

■ **INTRODUCTION**

The CE8303 is a CMOS PFM-control step-up switching DC/DC converter. The VFM controller allows the duty ratio to be automatically switched according to the load, enabling products with a low ripple over a wide range, high efficiency, and high output current. With the CE8303, a step-up switching DC/DC converter can be configured by using an external coil, capacitor, and diode. The built-in MOSFET is turned off by a protection circuit when the voltage at the LX pin exceeds the limit to prevent it from being damaged. This feature, along with the mini package and low current consumption, makes the CE8303 ideal for applications such as the power supply unit of portable equipment.

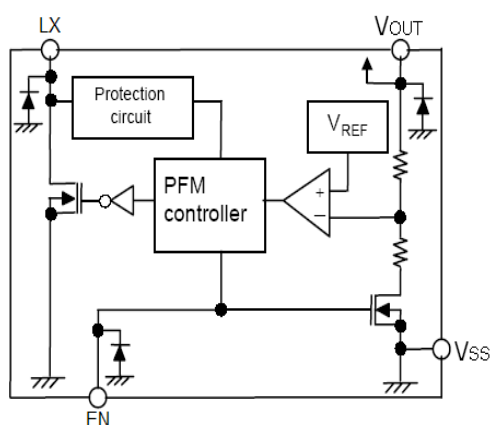
■ **FEATURES**

- Low voltage operation: Startup at 0.9 V @ $I_{OUT} = 1\text{ mA}$
- Work frequency: 300KHz
- External parts: Coil, capacitor, diode
- Accuracy of  $\pm 2.5\%$
- High efficiency: 87% (typ.)
- Shutdown function
- Low ripple, Low noise

■ **APPLICATIONS**

- Digital cameras
- Electronic notebooks and PDAs
- Portable CD/MD players
- Cameras, video equipment,
- Communications equipment
- Power supply for microcomputers

■ **BLOCK DIAGRAM**



■ **ORDER INFORMATION**

● **CE8303①②③④**

DESIGNATOR	SYMBOL	DESCRIPTION
①	A	Standard LX
	B	Standard EXT
	C	With shutdown, LX
	D	With shutdown, EXT
②③	Integer	Output Voltage (1.8~6.0) e.g.: 3.0V=②:3; ③:0
④	M	Package: SOT-23
	P	Package: SOT-89
	T	Package: TO-92

■ PIN CONFIGURATION

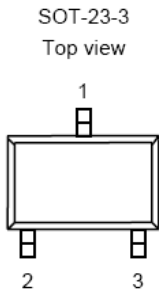


Table 1 CE8303A Series (SOT-23-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	V <sub>OUT</sub>	Output voltage pin
2	V <sub>SS</sub>	GND pin
3	LX	External inductor connection pin

Table 2 CE8303B Series (SOT-23-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	V <sub>OUT</sub>	Output voltage pin
2	V <sub>SS</sub>	GND pin
3	EXT	External transistor connection pin

Table 3 CE8303C Series (SOT-23-5 PKG)

PIN NO.	PIN NAME	FUNCTION
1	EN	Shutdown pin “H”: Normal operation “L”: Step-up stopped
2	V <sub>OUT</sub>	Output voltage pin
3	NC	(N.C.)
4	V <sub>SS</sub>	GND pin
5	LX	External inductor connection pin

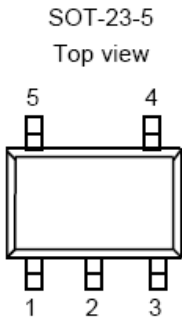


Table 4 CE8303D Series (SOT-23-5 PKG)

PIN NO.	PIN NAME	FUNCTION
1	EN	Shutdown pin “H”: Normal operation “L”: Step-up stopped
2	V <sub>OUT</sub>	Output voltage pin
3	NC	(N.C.)
4	V <sub>SS</sub>	GND pin
5	EXT	External transistor connection pin

Table 5 CE8303A Series (SOT-89-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	V <sub>SS</sub>	GND pin
2	V <sub>OUT</sub>	Output voltage pin
3	LX	External inductor connection pin

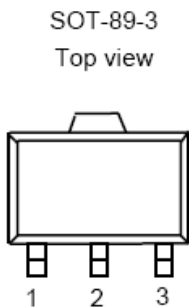


Table 6 CE8303B Series (SOT-89-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	V <sub>SS</sub>	GND pin
2	V <sub>OUT</sub>	Output voltage pin
3	EXT	External transistor connection pin

Table 7 CE8303C Series (SOT-89-5 PKG)

PIN NO.	PIN NAME	FUNCTION
1	NC	(N.C.)
2	V <sub>OUT</sub>	Output voltage pin
3	EN	Shutdown pin “H”: Normal operation “L”: Step-up stopped
4	LX	External inductor connection pin
5	V <sub>SS</sub>	GND pin

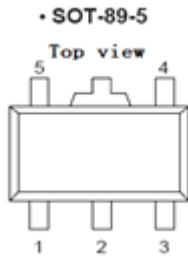


Table 8 CE8303D Series (SOT-89-5 PKG)

PIN NO.	PIN NAME	FUNCTION
1	NC	(N.C.)
2	V <sub>OUT</sub>	Output voltage pin
3	EN	Shutdown pin “H”: Normal operation “L”: Step-up stopped
4	EXT	External transistor connection pin
5	V <sub>SS</sub>	GND pin

Table 9 CE8303A Series (TO-92 PKG)



PIN NO.	PIN NAME	FUNCTION
1	V <sub>SS</sub>	GND pin
2	V <sub>OUT</sub>	Output voltage pin
3	LX	External inductor connection pin

■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, T<sub>a</sub>=25°C)

PARAMETER		SYMBOL	RATINGS	UNITS
V <sub>OUT</sub> pin voltage		V <sub>OUT</sub>	V <sub>SS</sub> -0.3 ~ V <sub>SS</sub> +8	V
EN pin voltage		EN	V <sub>SS</sub> -0.3 ~ V <sub>SS</sub> +8	V
LX pin voltage		V <sub>LX</sub>	V <sub>SS</sub> -0.3 ~ V <sub>SS</sub> +8	V
LX pin current		I <sub>LX</sub>	1000	mA
Power dissipation	SOT-23-5	PD	250	mW
Operating temperature		T <sub>opr</sub>	-20 ~+85	°C
Storage temperature		T <sub>stg</sub>	-40 ~+125	°C
Soldering Temperature & Time		T <sub>solder</sub>	260°C, 10s	

## ■ ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output voltage	$V_{\text{OUT}}$	—	$V_{\text{OUT(S)}} \times 0.975$	$V_{\text{OUT}}$	$V_{\text{OUT(S)}} \times 1.025$	V
Input voltage	$V_{\text{IN}}$	—	—	—	6	V
Operation start voltage	$V_{\text{ST}}$	$I_{\text{OUT}}=1\text{ mA}$	—	—	1.2	V
Hold voltage	$V_{\text{HOLD}}$	$I_{\text{OUT}}=1\text{ mA}$	0.9	—	—	V
Current consumption	$I_{\text{SS}}$	$V_{\text{OUT}}=V_{\text{OUT(S)}}+0.5\text{ V}$	—	7	—	$\mu\text{A}$
Current consumption during shutdown	$I_{\text{SSS}}$	$V_{\text{EN}}=0\text{ V}$ , No load	—	—	1.0	$\mu\text{A}$
Maximum Oscillation frequency	$F_{\text{max}}$	$V_{\text{OUT}}=0.95 \times V_{\text{OUT}}$ , measure waveform at LX pin	—	300	—	KHz
Duty ratio	Duty	—	—	75	—	%
Efficiency	EFFI	—	—	84	88	%
Current limit	$I_{\text{LIMIT}}$	—	—	800	—	mA
Shutdown pin input voltage	$V_{\text{SH}}$	—	1.5	—	—	V
	$V_{\text{SL}}$	—	—	—	0.3	V
Shutdown pin input current	$I_{\text{SH}}$	—	—	—	0.1	$\mu\text{A}$
	$I_{\text{SL}}$	—	-0.1	—	—	$\mu\text{A}$

Remark:  $V_{\text{IN}}=V_{\text{OUT(S)}} \times 0.6$  applied,  $I_{\text{OUT}}=V_{\text{OUT(S)}} / 250\ \Omega$

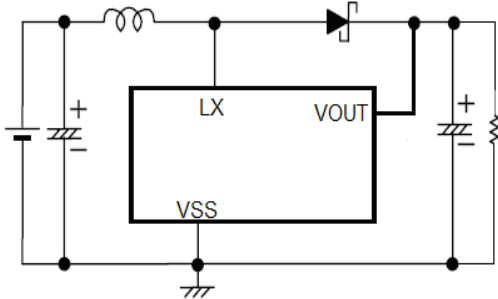
$V_{\text{OUT(S)}}$  specified above is the set output voltage value, and  $V_{\text{OUT}}$  is the typical value of the actual output voltage.

■ STANDARD CIRCUITS

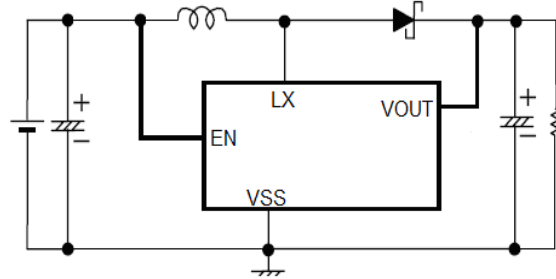
Component: Inductor: 22uH(Sumida)  
 Diode: IN5817、IN5819

Capacitor: 47uF/10V(Tantalum)  
 NMOS: XP151、XP161

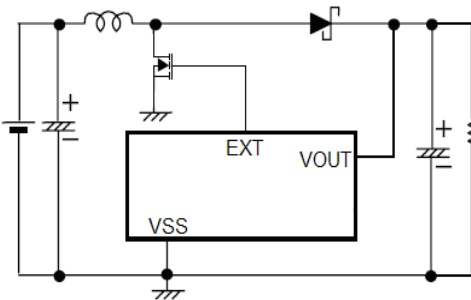
1、CE8303A Circuits:



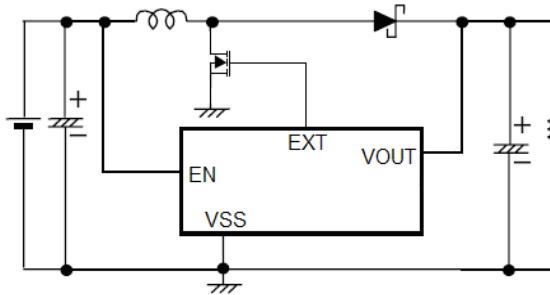
2、CE8303C Circuits:



3、CE8303B Circuits:



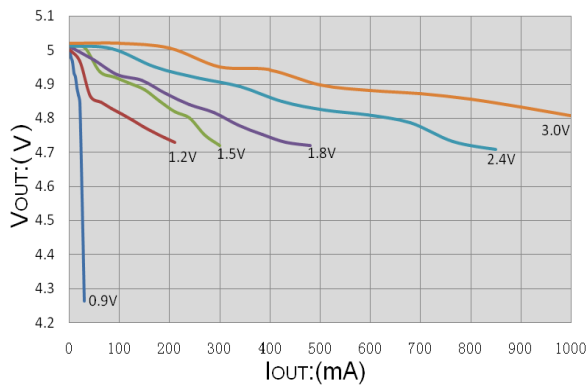
4、CE8303D Circuits:



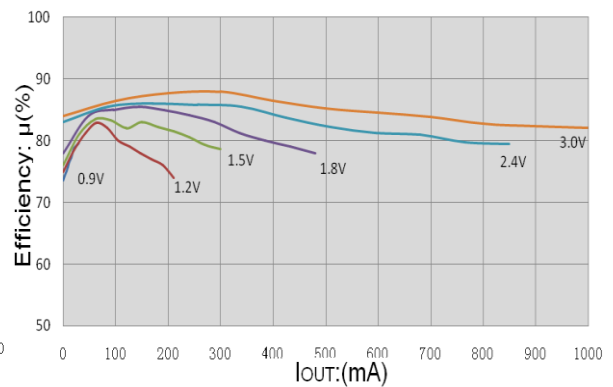
■ TYPICAL PERFORMANCE CHARACTERISTICS

CE8303B50P:

a、 $V_{OUT}$  vs.  $I_{OUT}$  :

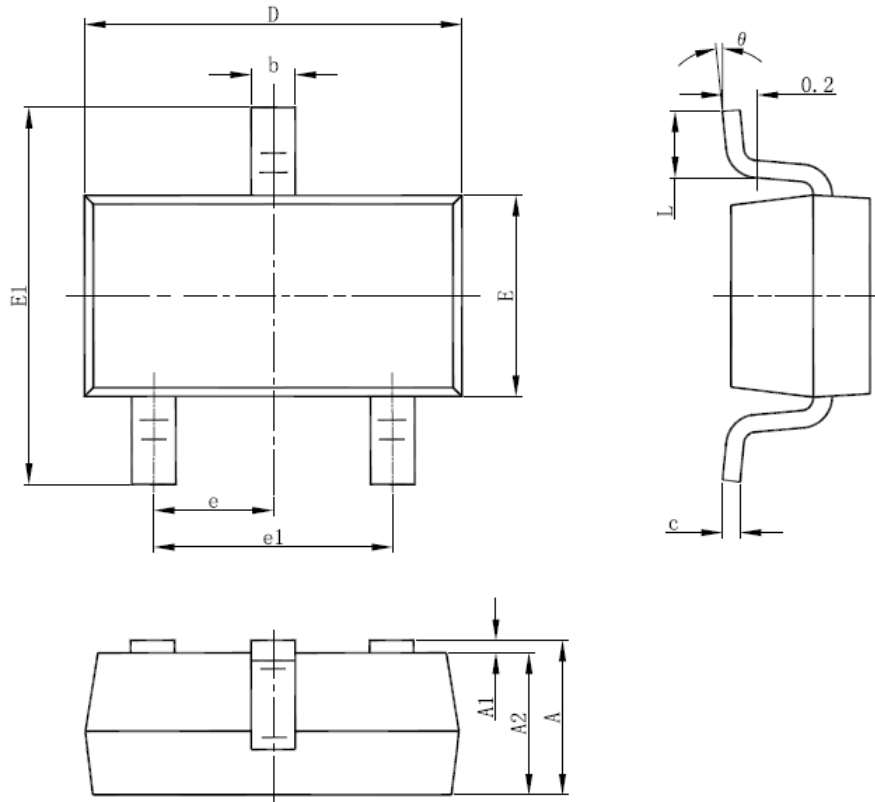


b、Efficiency vs.  $I_{OUT}$  :



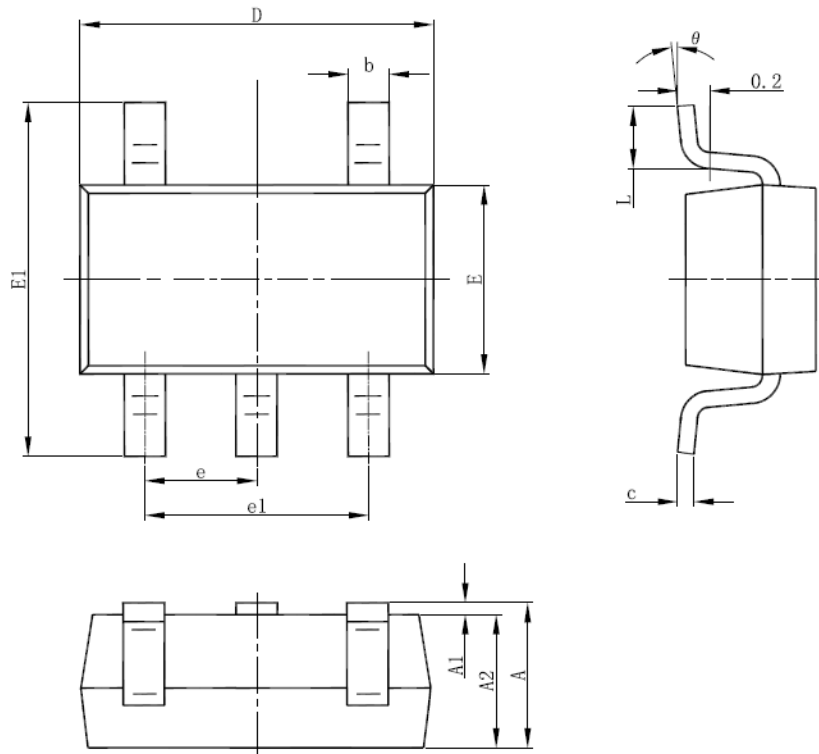
■ PACKAGE INFORMATION

- SOT-23-3



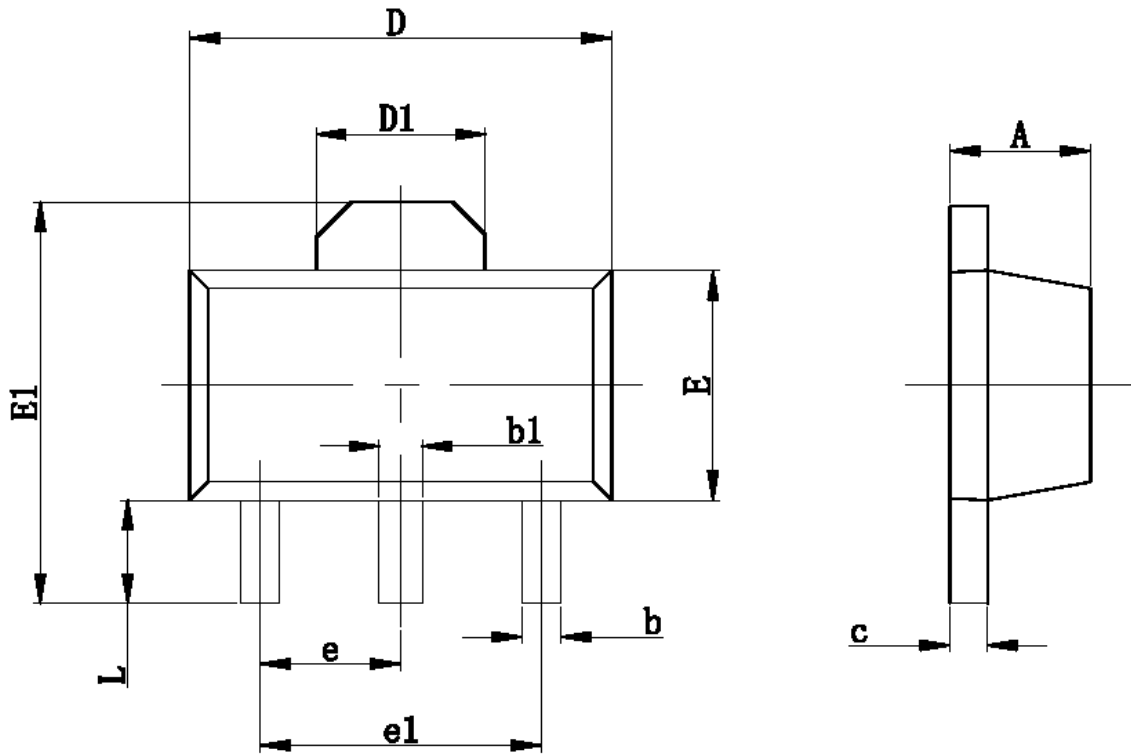
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

• SOT-23- 5



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
$\theta$	0°	8°	0°	8°

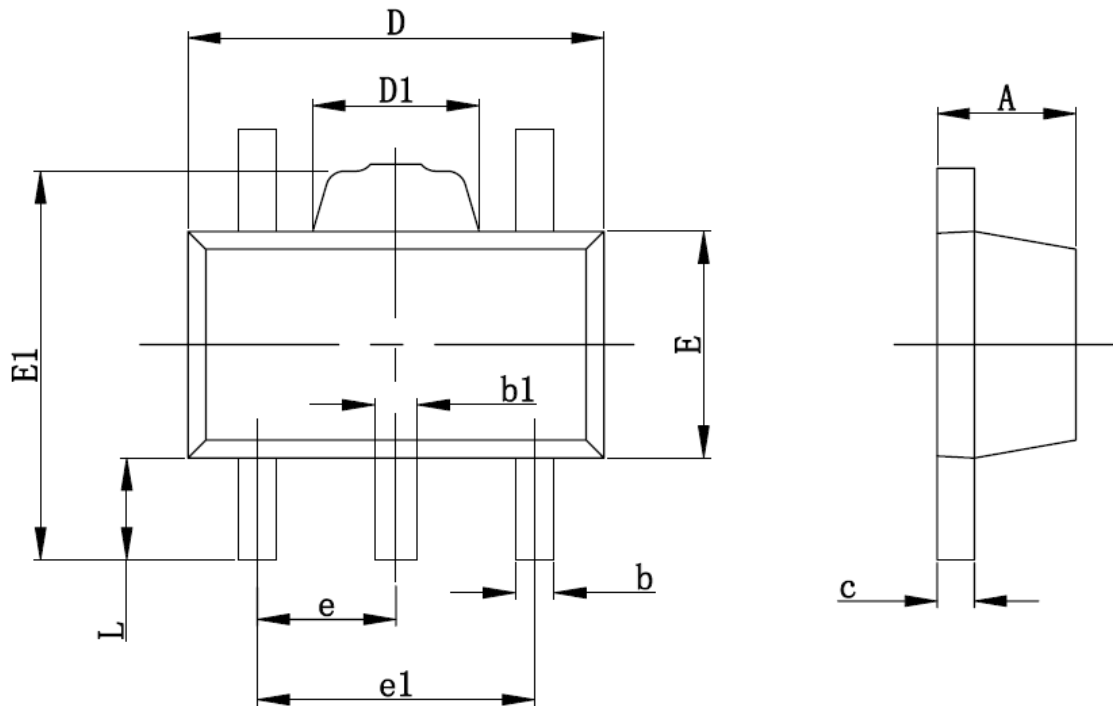
- SOT-89-3



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

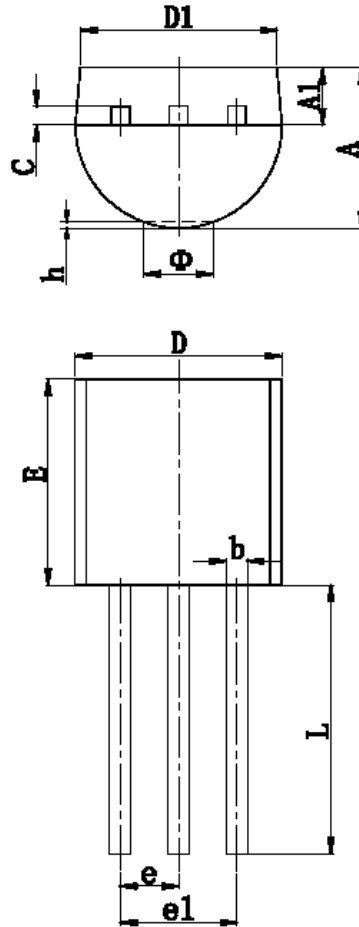


- SOT-89-5



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

- TO-92



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
$\Phi$		1.600		0.063
h	0.000	0.380	0.000	0.015

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