■ INTRODUCTION

The CE6201 series are a group of positive voltage regulators manufactured by CMOS technologies with low power consumption and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small. The CE6201 series consume less than 0.1uA in shutdown mode, which can prolong battery life in portable electronics. The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

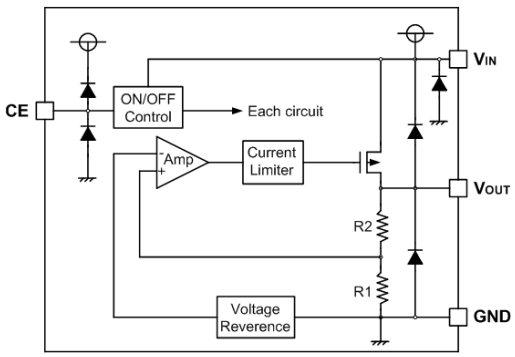
■ FEATURES

- Low Quiescent Current：2μA
- Operating Voltage：2.0V～10V
- Output Current: 300mA
- Low Dropout Voltage：150mV@100mA
- Excellent Line and Load Transient Response
- Output Voltage：1.5~ 5.0V
- High Accuracy：±2％（Typ.）
- Built-in Current Limiter, Short-Circuit Protection
- TTL- Logic-Controlled Shutdown Input
- Tantalum Capacitor compatible

■ APPLICATIONS

- Portable consumer equipments
- Laptop, Palmtops and PDA
- Digital Still and Video Cameras
- MP3, MP4 Player
- Radio control systems
- Battery-Powered Equipment

■ BLOCK DIAGRAM



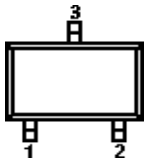
■ ORDER INFORMATION

CE6201①②③④

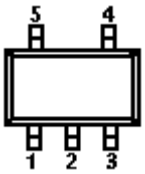
DESIGNATOR	SYMBOL	DESCRIPTION
①	A	Standard
	B	With Shutdown Function
②③	Integer	Output Voltage e.g.1.8V=②:1, ③:8
④	M/MA/MC/MY	Package:SOT-23-3/5
	P/PT	Package:SOT-89-3/5
	T	Package:TO-92

■ PIN CONFIGURATION

SOT-23-3

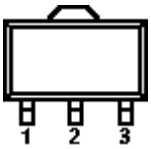


SOT-23-5

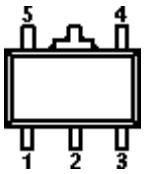


TO-92

SOT-89-3



SOT-89-5



PIN NUMBER							PIN NAME	FUNCTION
SOT-23-3				SOT-89-3		TO-92		
M	MA	MC	MY	P	PT	T		
1	2	3	3	1	2	1	V_{SS}	Ground
2	1	2	1	3	1	3	V_{OUT}	Output
3	3	1	2	2	3	2	V_{IN}	Power input

SOT-23-5

PIN NUMBER	SYMBOL	FUNCTION
1	V_{IN}	Power Input Pin
2	V_{SS}	Ground
3	CE	Chip Enable Pin
4	NC	No Connection
5	V_{OUT}	Output Pin

SOT-89-5

PIN NUMBER	SYMBOL	FUNCTION
1	V_{OUT}	Output Pin
2	V_{SS}	Ground
3	NC	No Connection
4	CE	Chip Enable Pin
5	V_{IN}	Power Input Pin

■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, Ta=25°C)

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	V_{SS} -0.3~V_{SS}+12	V
Output Current		I_{OUT}	600	mA
Output Voltage		V_{OUT}	V_{SS} -0.3~V_{IN}+0.3	V
Power Dissipation	SOT-23	Pd	250	mW
	SOT-89	Pd	500	mW
	TO-92	Pd	500	mW
Operating Temperature		T_{opr}	-40~+85	℃
Storage Temperature		T_{stg}	-40~+125	℃
Soldering Temperature & Time		T_{solder}	260℃, 10s	

■ ELECTRICAL CHARACTERISTICS

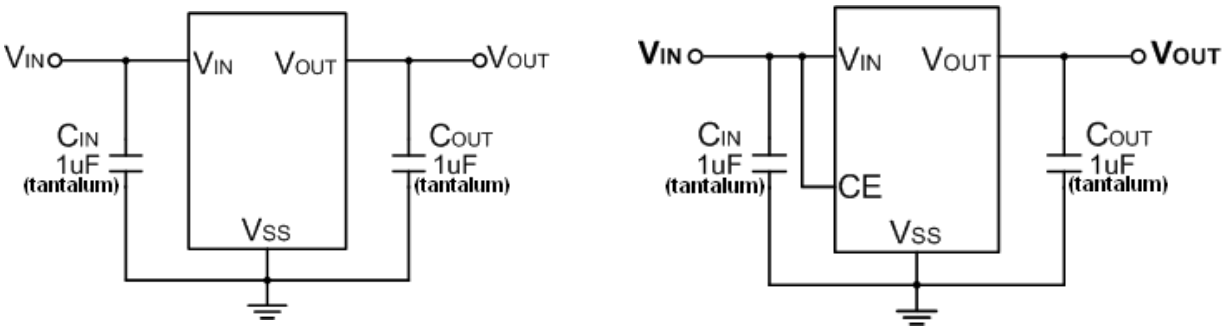
CE6201 Series (V_{IN}=V_{OUT}+1V, C_{IN}=C_{OUT}=1μF，Ta=25℃,unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=40mA	V_{OUT} *0.98	V_{OUT}	V_{OUT} *1.02	V
Supply Current	I_{SS}	I_{OUT}=0		2	3	μA
Standby Current	I_{STBY}	CE = V_{SS}			0.1	μA
Output Current	I_{OUT}	—	300			mA
Dropout Voltage (Note 3)	V_{dif}	I_{OUT} =100mA V_{OUT}≥3.0V		150		mV
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT} +1V, 1mA≤I_{OUT}≤100mA		10		mV
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	I_{OUT} =10mA V_{OUT} +1V≤V_{IN}≤6V		0.01	0.3	%/V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T \times V_{OUT}}$	I_{OUT} =10mA -40≤T≤+85		100		ppm
Short Current	I_{Short}	V_{OUT} =V_{SS}		50		mA
Input Voltage	V_{IN}	—	2.0		10	V
CE "High" Voltage	V_{CE}"H"		1.5		V_{IN}	V
CE "Low" Voltage	V_{CE}"L"				0.3	V

NOTE:

1. V_{OUT}：Specified Output Voltage.
2. V_{OUT} (E) ： Effective Output Voltage (Ie. The Output Voltage When V_{IN} = (V_{OUT} +1.0V) And Maintain A Certain I_{OUT} Value).
3. 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).

■ TYPICAL APPLICATION



■ APPLICATION INFORMATION

Selection of Input/ Output Capacitors

In general, all the capacitors need to be low leakage. Any leakage the capacitors have will reduce efficiency, increase the quiescent current.

A recent trend in the design of portable devices has been to use ceramic capacitors to filter DC/DC converter inputs. Ceramic capacitors are often chosen because of their small size, low equivalent series resistance (ESR) and high RMS current capability. Also, recently, designers have been looking to ceramic capacitors due to shortages of tantalum capacitors.

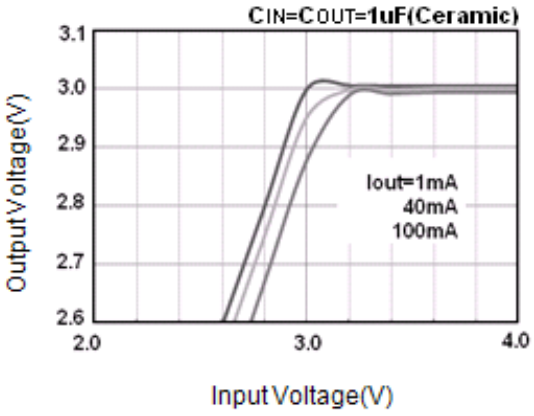
Unfortunately, using ceramic capacitors for input filtering can cause problems. Applying a voltage step to a ceramic capacitor causes a large current surge that stores energy in the inductances of the power leads. A large voltage spike is created when the stored energy is transferred from these inductances into the ceramic capacitor. These voltage spikes can easily be twice the amplitude of the input voltage step. (See “Ceramic Input Capacitors Can Cause Overvoltage Transients”——Linear Technology application note 88, March 2001)

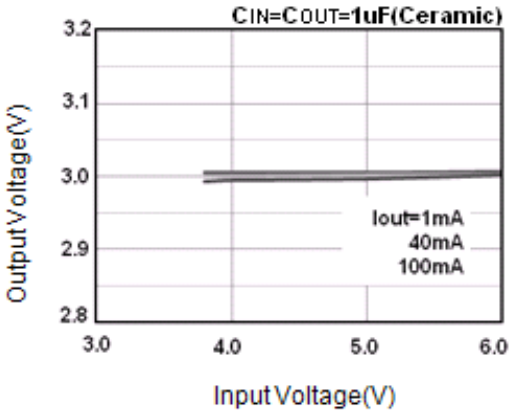
Many types of capacitors can be used for input bypassing, however, caution must be exercised when using multilayer ceramic capacitors (MLCC). Because of the self-resonant and high Q characteristics of some types of ceramic capacitors, high voltage transients can be generated under some start-up conditions, such as connecting the LDO input to a live power source. Adding a 3Ω resistor in series with an X5R ceramic capacitor will minimize start-up voltage transients.

The LDO also requires an output capacitor for loop stability. Connect a 1μF tantalum capacitor from OUT to GND close to the pins. For improved transient response, this output capacitor may be ceramic.

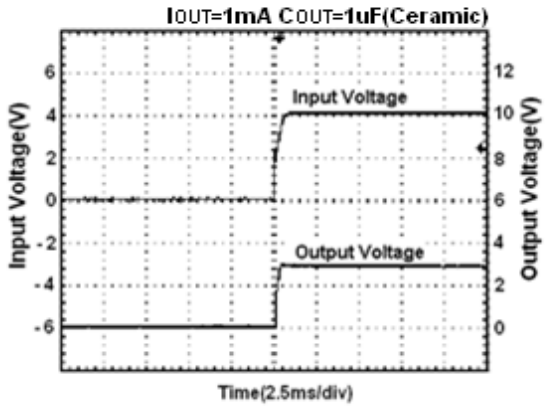
■ TYPICAL PERFORMANCE CHARACTERISTICS

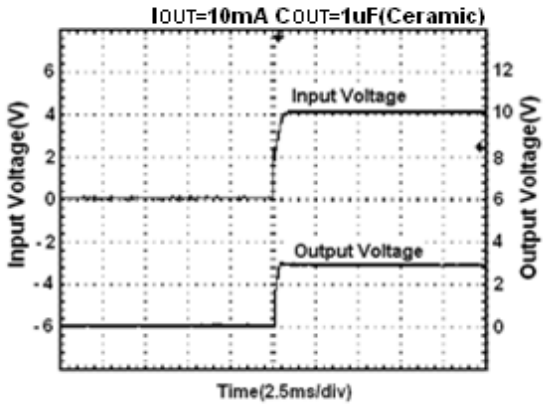
（1）Output Voltage vs. Input Voltage



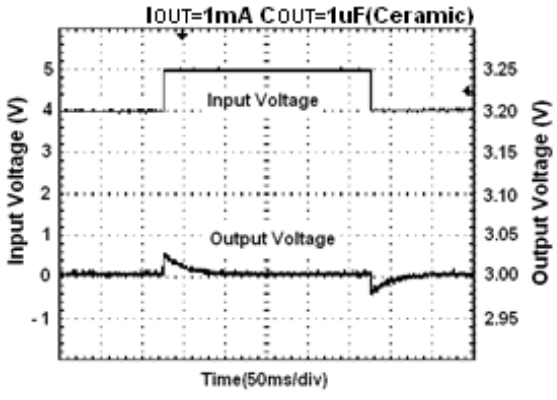


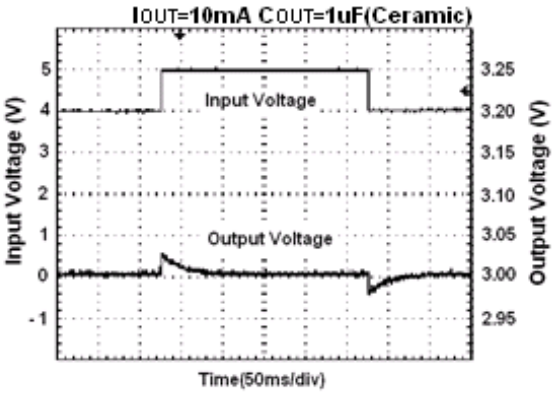
（2）Input Transient Response 1



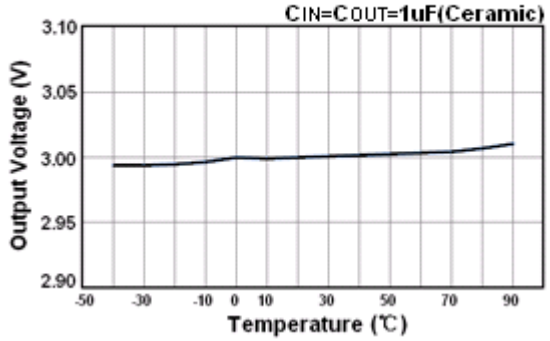


（3）Input Transient Response 2



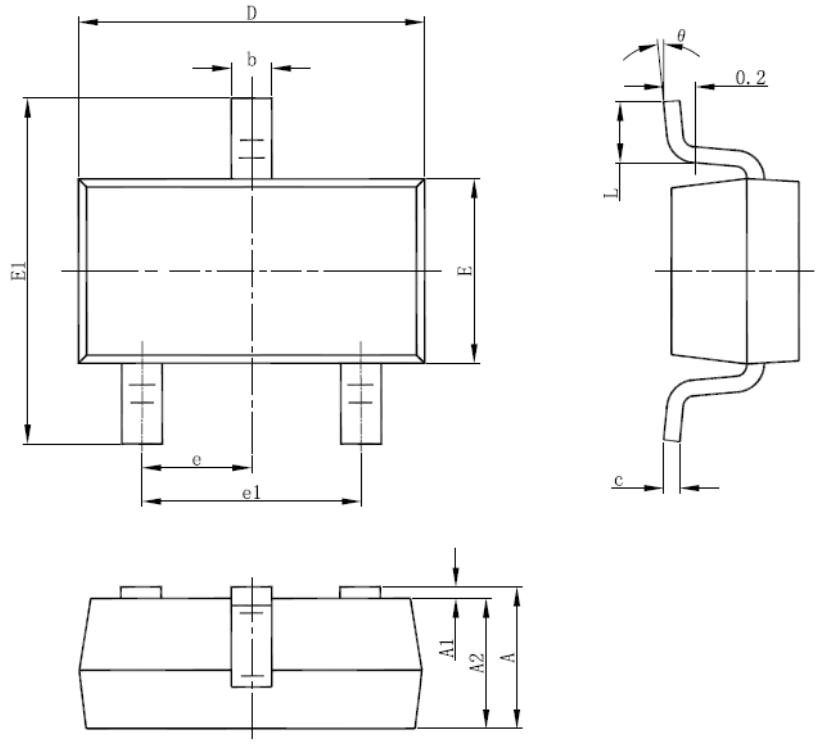


（4）Output Voltage vs. Temperature



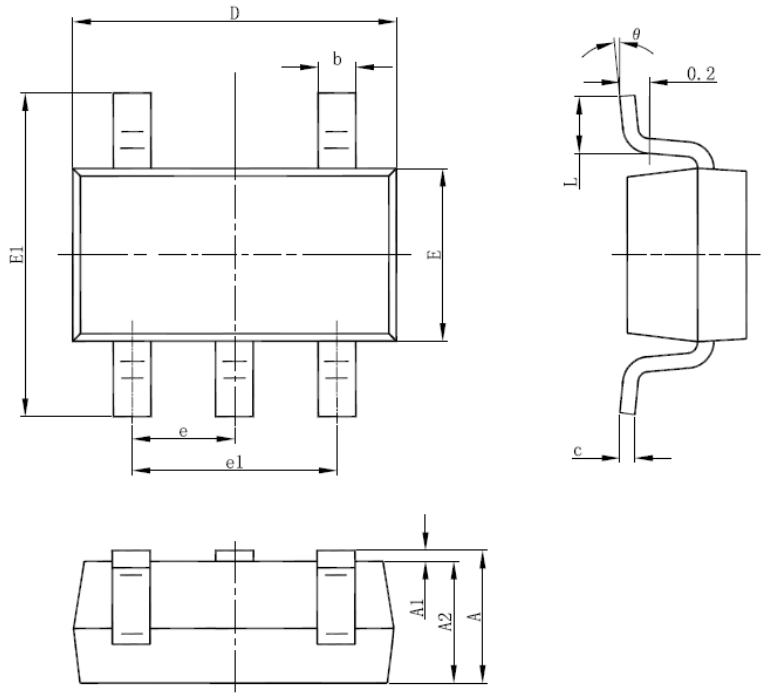
■ PACKAGING INFORMATION

● SOT-23-3 PACKAGE OUTLINE DIMENSIONS



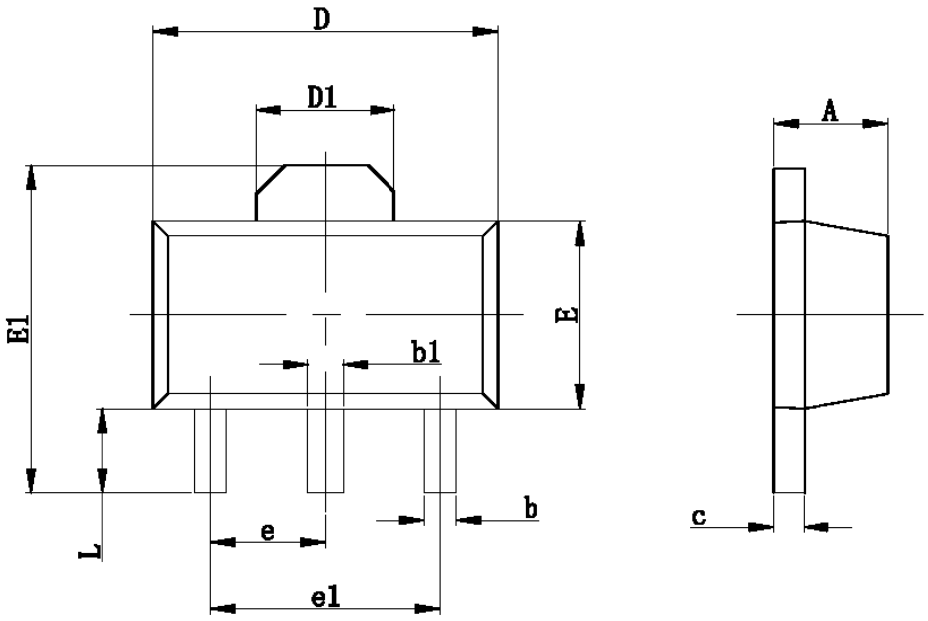
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

● **SOT-23-5 PACKAGE OUTLINE DIMENSIONS**



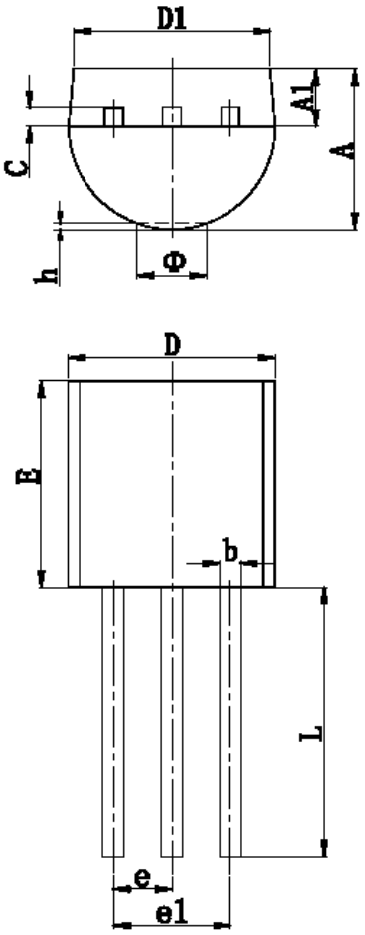
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

- **SOT-89-3 PACKAGE OUTLINE DIMENSIONS**



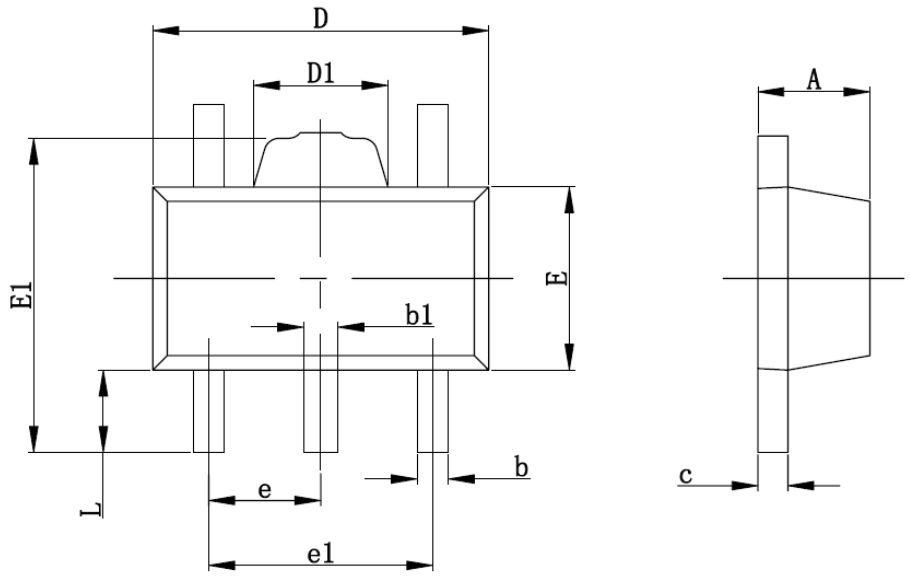
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.200	0.035	0.047

- **TO-92 PACKAGE OUTLINE DIMENSIONS**



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	4.400	4.700	0.173	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

- **SOT-89-5 PACKAGE OUTLINE DIMENSIONS**



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	0.440	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