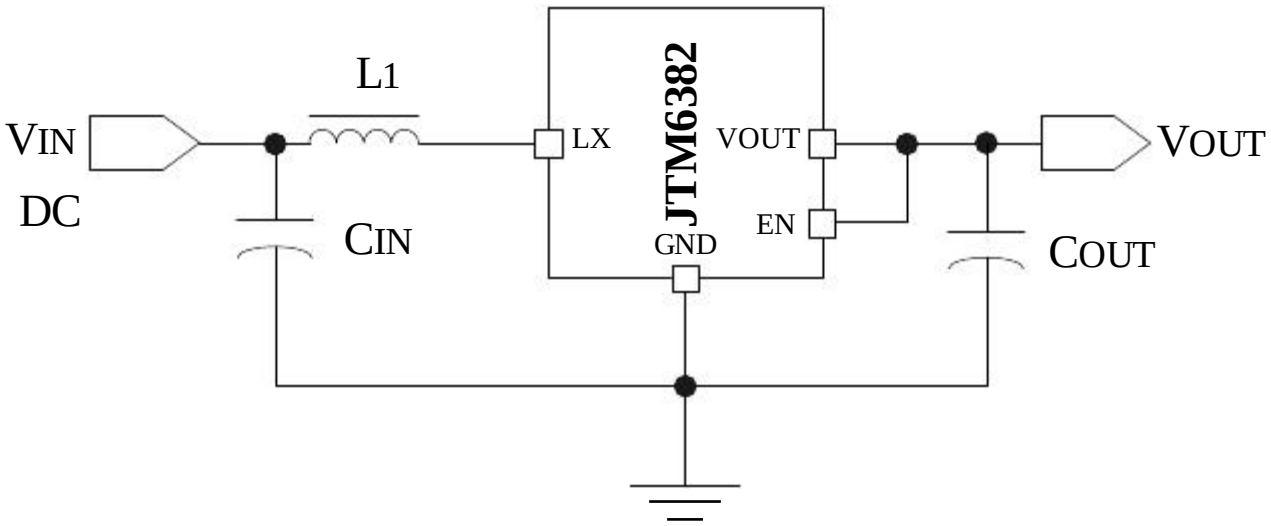


Figure 1：Typical Application Circuit Diagrams of JTM6382

Ordering Information

Type Number

JTM6382PXXX

Package Type：

MR：SOT23
M5：SOT23-5
PR：SOT89-3
TB: TO92

Output Voltage：

25：2.5V
26：2.6V
…
36：3.6V

Package Marking

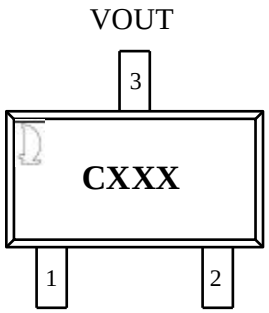
CXXX

Lot Number

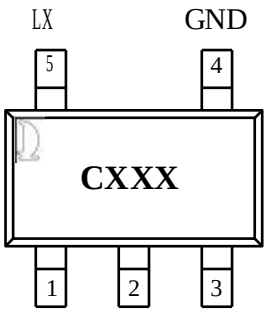
Output Voltage：

25：2.5V
26：2.6V
…
36：3.6V

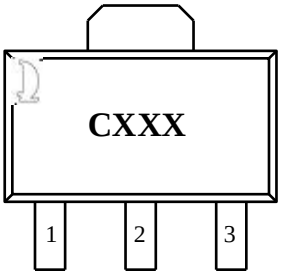
Pin Assignments



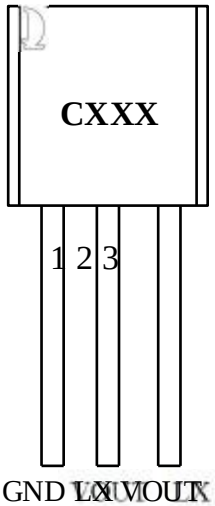
JTM6382PXXMR
(SOT23)



JTM6382PXXM5
(SOT23-5)



JTM6382PXXPR
(SOT89-3)



JTM6382PXXTB
(TO92)

Pin Description

Pin Name	Type Number and Package Type				Description
	JTM6382 PXXMR SOT23	JTM6382 PXXM5 SOT23-5	JTM6382 PXXPR SOT89-3	JTM6382 PXXTB	
LX	2	5	3	3	Switching Pin
VOUT	3	2	2	2	Output Voltage
EN	-	1	-	-	Chip Enable Pin （Active High）
GND	1	4	1	1	Ground
NC	-	3	-	-	No Connection

Functional Block Diagram

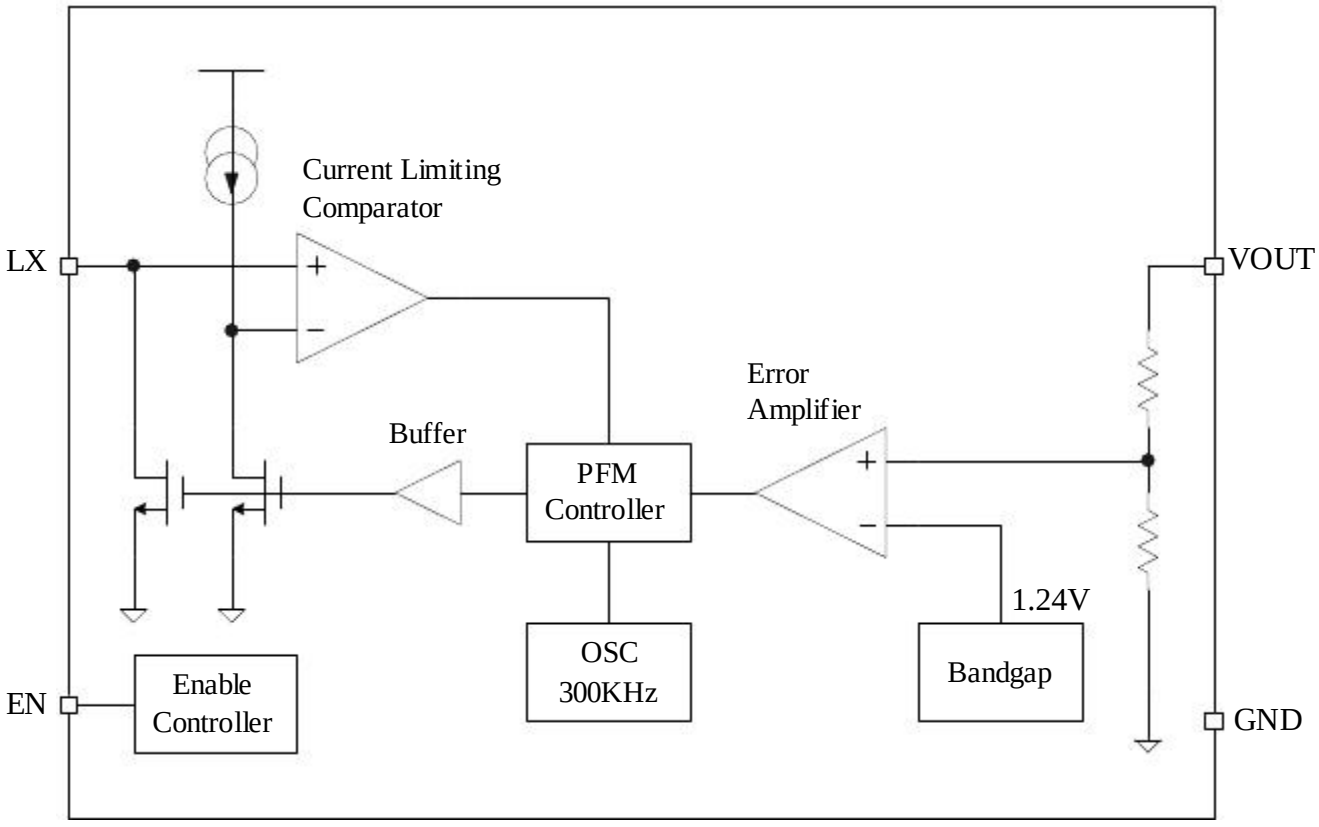


Figure 2：Functional Block Diagram of JTM6382

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Description	Min	Max	Unit
Voltage	V_{MAX}	Maximum Voltage On VOUT and VLX Pins		7	V
Current	I_{LX_MAX}	Maximum Current On LX Pin		1000	mA
Power Dissipation	P_{SOT-23}	Maximum Power Dissipation for PSOT23 Package		0.3	W
	$P_{SOT23-5}$	Maximum Power Dissipation for PSOT23-5 Package		0.3	W
	$P_{SOT89-3}$	Maximum Power Dissipation for PSOT89-3Package		0.5	W
	P_{TO92}	Maximum Power Dissipation for PTO92 Package		0.75	W
Thermal	T_J	Junction Temperature Range	-20	125	^oC
	T_A	Operating Temperature Range	-20	85	^oC
	T_{STG}	Storage Temperature Range	-40	120	^oC
	T_{SD1}	Soldering Temperature Rang for PSOT23, PSOT23-5 and PSOT89-3 Packages（less than 30 sec）	230	240	^oC
	T_{SD2}	Soldering Temperature Rang for PTO92 Packages（less than 5 sec）	250	260	^oC
ESD	V_{ESD}	ESD Voltage for Human Body Mode		2000	V

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

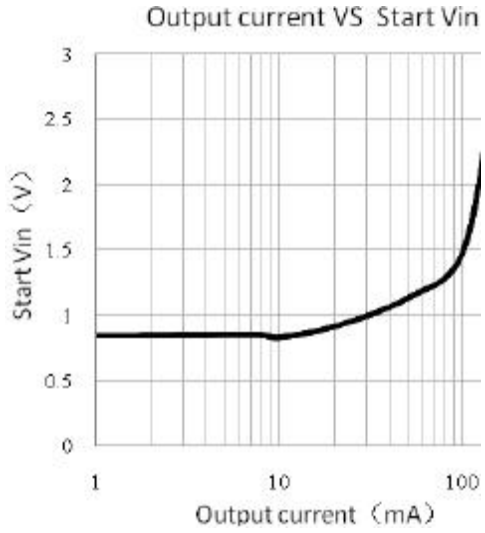
Electronic Characteristics

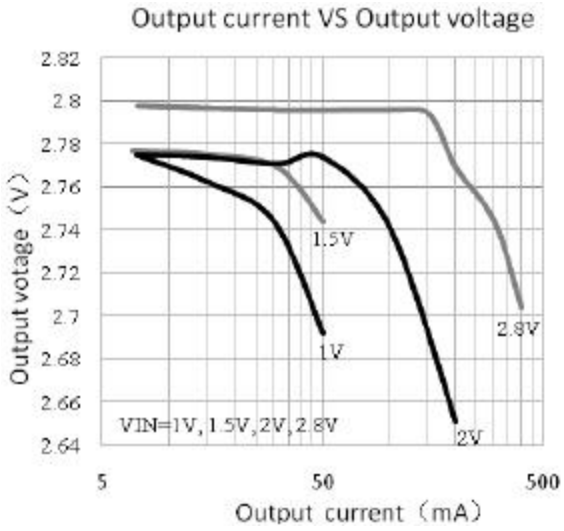
T_A =25°C, C_{IN}=100uF, C_{OUT}=100uF, L_1 =47uH, unless otherwise specified

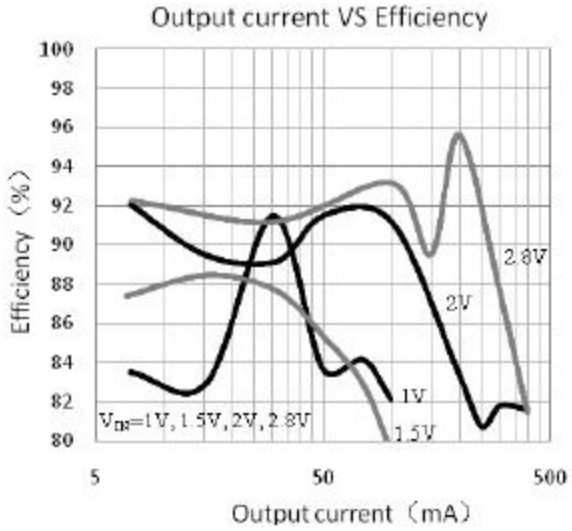
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage						
Maximum Input Voltage	V_{IN_MAX}		0.7		V_{OUT}	V
Start-up Voltage	V_{START}	I_{LOAD}=1mA, V_{IN} rises from 0V to 2V			0.8	V
Hold-on Voltage	V_{HOLD}	I_{LOAD}=1mA， V_{IN} falls from 2V to 0V	0.6			V
Supply Current						
Current Limiting	I_{LIMIT}		600	800	1000	mA
Input Current Without Load	I_{IN0}	V_{IN}=1.8V， V_{OUT}=3.3V		15		uA
Standby Input Current	I_{INQ}	Without Load，EN="Low"			1	uA
Output Voltage						
Output Voltage Accuracy	ΔV_{OUT}		-2.5		2.5	%
Efficiency						
Efficiency	η			90	95	%
Enable Input On EN Pin						
"High" Voltage Level On EN Pin			0.4× V_{OUT}			V
"Low" Voltage Level On EN Pin					0.2	V
OSC Characteristics						
Maximum frequency	F_{MAX}			300		KHz
Duty Cycle	D_{OSC}			83		%

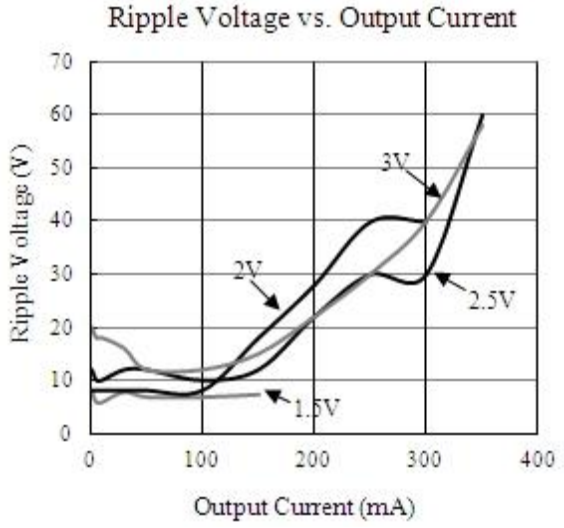
Typical Electrical Curves

TA =25oC, CIN=47uF, COUT=100uF, L1 =47uH, unless otherwise specified









Applications Information

JTM6382 is a constant on-time synchronous step-up converter using the PFM control scheme, which is inherently stable. JTM6382 includes a fully integrated synchronous rectifier which reduces costs and board areas. A true load disconnect function ensures that the device is completely shutdown

Low Voltage Start-up

The devices have a very low start up voltage down to 0.8V. When power supply is first applied, the synchronous switch will be initially off but energy will be transferred to the load through its intrinsic body diode.

Shutdown

During normal device operation, the EN pin should be either high or connected to the VOUT pin or the VIN power source. When the device is in the shutdown mode, that is, when the EN pin is pulled low, the internal circuitry will be switched off. During shutdown, the PMOS power transistor will be switched off thus placing the output into a floating condition.

Synchronous Rectification

A dead time exists between the NMOS and PMOS switching operations. In synchronous rectification, the PMOS is replaced by a Schottky diode. Here the PMOS switch must be completely off before the NMOS switch is switched on. A fter each cycle, a 3 0ns delay time is inserted to ensure the NMOS switch is completely off before the PMOS switch is switched on to maintain a high efficiency over a wide input voltage and output power range.

Inductor Selection

Selecting a suitable inductor is an important consideration as it is usually a compromise situation between the output current requirements, the inductor saturation limit and the acceptable output voltage ripple.

Lower values of inductor can provide higher output currents but will suffer from higher ripple voltages and reduced efficiencies. Higher inductor values can provide reduced output ripple voltages and better efficiencies, but will be limited in their output current capabilities. For all inductors it must be noted however that lower core losses and lower DC resistance values will always provide higher efficiencies. The peak inductor current can be calculated using the following equation:

$$L_{MIN} \varepsilon \frac{1- D^{2}}{2 * F_S}$$

Where D=1-V_{IN}/V_{OUT}, Fs is the OSC frequency.

Capacitor Selection

As the output capacitor selected affects both efficiency and output ripple voltage, it must be chosen with care to achieve best results from the converter. Output voltage ripple is the product of the peak inductor current and the output capacitor equivalent series resistance or ESR for short. It is important that low ESR value capacitors are used to achieve optimum performance.

One method to achieve low ESR values is to connect two or more filter capacitors in parallel. The capacitors values and rated voltages are only suggested values.

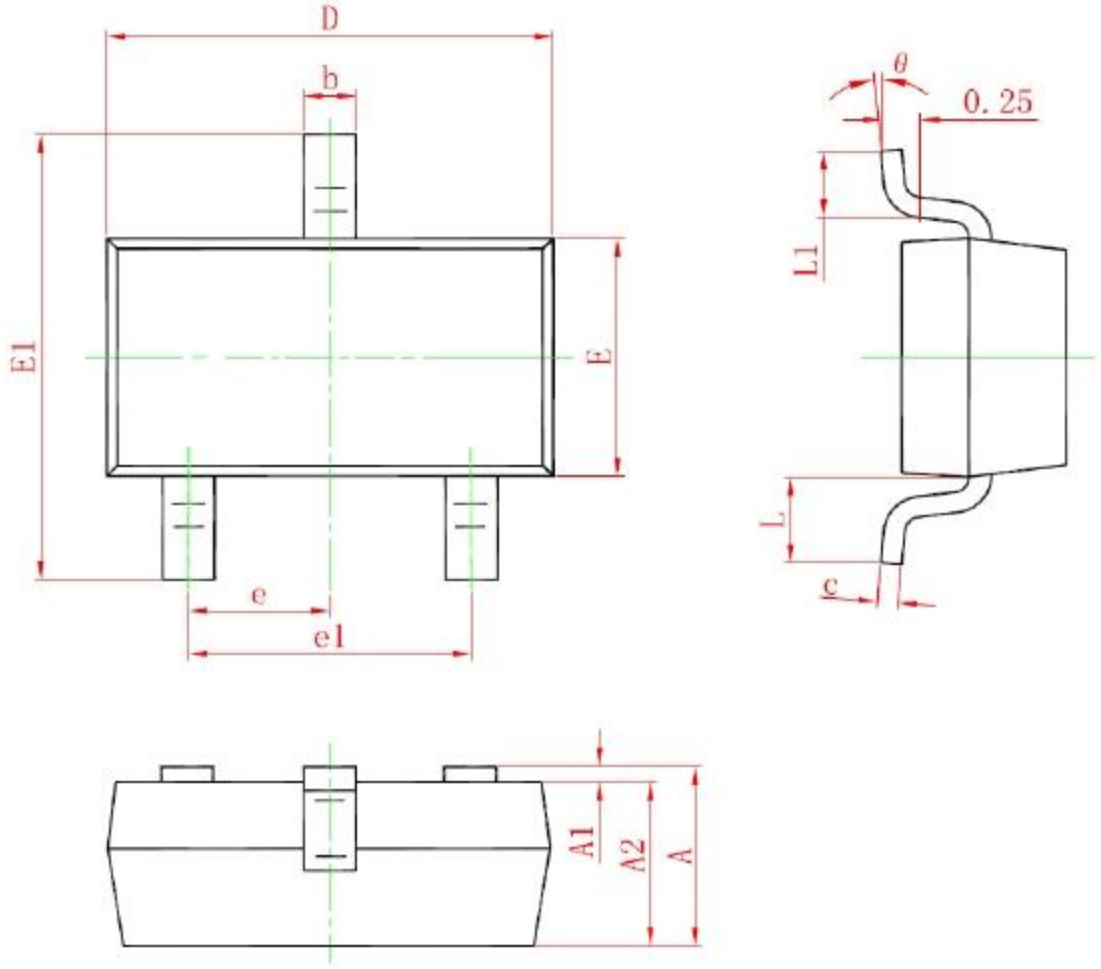
PCB Layout

External components should be located as close as possible to the IC to minimize the corresponding connection wires, in particular, when an external component is connected to the VOUT pin.

The VSS pin should be sufficient grounded, otherwise, the zero level within IC will vary with the switching current, which may result in unstable problems.

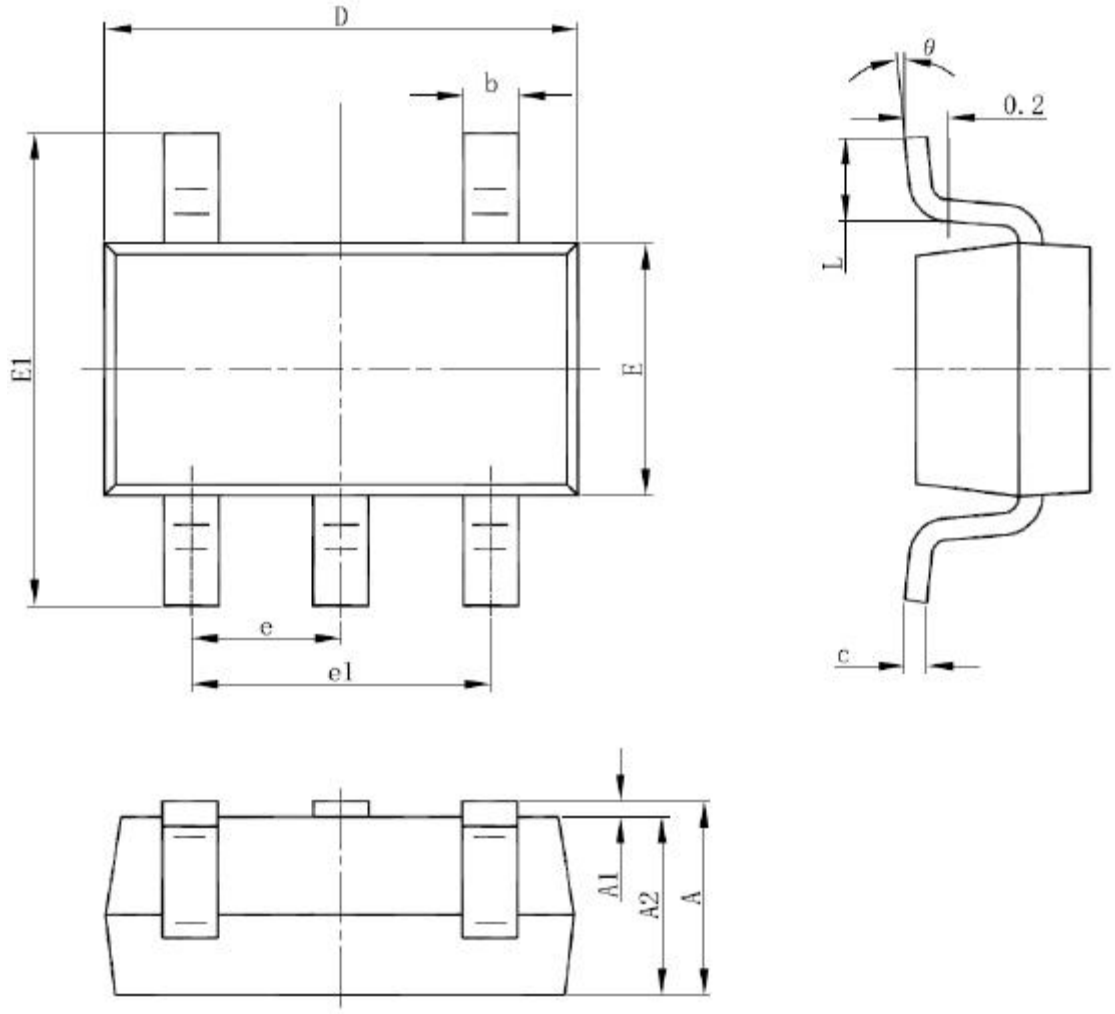
Package Information

Physical Dimensions for SOT23 Package:



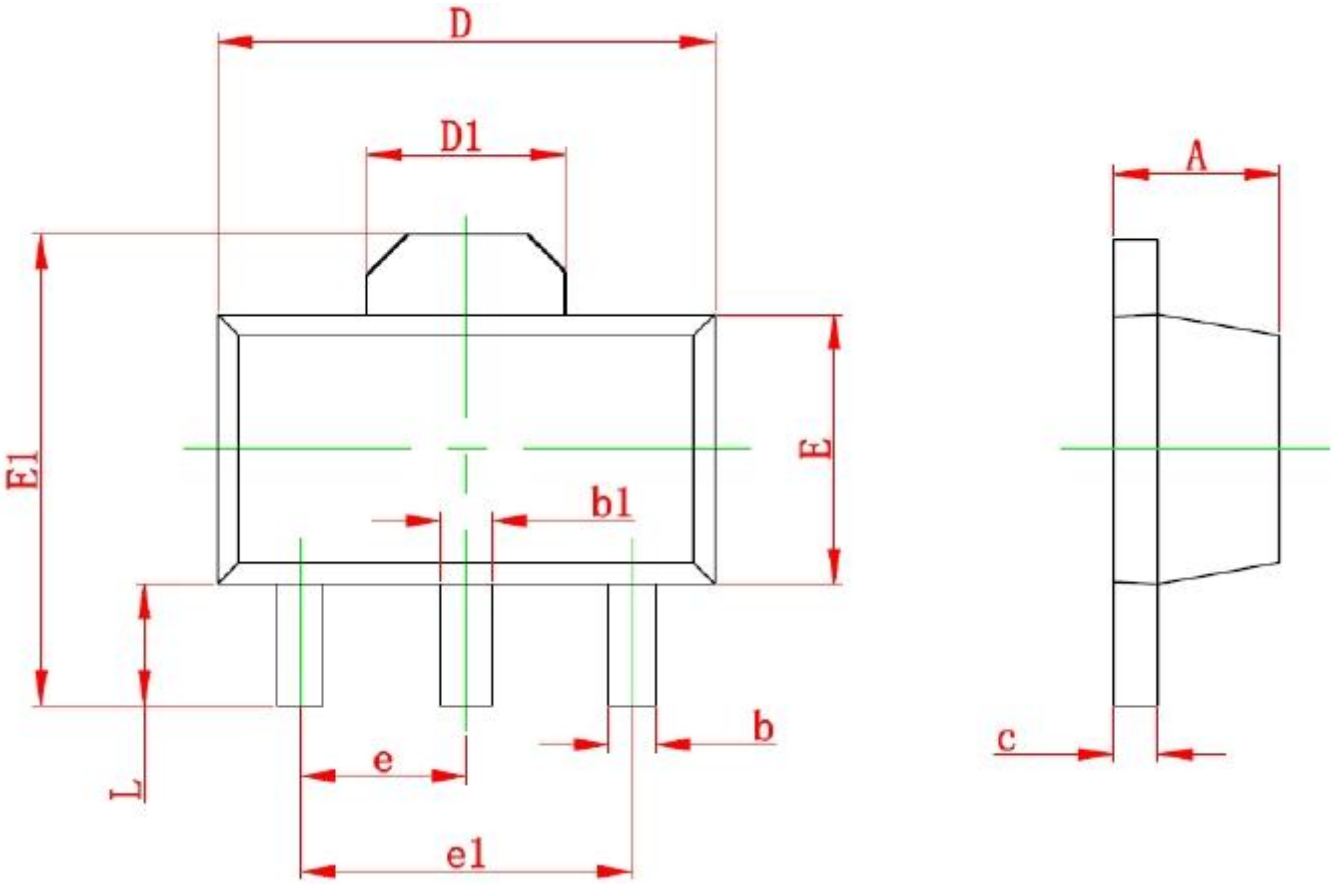
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Physical Dimensions for SOT23-5 Package:



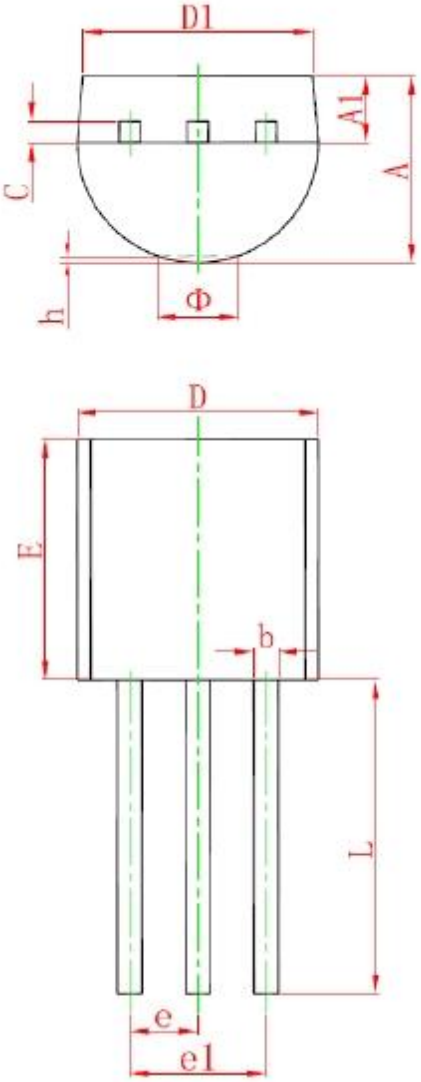
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

Physical Dimensions for SOT89-3 Package:



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	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

Physical Dimensions for TO-92 Package:



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015