■ INTRODUCTION

The SML104 Series are a group of positive voltage regulators manufactured by CMOS technology with high ripple rejection, ultra-fast transient response and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small. Each of the SML104 series consists of a high-precision voltage reference, an error correction circuit, and a current limited output driver. Thus the series are very suitable for the battery-powered equipments, wireless communication applications, industry equipments and so on.

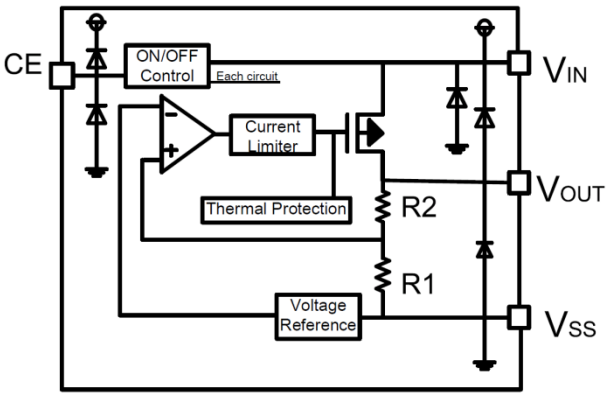
■ FEATURES

- Guaranteed Output Current: 1.0A (Typ.)
- Low Quiescent Current: 80μA (Typ.)
- Output Voltage Range: 1.1V ~ 5.0V
- Input Voltage Range: 2.0V ~ 6.0V
- High Accuracy: ±2% (Typ.)
- Dropout Voltage:
  500mV @ 1.0A (3.0V Typ.)
- Excellent Line Regulation: 0.02% / V
- High PSRR: 70dB @ 1KHz
- Built-in Current Limiter & Thermal Protection
- Short Circuit Current Fold-back
- Output Capacitor: Ceramic Compatible

■ APPLICATIONS

- Battery powered systems
- Portable instrumentations
- PC peripherals
- CD/DVD-ROM, CD/RW
- Wireless devices
- Battery charger

■ BLOCK DIAGRAM

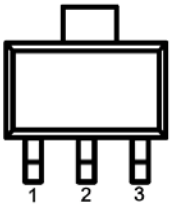


■ ORDER INFORMATION

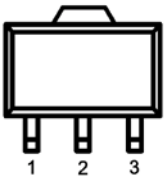
SML104①②③④

DESIGNATOR	SYMBOL	DESCRIPITION
①	A	Standard
	B	With Shutdown Function
②③	Integer	Output Voltage(1.1~5.0V) e.g: 3.0V = ②: 3, ③: 0
④	G/GW	Package: SOT-223
	P/PL	Package: SOT-89-3/5
	M	Package: SOT-23-5

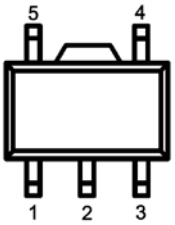
■ PIN CONFIGURATION



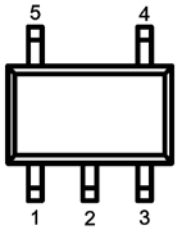
SOT-223
Top view



SOT-89-3
Top view



SOT-89-5
Top view



SOT-23-5
Top view

SML104AXX (SOT-223, SOT-89-3)

PIN NUMBER						PIN NAME	FUNCTION
SOT-223			SOT-89-3				
G	GW	GL	P	PW	PL		
1	1	2	1	1	2	V_{SS}	Ground
2	3	1	2	3	1	V_{IN}	Power input
3	2	3	3	2	3	V_{OUT}	Output

SML104BXX (SOT-23-5, SOT-89-5)

PIN NUMBER			PIN NAME	FUNCTION
SOT-23-5	SOT-89-5			
M	P	PL		
3	4	1	CE	Chip Enable
2	2	2	V_{SS}	Ground
4	3	3	NC	No Connection
1	5	4	V_{IN}	Power input
5	1	5	V_{OUT}	Output Pin

■ ELECTRICAL CHARACTERISTICS

SML104 Series (V_{IN} = V_{OUT} + 1V, C_{IN} = C_{OUT} = 4.7μF, T_A = 25℃, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT} = 100mA	V_{OUT} *0.98	V_{OUT} (Note1)	V_{OUT} *1.02	V
Supply Current	I_{SS}			80	120	μA
Shutdown Current	I_{SHDN}	V_{CE} = V_{SS}		0.1	1.0	μA
Output Current	I_{OUT}	—	1000	1300		mA
Dropout Voltage (Note 3)	V_{dif1}	I_{OUT} = 300mA		150		mV
	V_{dif2}	I_{OUT} = 1000mA		500		mV
Load Regulation	ΔV_{OUT}	V_{IN} = V_{OUT} + 1V, 1mA ≤ I_{OUT} ≤ 1.0A		30		mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} * V_{OUT}}$	I_{OUT} =100mA V_{OUT} +1V ≤ V_{IN} ≤ 6V		0.02	0.2	%/V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T * V_{OUT}}$	I_{OUT} = 100mA -40℃ ≤ T ≤ +85℃		50		ppm/℃
Short Current	I_{Short}	V_{OUT} = V_{SS}		120		mA
Input Voltage	V_{IN}	—	2.0		6.0	V
Power Supply Rejection Rate 1KHz	PSRR	I_{OUT} = 100mA		70		dB
Power Supply Rejection Rate 10KHz	PSRR	I_{OUT} = 100mA		50		dB
CE "High" Voltage	V_{CE}"H"		1.5		V_{IN}	V
CE "Low" Voltage	V_{CE}"L"				0.3	V
Thermal Shutdown Temperature	T_{SD}			150		℃
Thermal Shutdown Temperature Hysteresis	ΔT_{SD}			30		℃

NOTE:

1. V_{OUT}: Specified Output Voltage.
2. V_{OUT}(E): Effective Output Voltage (I.e. The Output Voltage When V_{IN} = (V_{OUT} + 1.0V) And Maintain A Certain I_{OUT} Value).
3. V_{diff}: The Difference Of Output Voltage And Input Voltage When Input Voltage Is Decreased Gradually Till Output Voltage Equals To 98% Of V_{OUT}(E); When V_{OUT} < 2.5V, V_{IN} ≥ 2.5V Should be Guaranteed.

■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, T_A = 25°C)

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	V_{SS} - 0.3 ~ V_{SS} + 7	V
Output Current		I_{OUT}	2000	mA
Output Voltage		V_{OUT}	V_{SS} - 0.3 ~ V_{IN} + 0.3	V
Power Dissipation	SOT-23-5	Pd	400	mW
	SOT-89-3/5		600	mW
	SOT-223		800	mW
Operating Temperature		T_{opr}	-40 ~ +85	℃
Storage Temperature		T_{stg}	-55 ~ +150	℃
Lead Temperature (Soldering, 10sec)		T_{solder}	260	℃
ESD rating		Human Body Model-(HBM)	≥ 2	kV
		Machine Model-(MM)	≥ 200	V

■ TYPICAL APPLICATION CIRCUITS

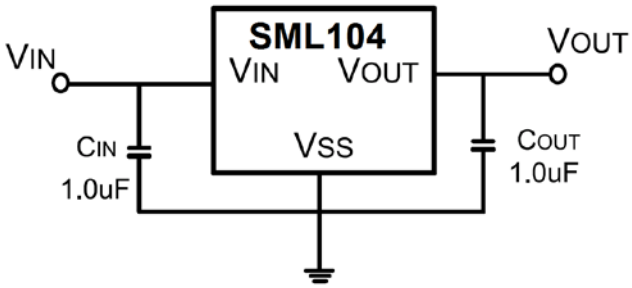


Figure1 SML104A Typical Application Circuit

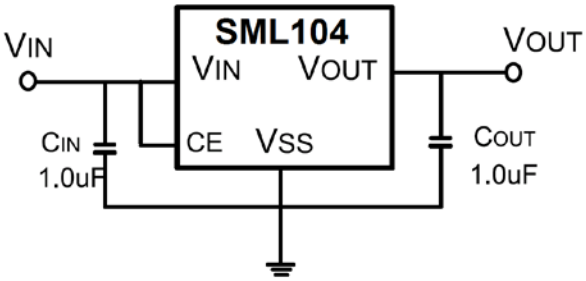
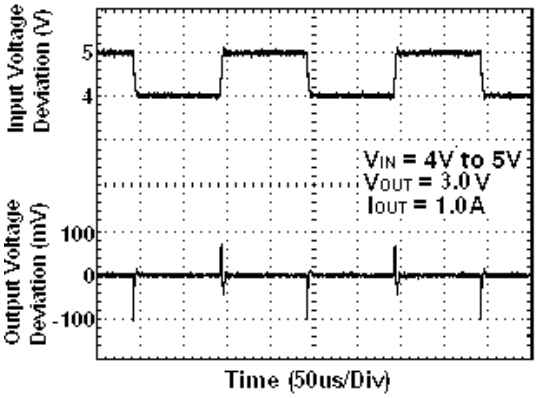


Figure2 SML104B Typical Application Circuit

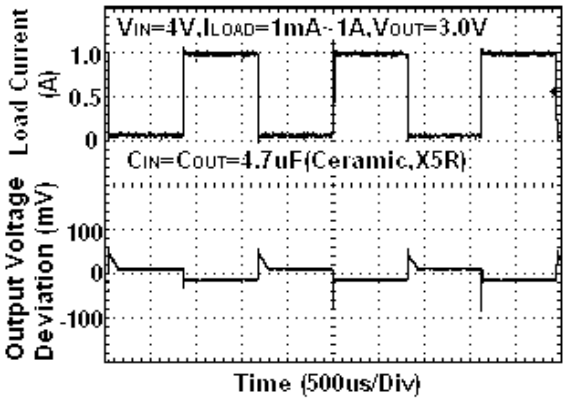
Caution: A general series regulator may oscillate, depending on the external components selected. Check that no oscillation occurs with the application using the above capacitor.

■ TYPICAL PERFORMANCE CHARACTERISTICS

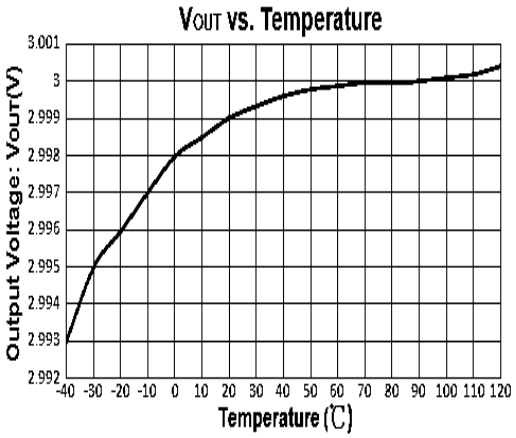
(1)Input Transient Response



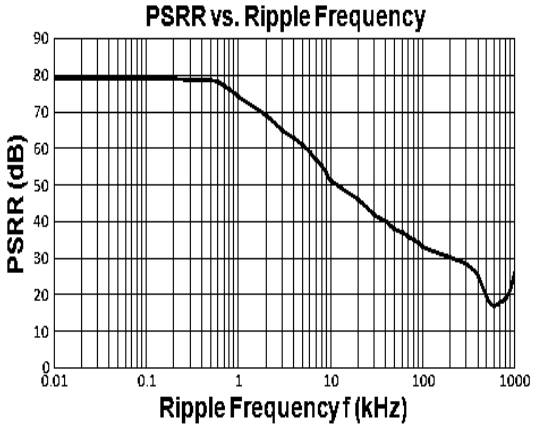
(2)Load Transient Response



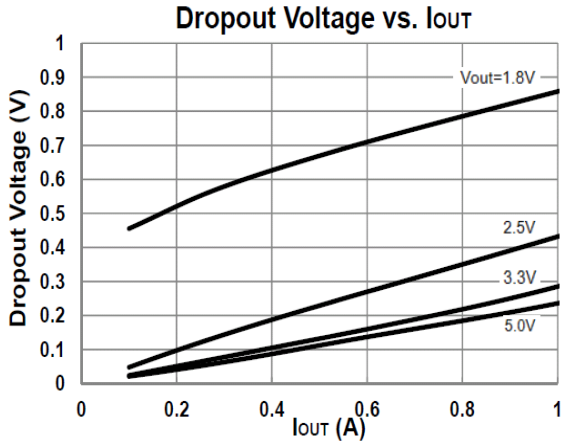
(3)Output Voltage vs. Temperature



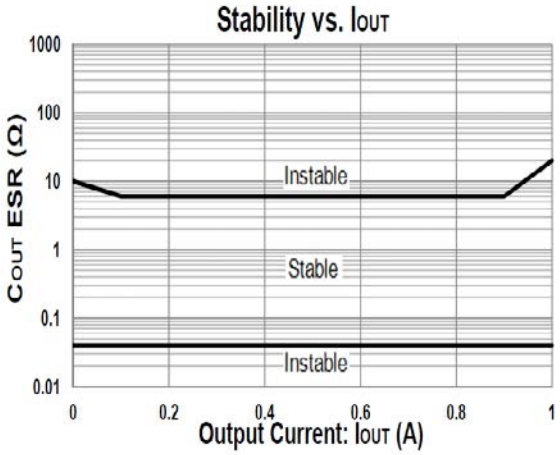
(4)Power Supply Rejection Ratio



(5)Dropout Voltage vs. Output Current

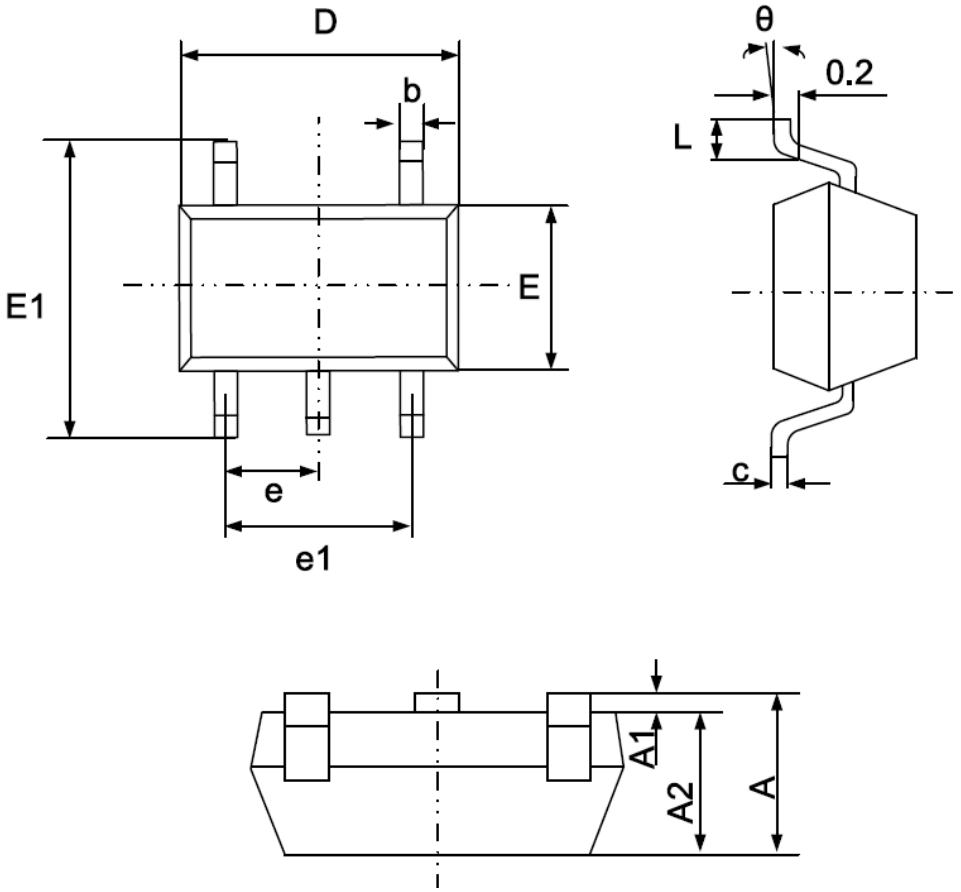


(6)Region of Stable C_{OUT} ESR vs. Load



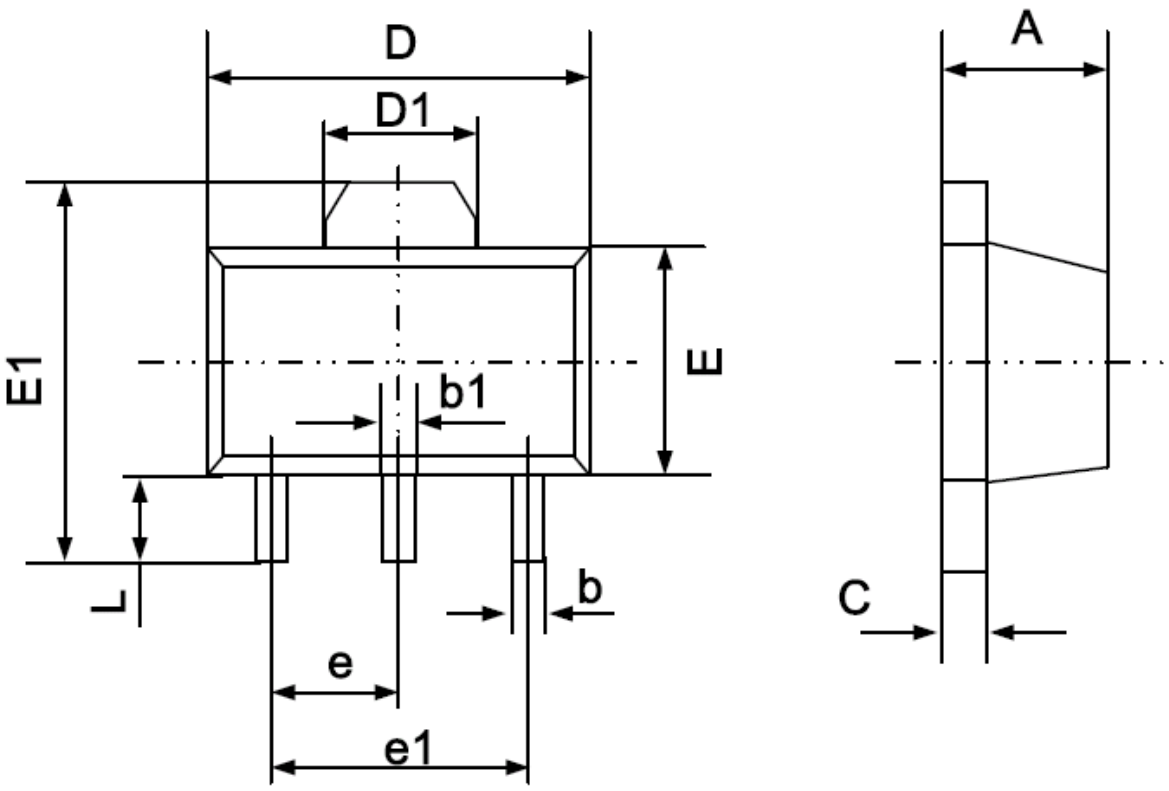
■ PACKAGING INFORMATION

● SOT-23-5 PACKAGE OUTLINE DIMENSIONS



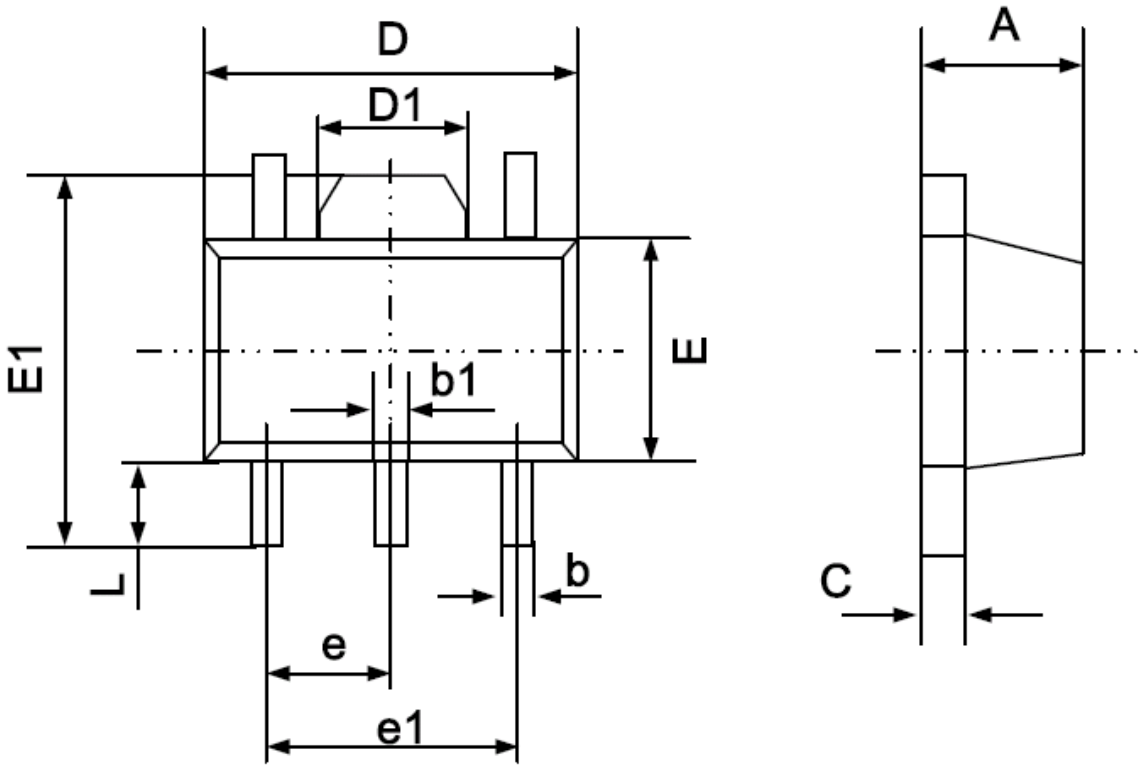
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
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**



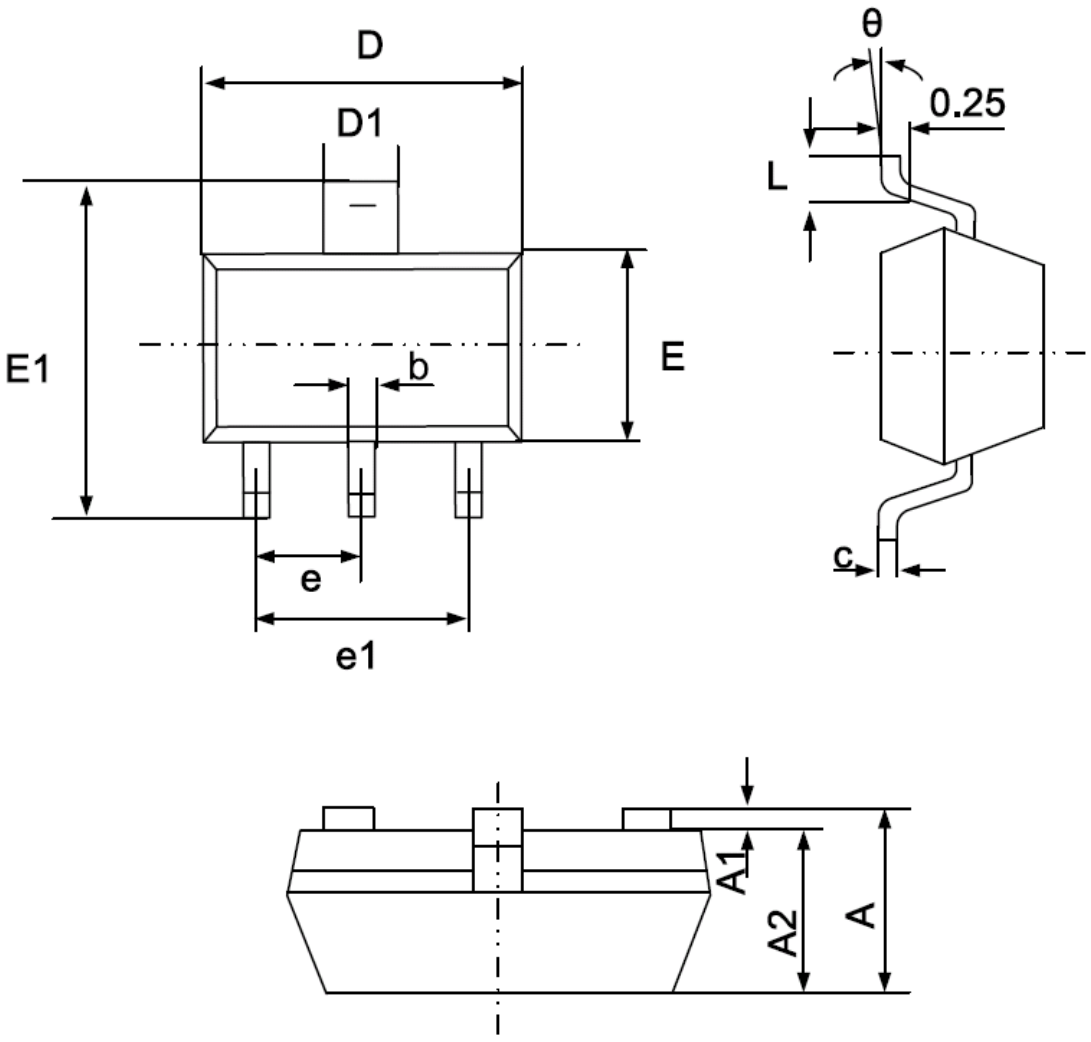
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060 TYP	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.200	0.035	0.047

- **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	1.500 TYP		0.060 TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043

- **SOT-223 PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300 (BSC)		0.091 (BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°