

CJ6376 Series

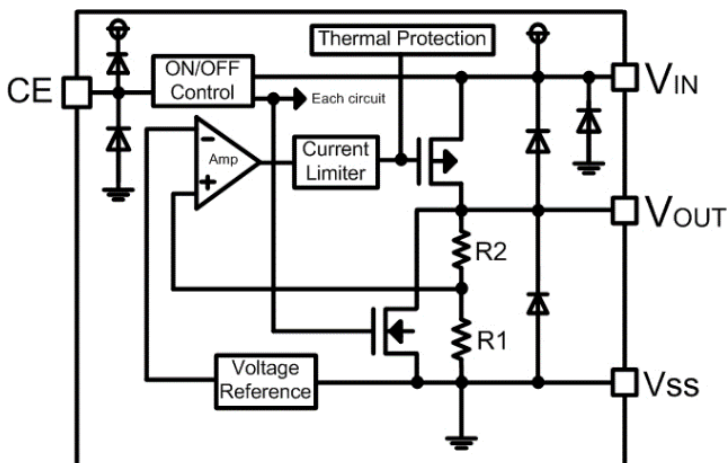
■ INTRODUCTION

CJ6376 series is a group of positive voltage regulators manufactured by CMOS process, which has low power consumption and low dropout voltage. Even if the input and output voltage difference is very small, it can also provide larger output current. CJ6376 series can provide 300 mA output current and allow input voltage up to 36V. This series of products are very suitable for battery powered devices, such as RF applications and other systems requiring quiet voltage sources.

■ APPLICATIONS

- Cordless Phones
- Radio Control Systems
- Laptop, Palmtops and PDAs
- Single-lens Reflex DSC
- PC Peripherals with Memory

■ BLOCK DIAGRAM



■ FEATURES

- Low Quiescent Current: 2 μ A
 - Operating Voltage Range: 2.5V ~ 36V
 - Output Current: 300mA
 - Low Dropout Voltage:
200mV@100mA ($V_{OUT} = 3.3V$)
 - Output Voltage: 1.2 ~ 12V
 - High Accuracy: $\pm 2\%/\pm 1\%$ (Typ.)
 - High Power Supply Rejection Ratio:
70dB@1kHz
 - Low Output Noise:
27x V_{OUT} μV_{RMS} (10Hz~100kHz)
 - Excellent Line and Load Transient Response
 - Built-in Current Limiter, Short-Circuit Protection
 - Over-Temperature Protection
-
- LAN Cards
 - Ultra Low Power Microcontrollers
 - Wireless Communication Equipments
 - Portable Audio Video Equipments
 - Car Navigation Systems

■ ORDER INFORMATION

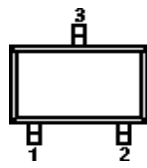
CJ6376①②③④

DESIGNATOR	SYMBOL	DESCRIPTION
①	A	Standard
	B	High Active, pull-down resistor built-in, with C_{OUT} discharge resistor
②③	Integer	Output Voltage e.g. 3.3V=②:3, ③:3
④	M/MC/MY	Package:SOT-23-3L
	M/MR/MF	Package:SOT-23-5L
	G/GW/GL	Package:SOT-223

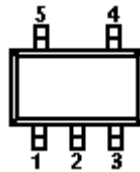
Pin Configuration

(Top View)

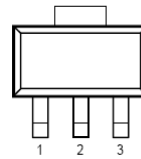
SOT-23-3L



SOT-23-5L



SOT-223



SOT-23-3L

PIN NUMBER			PIN NAME	FUNCTION
CJ6376AxxM/MC/MY				
M	MC	MY		
1	3	3	V_{SS}	Ground
2	2	1	V_{OUT}	Output
3	1	2	V_{IN}	Power Input

SOT-23-5L

PIN NUMBER			PIN NAME	FUNCTION
CJ6376BxxM	CJ6376AxxMF/MR			
M	MF	MR		
1	1	2	V_{IN}	Power Input
2	2	1	V_{SS}	Ground
3	/	/	CE	Chip Enable Pin
4	3/4	4/5	NC	No Connection
5	5	3	V_{OUT}	Output

SOT-223

PIN NUMBER			PIN NAME	FUNCTION
CJ6376AxxG/GW/GL				
G	GW	GL		
1	1	2	V_{IN}	Power input
2	3	1	V_{SS}	Ground
3	2	3	V_{OUT}	Output

Electrical Characteristics

■ ABSOLUTE MAXIMUM RATINGS⁽¹⁾

(T_A = 25°C, Unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage ⁽²⁾		V _{IN}	-0.3~40	V
Output Voltage ⁽²⁾		V _{OUT}	-0.3~13	V
CE Pin Voltage		V _{CE}	-0.3~33	V
Output Current		I _{OUT}	600	mA
Maximum Power Dissipation	SOT-23-3L	P _{D Max} ⁽³⁾	OTP Limited	W
	SOT-23-5L			
	SOT-223			
Maximum Junction Temperature ⁽⁴⁾		T _{J Max}	150	°C
Storage Temperature		T _{stg}	-65~150	°C
Lead Temperature(Soldering, 10 sec)		T _{solder}	260	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltages are with respect to network ground terminal.

(3) Refer to *Thermal Information* for details.

(4) This IC includes over temperature protection that is intended to protect the device during momentary over-load. Junction temperature will exceed 125°C when over temperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	MIN.	NOM.	MAX.	UNITS
Supply voltage at V _{IN}	2.5		36	V
Operating junction temperature range, T _J	-40		125	°C
Operating free air temperature range, T _A	-40		85	°C

■ THERMAL INFORMATION

THERMAL METRIC ⁽⁵⁾	SYMBOL	CJ6376 Series			UNIT
		SOT-23-3L	SOT-23-5L	SOT-223	
Junction-to-ambient thermal resistance	R _{θJA}	250	250	100	°C/W
Junction-to-case thermal resistance	R _{θJC}	125	125	50	°C/W
Maximum power dissipation for reference	P _{D Ref}	0.4	0.4	1.0	W

(5) The junction temperature must be maintained below the maximum temperature specified in the *data sheet*. To calculate the dissipated power required for the design, the following formula can be used:

$$P_D = \frac{T_J - T_A}{R_{\theta JA}}$$

where, T_J = Junction Temperature, T_A = Free Air Temperature, P_D = Power Dissipation, θ_{JA} = Junction-to-Ambient Thermal Resistance.

Electrical Characteristics

CJ6376 Series ($V_{IN} = V_{OUT} + 1V$, $C_{IN} = 1\mu F$, $C_{OUT} = 1\mu F$, $T_A = 25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP. ⁽⁶⁾	MAX.	UNITS	
Input Voltage	V_{IN}		2.5	—	36	V	
Output Voltage Range	V_{OUT}		2.1	—	12	V	
DC Output Accuracy		$I_{OUT}=10mA$	-2	—	2	%	
			-1	—	1	%	
Dropout Voltage	$V_{dif}^{(7)}$	$I_{OUT}=100mA, V_{OUT}=3.3V$	—	200	—	mV	
Supply Current	I_{SS}	$I_{OUT}=0A$	$1.2V < V_{OUT} \leq 7.0V$	—	2	5	μA
			$7.0V < V_{OUT} \leq 12V$	—	3	6	μA
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	$I_{OUT} = 10mA$ $V_{OUT} + 1V \leq V_{IN} \leq 36V$	—	0.01	0.3	%/V	
Load Regulation	ΔV_{OUT}	$V_{IN} = V_{OUT} + 1V$, $1mA \leq I_{OUT} \leq 100mA$	—	10	—	mV	
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_A}$	$I_{OUT}=40mA$, $-40^\circ C < T_A < 85^\circ C$	—	50	—	ppm	
Output Current Limit	I_{LIM}	$V_{OUT} = 0.5 \times V_{OUT(Normal)}$, $V_{in}=5V$	350	600	—	mA	
Short Current	I_{SHORT}	$V_{OUT}=V_{SS}$	—	100	—	mA	
Power Supply Rejection Ratio	PSRR	$I_{OUT}=50mA$	100Hz	—	75	—	dB
			1kHz	—	70	—	
			10kHz	—	55	—	
			100kHz	—	40	—	
Output Noise Voltage	V_{ON}	BW=10Hz to 100kHz	—	$27 \times V_{OUT}$	—	μV_{RMS}	
Thermal Shutdown Temperature	T_{SD}	—	—	160	—	$^\circ C$	
Thermal Shutdown Hysteresis	ΔT_{SD}	—	—	20	—	$^\circ C$	
Standby Current	I_{STBY}	$CE = V_{SS}$	—	—	0.5	μA	
CE "High" Voltage	$V_{CE} "H"$		1.5	—	V_{IN}	V	
CE "Low" Voltage	$V_{CE} "L"$		—	—	0.3	V	
C_{OUT} Auto-Discharge Resistance	$R_{Discharge}$	$V_{IN} = 5V, V_{OUT} = 3.0V$, $V_{CE}=V_{SS}$	—	150	—	Ω	

(6) Typical numbers are at $25^\circ C$ and represent the most likely norm.

(7) V_{dif} : The difference of output voltage and input voltage when input voltage is decreased gradually till output voltage equals to 98% of V_{OUT} (E).

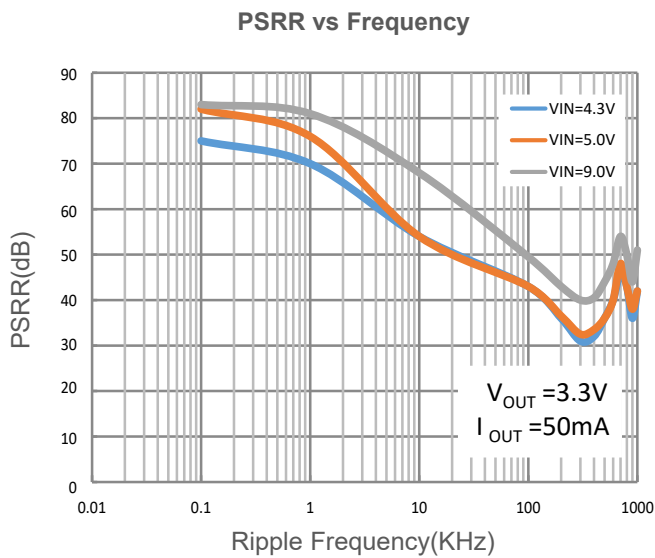
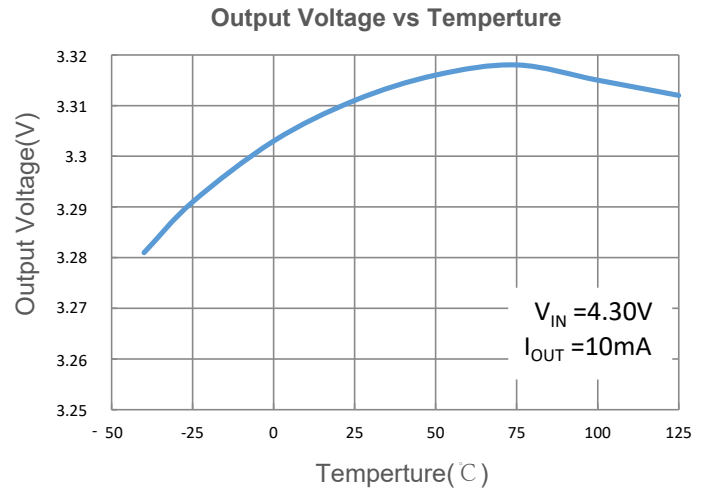
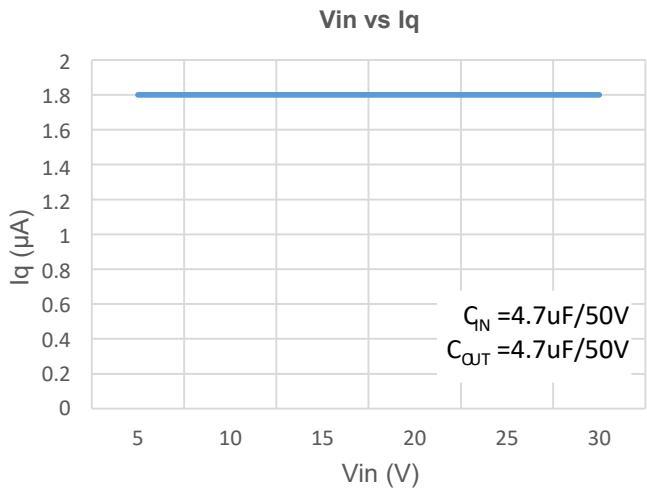
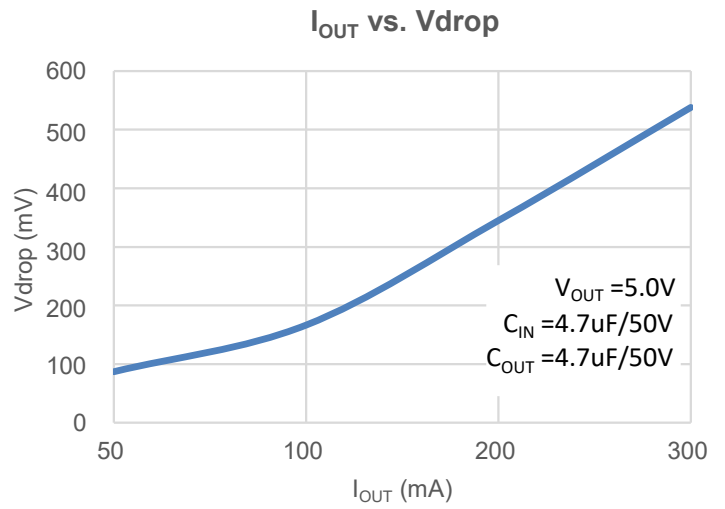
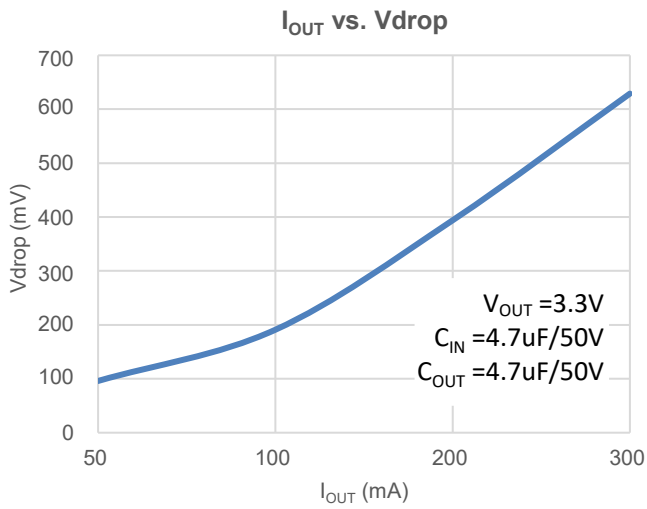
■ ESD RATINGS

ESD RATINGS		SYMBOL	VALUE	UNIT
Electrostatic discharge ⁽⁸⁾	Human body model	$V_{ESD-HBM}$	1 000	V
	Machine model	V_{ESD-MM}	200	

(8) ESD testing is performed according to the respective JESD22(JEDEC) standard. The human body model is a 100pF capacitor discharged through a 1.5k Ω resistor into each pin. The machine model is a 200pF capacitor discharged directly into each pin.

Typical Characteristics

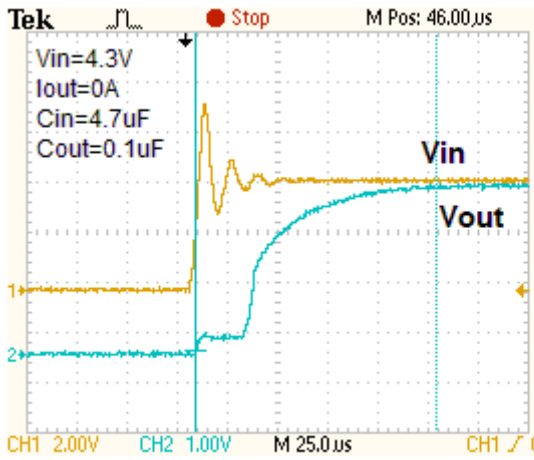
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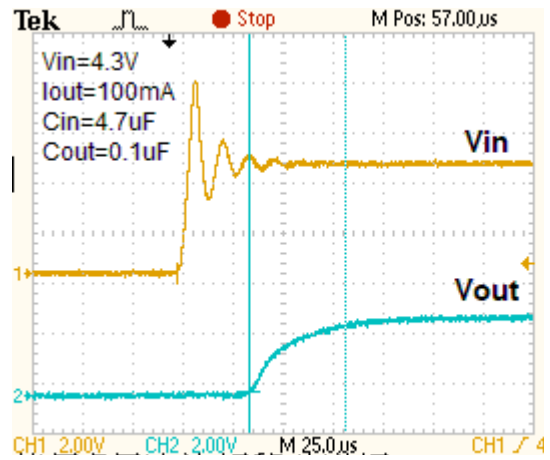
Typical Characteristics

(Unless otherwise specified, $T_A=25^\circ\text{C}$)

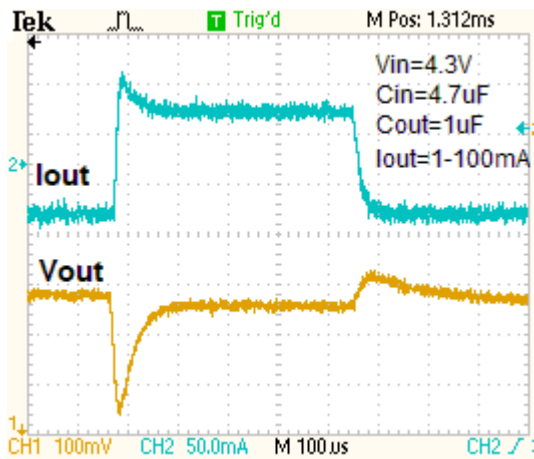
Power Up Response



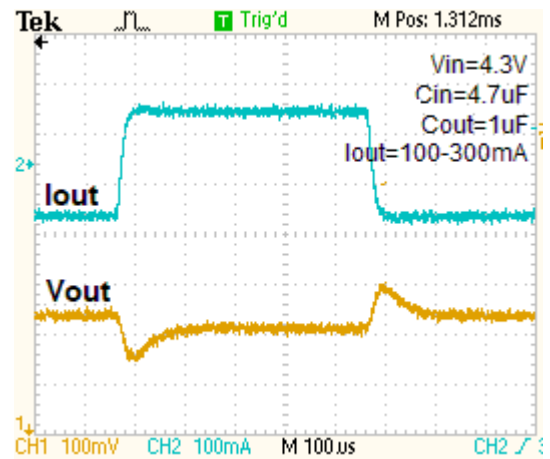
Power Up Response



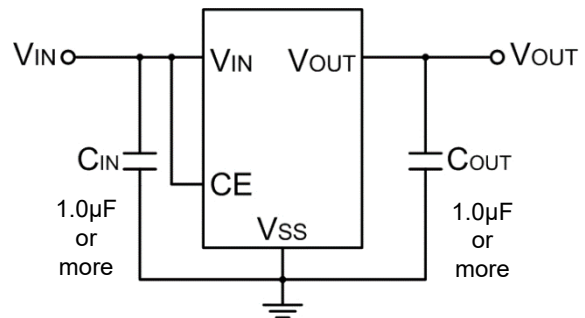
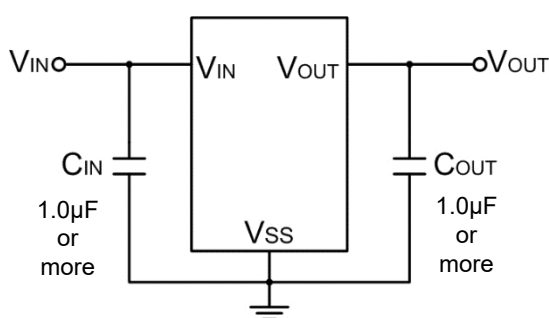
Load Transient Response



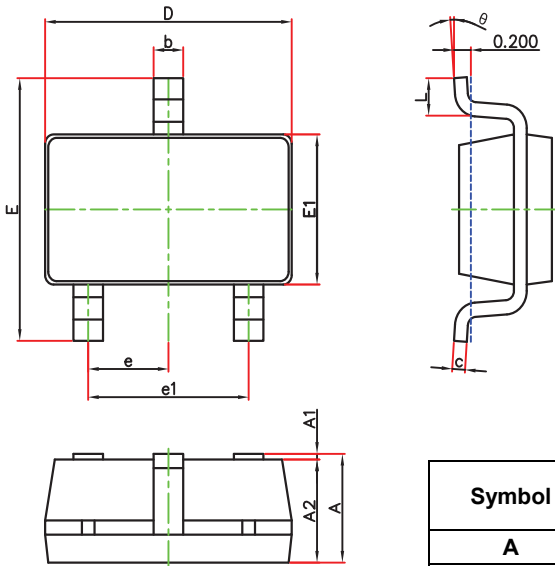
Load Transient Response



■ TYPICAL APPLICATION CIRCUIT

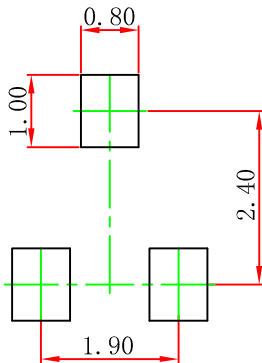


SOT-23-3L Package Outline Dimensions



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	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
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°

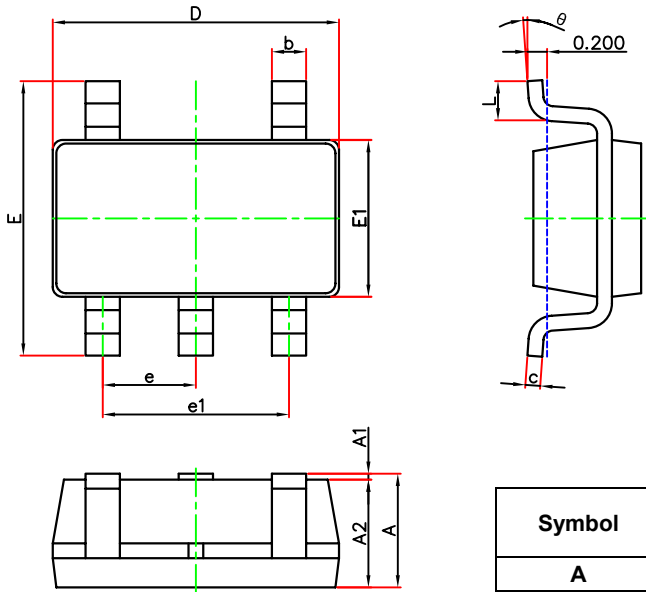
SOT-23-3L Suggested Pad Layout



Note:

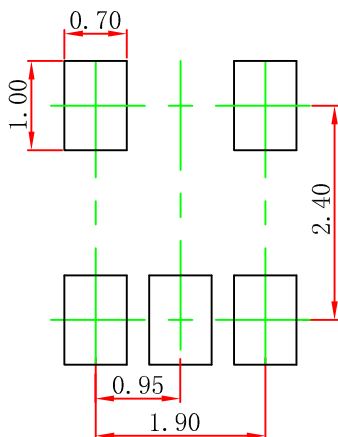
1. Controlling dimension "in" millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purpose only.

SOT-23-5L Package Outline Dimensions



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	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
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
theta	0°	8°	0°	8°

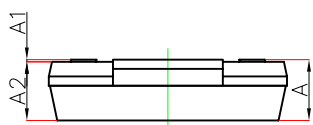
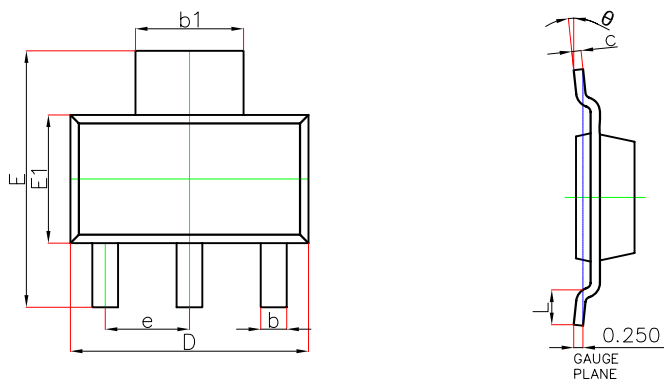
SOT-23-5L Suggested Pad Layout



Note:

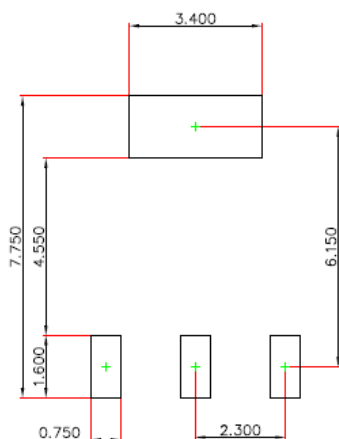
1. Controlling dimension in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purpose only.

SOT-223 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	—	1.800	—	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	—	0.030	—
θ	0°	10°	0°	10°

SOT-223 Suggested Pad Layout



- Note:
1. Controlling dimension in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purpose only.

DISCLAIMER

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