Low Consumption Current High PSRR 300mA CMOS Voltage Regulator

CE1133 Series

■ INTRODUCTION

The CE1133 series are a group of positive voltage regulators manufactured by CMOS technologies with high ripple rejection, low power consumption and low dropout voltage, which can prolong battery life in portable electronics. The CE1133 series work with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications. The CE1133 series consume less than 0.1uA in shutdown mode and have fast turn-on time less than 50us. The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

■ FEATURES

- Low Dropout Voltage：150mV@150mA
- Low Quiescent Current：5μA
- High Ripple Rejection：65dB@1kHz
- Excellent Line and Load Transient Response
- Operating Voltage：2.0V～7.0V
- Output Voltage：1.2 ~ 5.0V
- High Accuracy：±2％（Typ.）
- Built-in Current Limiter, Short-Circuit Protection
- TTL- Logic-Controlled Shutdown Input

■ APPLICATIONS

- Cellular and Smart Phones
- Laptop, Palmtops and PDA
- Digital Still and Video Cameras
- MP3, MP4 Player
- Radio control systems
- Battery-Powered Equipment

■ BLOCK DIAGRAM

■ ORDER INFORMATION
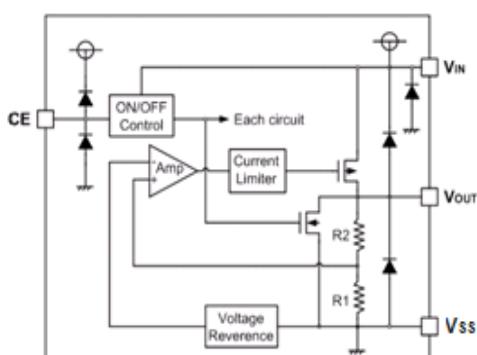
CE1133①②③④

DESIGNATOR	SYMBOL	DESCRIPTION
①	A	Standard
	B	With Shutdown Function
②③	Integer	Output Voltage e.g.1.8V=②:1, ③:8
④	M	Package:SOT-23-3/5
	U	Package:SC-70-5
	P/PT	Package:SOT-89-3/5
	T	Package:TO-92
	F	Package:DFN1×1-4

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■ PIN CONFIGURATION
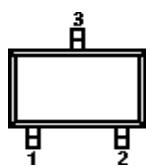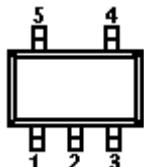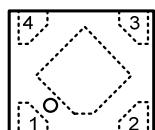
SOT-23-3   SOT-23-5   TO-92   DFN1×1-4   SOT-89-3   SOT-89-5
/SC-70-5
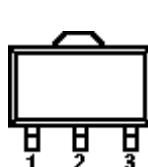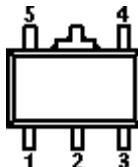
PIN NUMBER							PIN NAME	FUNCTION
SOT-23-3				SOT-89-3		TO-92		
M	MA	MC	MY	P	PT	T		
1	2	3	3	1	2	1	V_{SS}	Ground
2	1	2	1	3	1	3	V_{OUT}	Output
3	3	1	2	2	3	2	V_{IN}	Power input

SOT-23-5/SC-70-5

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

DFN1×1-4

PIN NUMBER F	SYMBOL	FUNCTION
1	V_{OUT}	Output Pin
2	V_{SS}	Ground
3	CE	Chip Enable Pin
4	V_{IN}	Power Input Pin

SOT-89-5

PIN NUMBER P	PT	SYMBOL	FUNCTION
1	5	V_{OUT}	Output Pin
2	2	V_{SS}	Ground
3	1	NC	No Connection
4	3	CE	Chip Enable Pin
5	4	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}+8	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
	SC-70	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**

CE1133Series   ($V_{IN}=V_{OUT}+1V$, $C_{IN}=C_{OUT}=1μF$，Ta=25℃,unless otherwise specified)

| PARAMETER		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Voltage		$V_{OUT}(E)$ (Note 2)	I_{OUT}=1mA	V_{OUT} *0.98	V_{OUT}	V_{OUT} *1.02	V
Supply Current		I_{SS}	I_{OUT}=0		5	10	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} =150mA V_{OUT}≥3.0V		150		mV
Load Regulation		ΔV_{OUT}	V_{IN}= V_{OUT} +1V, 1mA≤I_{OUT}≤100mA		10		mV
Line Regulation		$\dfrac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	I_{OUT} =10mA V_{OUT} +1V≤V_{IN}≤6V		0.01	0.2	%/V
Output Voltage Temperature Characteristics		$\dfrac{\Delta V_{OUT}}{\Delta T \times V_{OUT}}$	I_{OUT} =10mA -40≤T≤+85		100		ppm
Short Current		I_{Short}	V_{OUT} =V_{SS}		50		mA
Input Voltage		V_{IN}	—	2.0		7.0	V
Power Supply Rejection Rate	1kHz	PSRR	I_{OUT}=50mA		65		dB
	10kHz				50		
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).

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■ **TYPICAL APPLICATION**
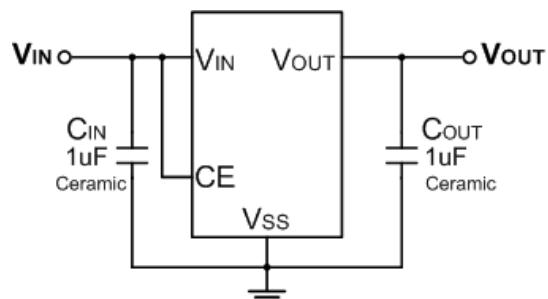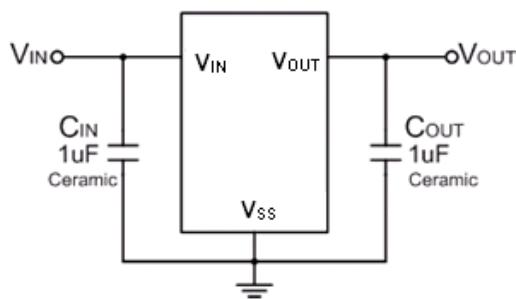
■ **TYPICAL PERFORMANCE CHARACTERISTICS**

■ **TYPICAL PERFORMANCE CHARACTERISTICS**

CE Pin Shutdown Response

CIN=COUT=1uF   VOUT=2.8V
VIN=3.8V   No Load
CH1 2.00V   CH2 1.00V   M 250μs   CH2

Start Up

VIN=3.8V   VOUT=2.8V
CIN=COUT=1uF
No Load
CH1 2.00V   CH2 1.00V   M 25.0μs   CH2
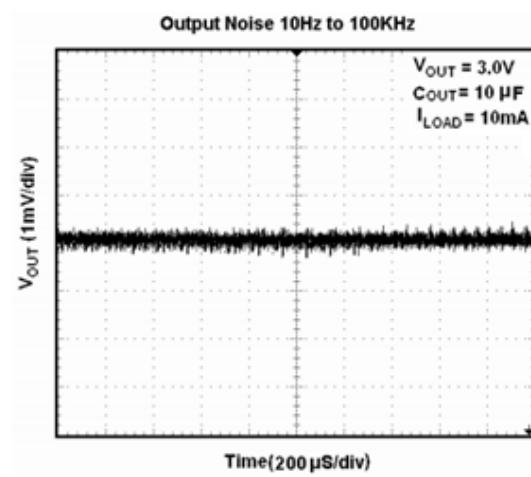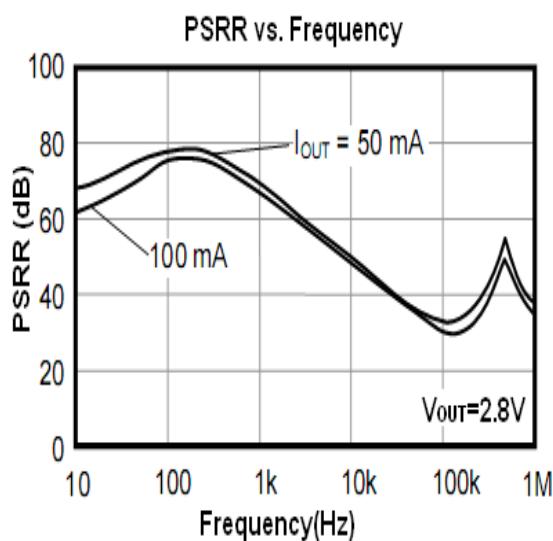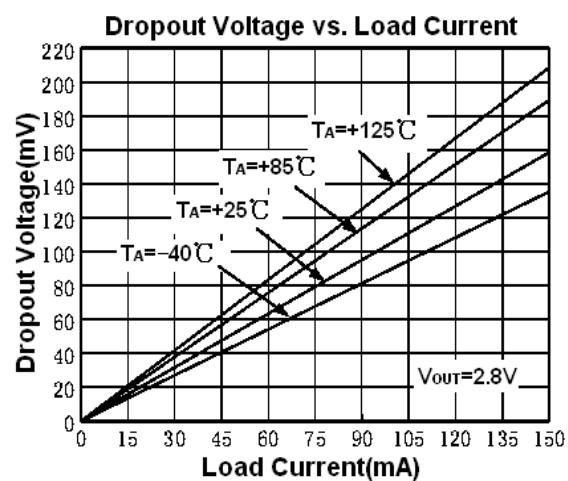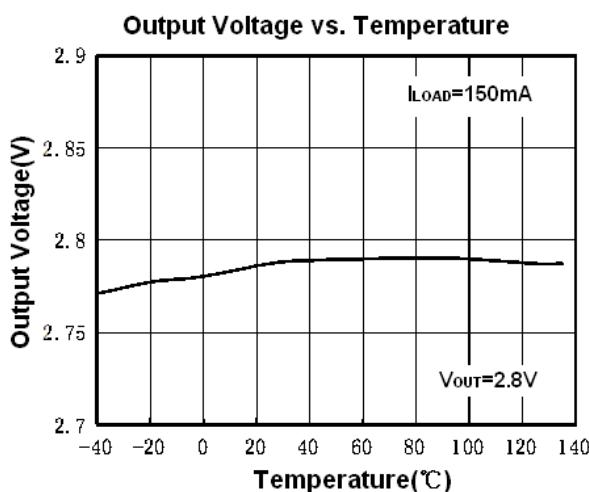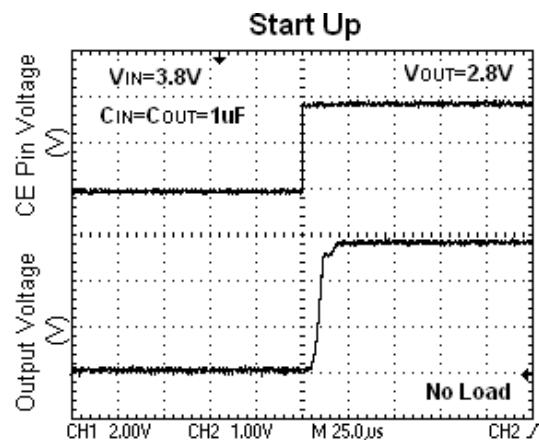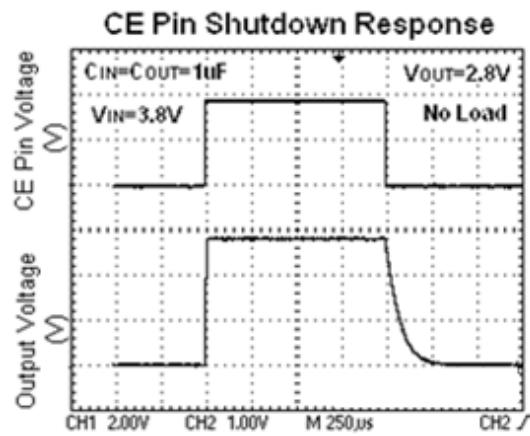
■   **PACKAGING INFORMATION**

● **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°

● **SC-70-5 PACKAGE OUTLINE DIMENSIONS**
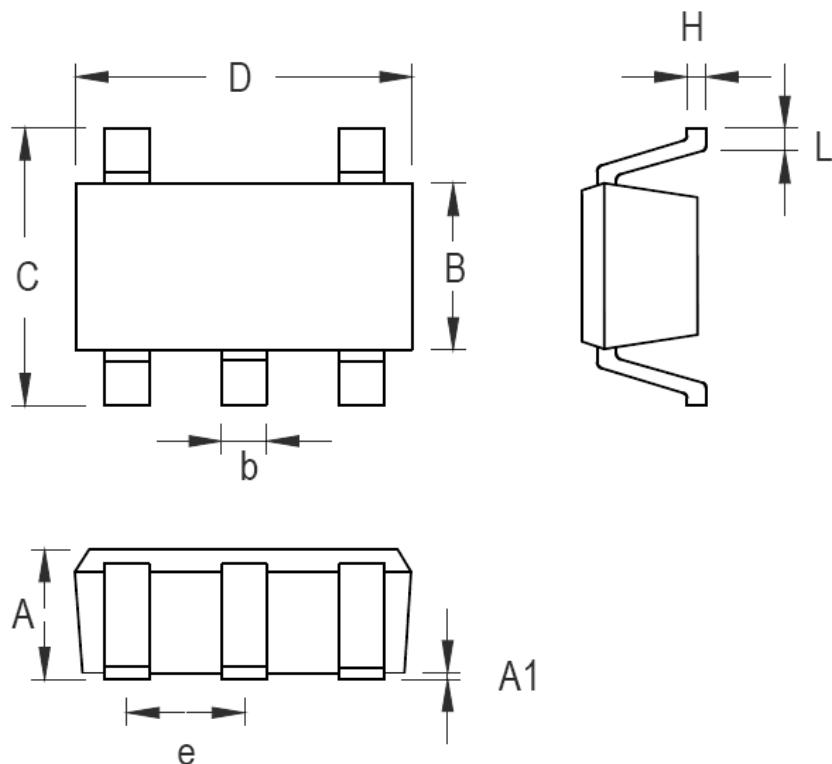
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.100	0.031	0.044
A1	0.000	0.100	0.000	0.004
B	1.150	1.350	0.045	0.054
b	0.150	0.400	0.006	0.016
C	1.800	2.450	0.071	0.096
D	1.800	2.250	0.071	0.089
e	0.650		0.026	
H	0.080	0.260	0.003	0.010
L	0.210	0.460	0.008	0.018

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● **SOT-89-3 PACKAGE OUTLINE DIMENSIONS**
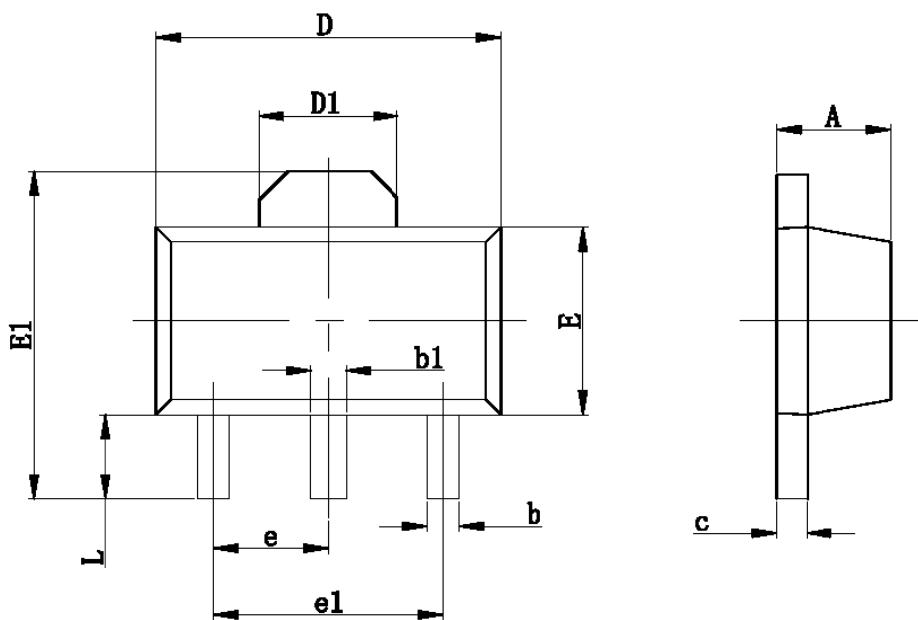
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.200	0.035	0.047

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● **TO-92 PACKAGE OUTLINE DIMENSIONS**
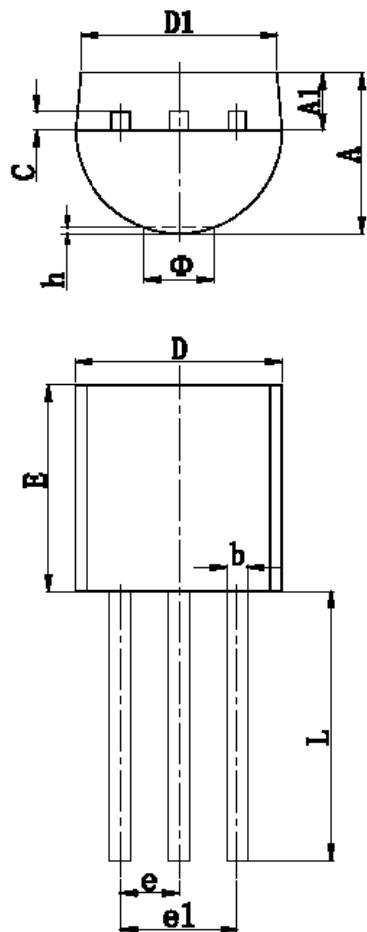
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.400	4.700	0.173	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	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

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● **DFN1×1-4   PACKAGE OUTLINE DIMENSIONS**
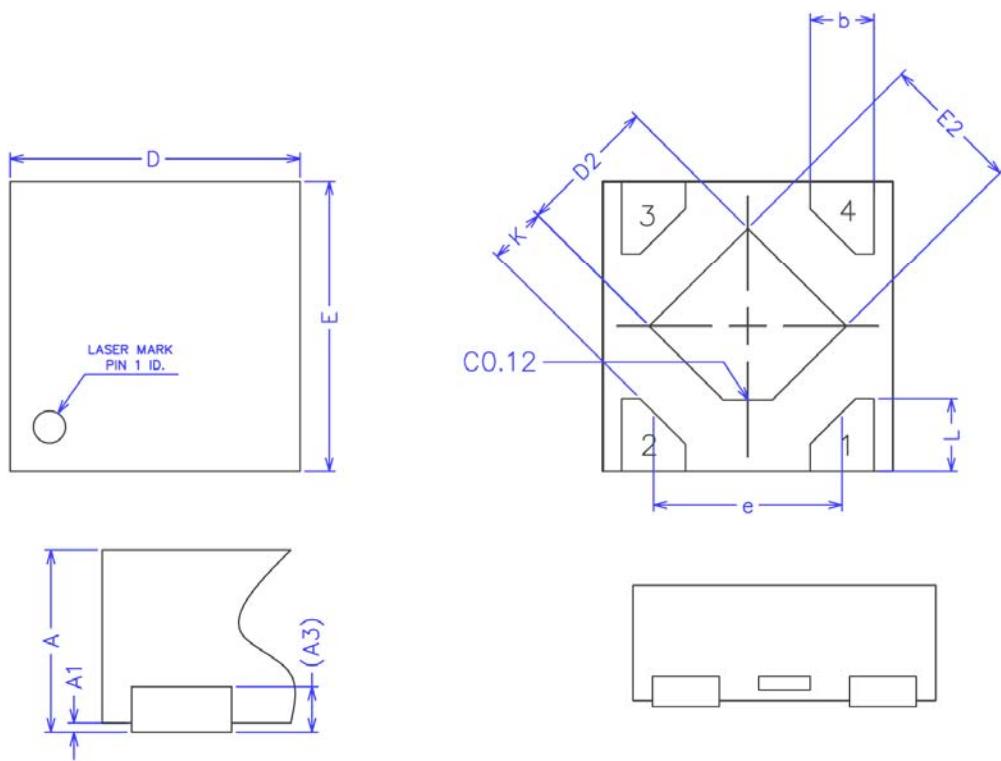
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.34	0.37	0.40
A1	0.00	0.02	0.05
A3		0.100REF	
b	0.17	0.22	0.27
D	0.95	1.00	1.05
E	0.95	1.00	1.05
D2	0.43	0.48	0.53
E2	0.43	0.48	0.53
L	0.20	0.25	0.30
e	–	0.65	–
K	0.15	–	–

● **SOT-89-5 PACKAGE OUTLINE DIMENSIONS**
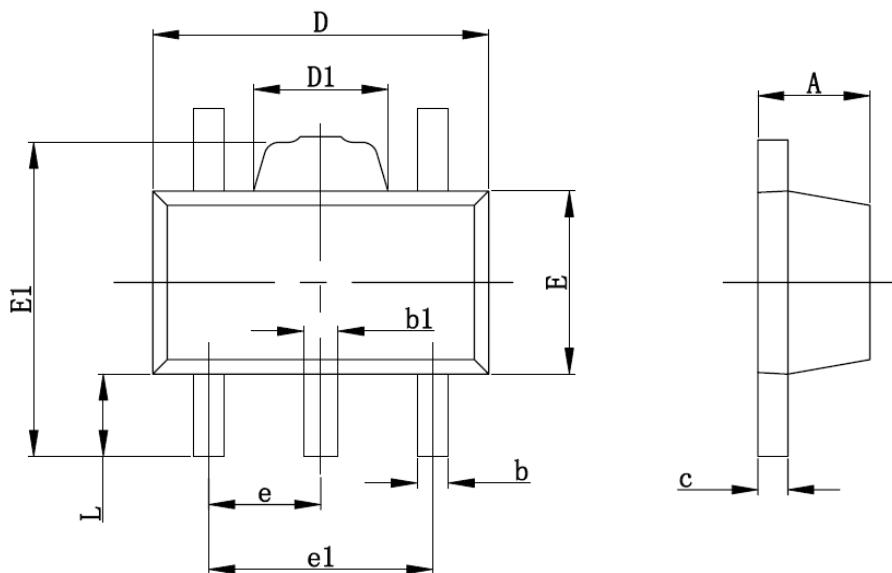
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.360	0.560	0.014	0.022
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.400	1.800	0.055	0.071
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	2.900	3.100	0.114	0.122
L	0.900	1.100	0.035	0.043