■ INTRODUCTION

The SMD103 is a CMOS PFM-control step-up switching DC/DC converter. The PFM 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 SMD103, 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 SMD103 ideal for applications such as the power supply unit of portable equipment.

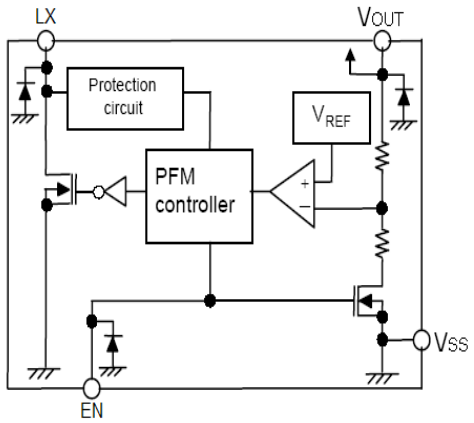
■ FEATURES

- Low voltage operation:
  Startup at 0.9V@I_{OUT}=1mA
- Working frequency: 300KHz
- External parts: Coil, capacitor, diode
- Accuracy of ±2%
- 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

SMD103①②③④

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-89-3/5
	T	Package: TO-92

■ PIN CONFIGURATION

SOT-23-3
Top view

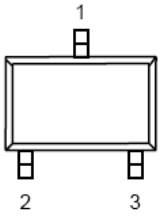


Table 1 SMD103A Series（SOT-23-3 PKG）

PIN NO.	PIN NAME	FUNCTION
1	V_{OUT}	Output voltage pin
2	V_{SS}	GND pin
3	LX	External inductor connection pin

Table 2 SMD103B Series（SOT-23-3 PKG）

PIN NO.	PIN NAME	FUNCTION
1	V_{OUT}	Output voltage pin
2	V_{SS}	GND pin
3	EXT	External transistor connection pin

Table 3 SMD103C Series（SOT-23-5 PKG）

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

SOT-23-5
Top view

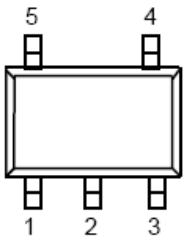


Table 4 SMD103D Series（SOT-23-5 PKG）

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

Table 5 SMD103A Series （SOT-89-3 PKG）

PIN NO.	PIN NAME	FUNCTION
1	V_{SS}	GND pin
2	V_{OUT}	Output voltage pin
3	LX	External inductor connection pin

SOT-89-3
Top view

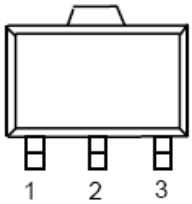


Table 6 SMD103B Series （SOT-89-3 PKG）

PIN NO.	PIN NAME	FUNCTION
1	V_{SS}	GND pin
2	V_{OUT}	Output voltage pin
3	EXT	External transistor connection pin

Table 7 SMD103C Series （SOT-89-5 PKG）

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

• SOT-89-5

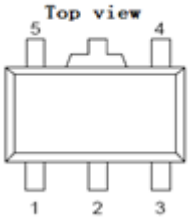


Table 8 SMD103D Series（SOT-89-5 PKG）

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

TO-92

Table 9 SMD103A Series （TO-92 PKG）

PIN NO.	PIN NAME	FUNCTION
1	V_{SS}	GND pin
2	V_{OUT}	Output voltage pin
3	LX	External inductor connection pin

■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, T_A=25°C)

PARAMETER		SYMBOL	RATINGS	UNITS
V_{OUT} pin voltage		V_{OUT}	V_{SS}-0.3~V_{SS}+8	V
EN pin voltage		EN	V_{SS}-0.3~V_{SS}+8	V
LX pin voltage		V_{LX}	V_{SS}-0.3~V_{SS}+8	V
LX pin current		I_{LX}	1500	mA
Power dissipation	SOT-23-X	PD	400	mW
	SOT-89-X	PD	600	mW
	TO-92	PD	500	mW
Operating temperature		T_{opr}	-40~+85	°C
Storage temperature		T_{stg}	-55~+150	°C
Soldering Temperature & Time		T_{solder}	260°C, 10s	

■ ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, T_A=25°C)

PARAMETER	SYNBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output voltage	V_{OUT}	—	$V_{OUT(S)}$ ×0.98	V_{OUT}	$V_{OUT(S)}$ ×1.02	V
Input voltage	V_{IN}	—	—	—	6	V
Operation start voltage	V_{ST}	I_{OUT}=1mA	—	—	0.9	V
Hold voltage	V_{HOLD}	I_{OUT}=1mA	0.8	—	—	V
Current consumption	I_{SS}	V_{OUT}=$V_{OUT(S)}$+0.5 V	—	7	—	μA
Current consumption during shutdown	I_{SSS}	V_{EN}=0V,No load	—	—	1.0	μA
Maximum Oscillation frequency	F_{max}	V_{OUT}=0.95×V_{OUT},measure waveform at LX pin	—	300	—	KHz
Duty ratio	Duty		—	75	—	%
Efficiency	EFFI		—	87		%
Current limit	I_{LIMIT}		—	1000	—	mA
Shutdown pin input voltage	V_{SH}		1.5	—	—	V
	V_{SL}		—	—	0.3	V
Shutdown pin input current	I_{SH}		—	—	0.1	μA
	I_{SL}		-0.1	—	—	μA

Remark：V_{IN}=$V_{OUT(S)}$×0.6 applied, I_{OUT}=$V_{OUT(S)}$/250Ω

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

■ STANDARD CIRCUITS

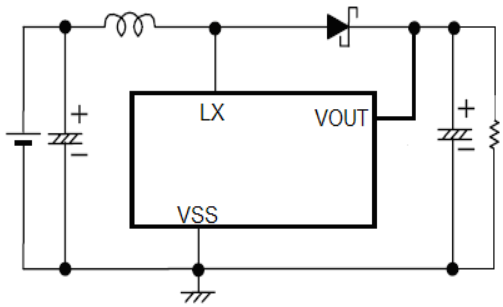
Component:

Inductor：22uH(Sumida)

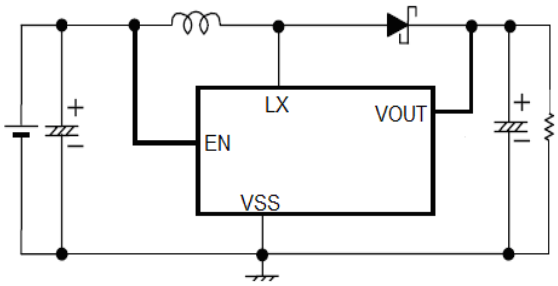
Capacitor：47uF/10V (Tantalum)

Diode：IN5817、IN5819NMOS：CE2312

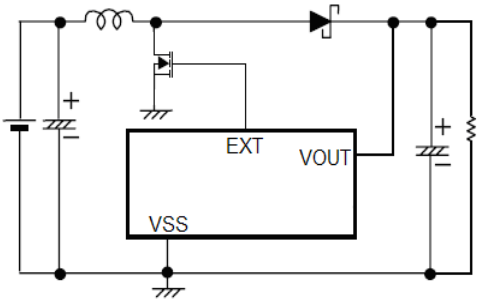
1、SMD103A Circuits：



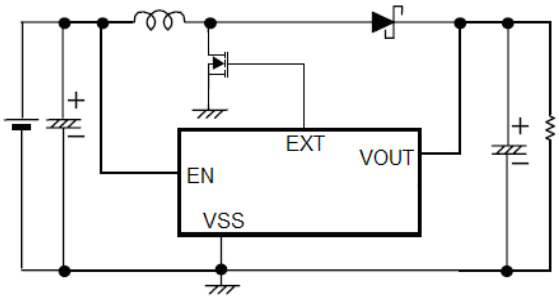
2、SMD103C Circuits：



3、SMD103B Circuits：



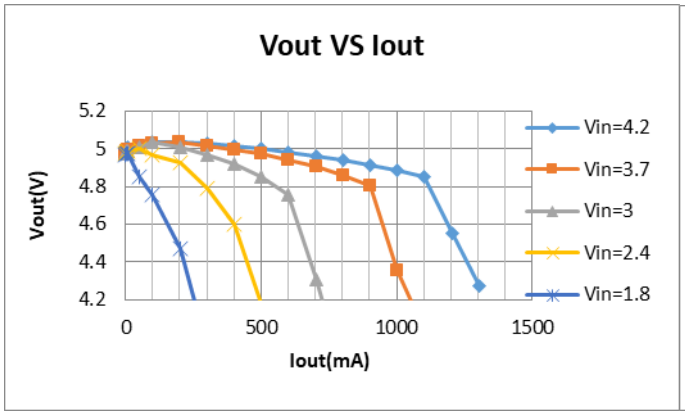
4、SMD103D Circuits：



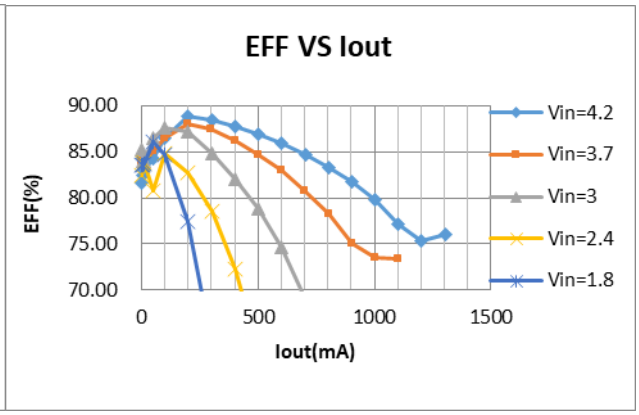
■ TYPICAL PERFORMANCE CHARACTERISTICS

SMD103A50P：

a、V_{OUT} vs. I_{OUT}:

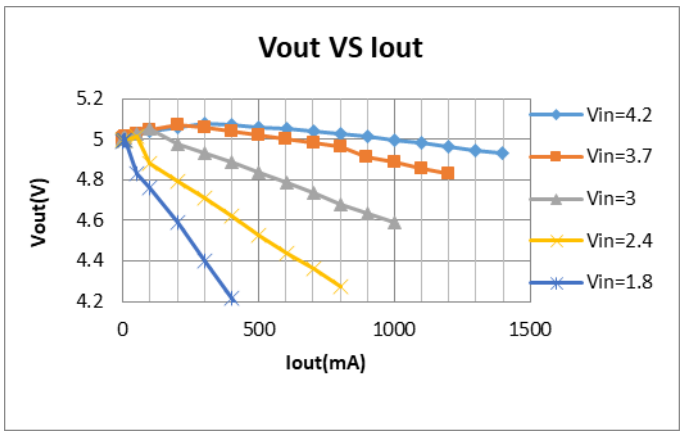


b、Efficiency vs. I_{OUT} :

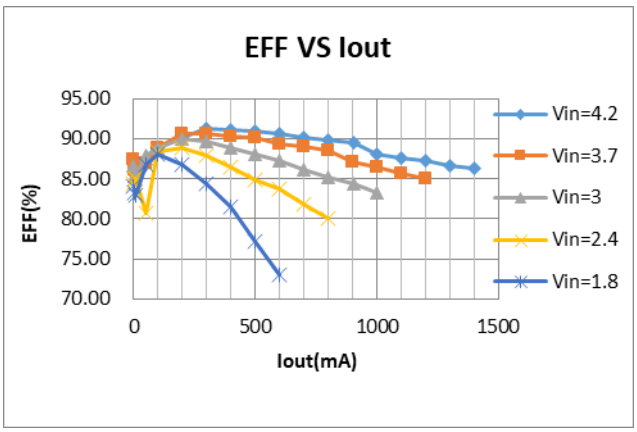


SMD103B50P：

a、V_{OUT} vs. I_{OUT}:

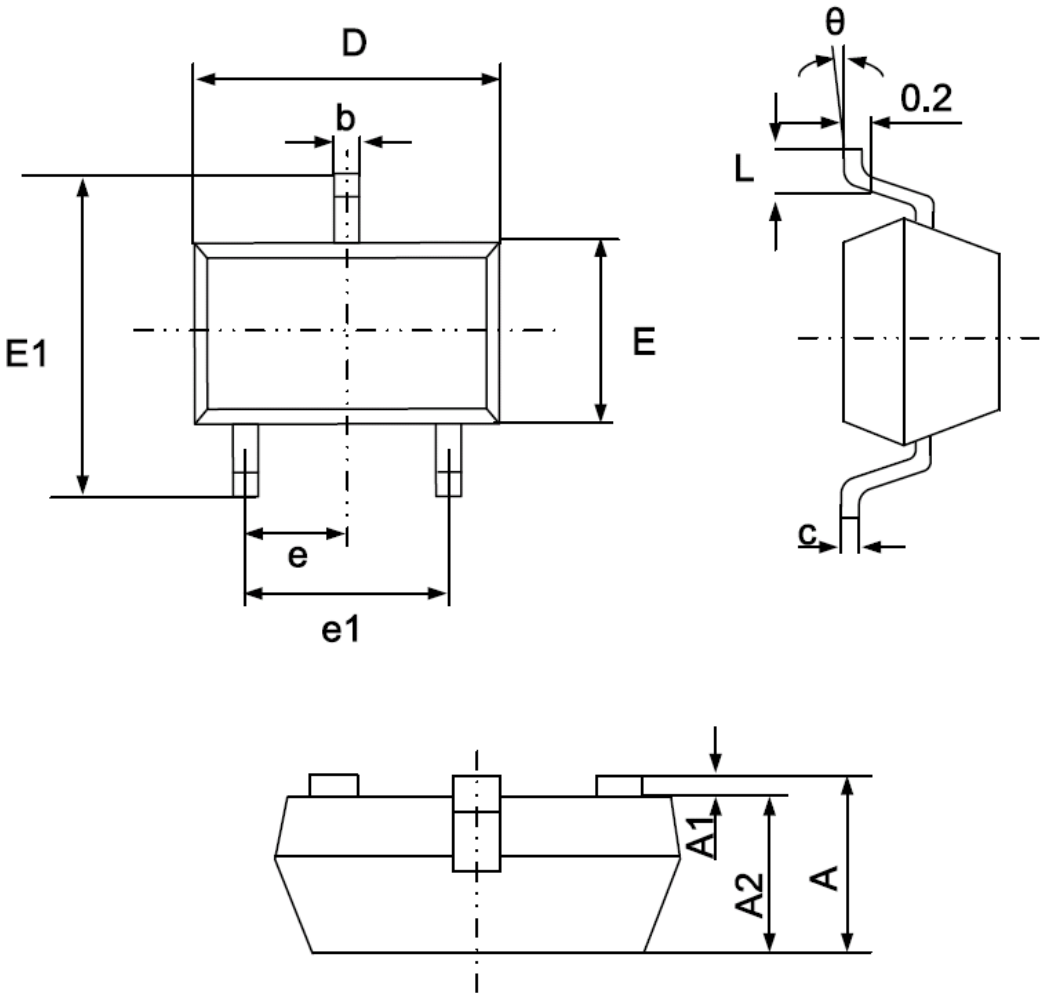


b、Efficiency vs. I_{OUT} :



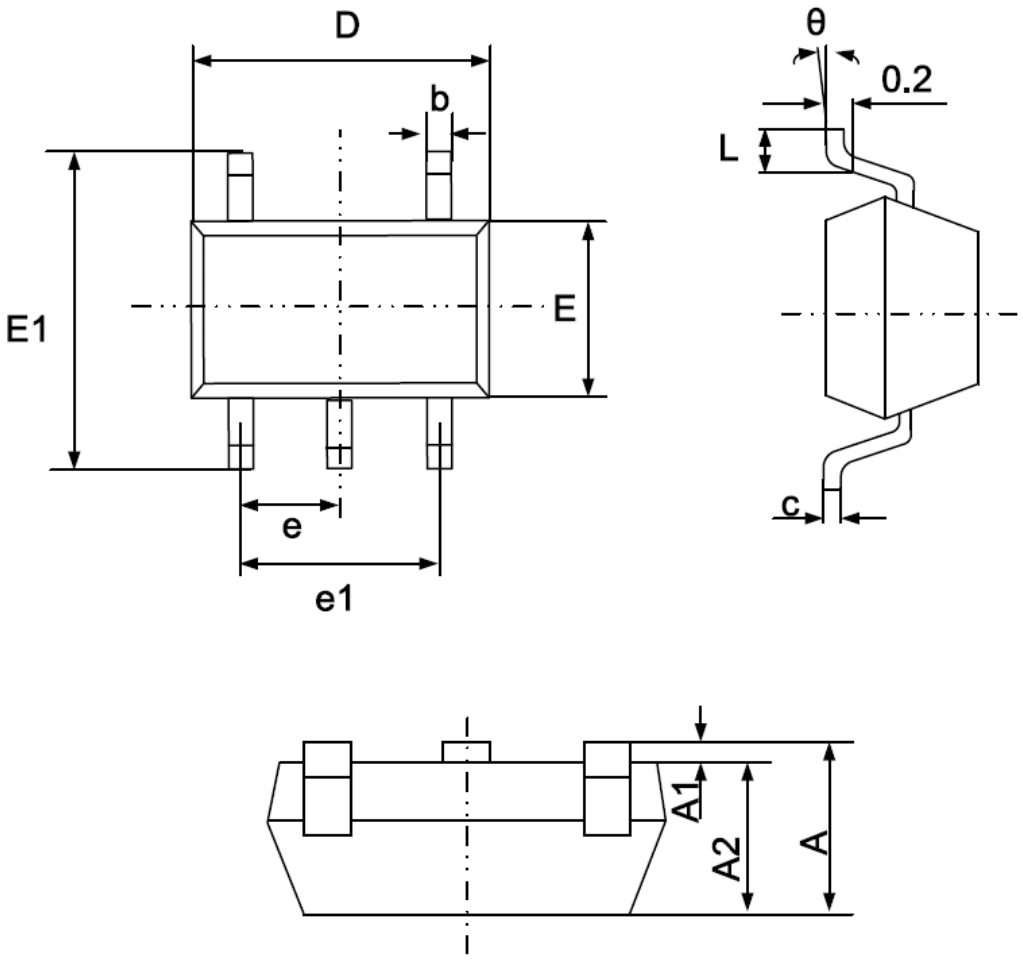
■ PACKAGEINFORMATION

● SOT-23-3 PACKAGE OUTLINE DIMENSIONS



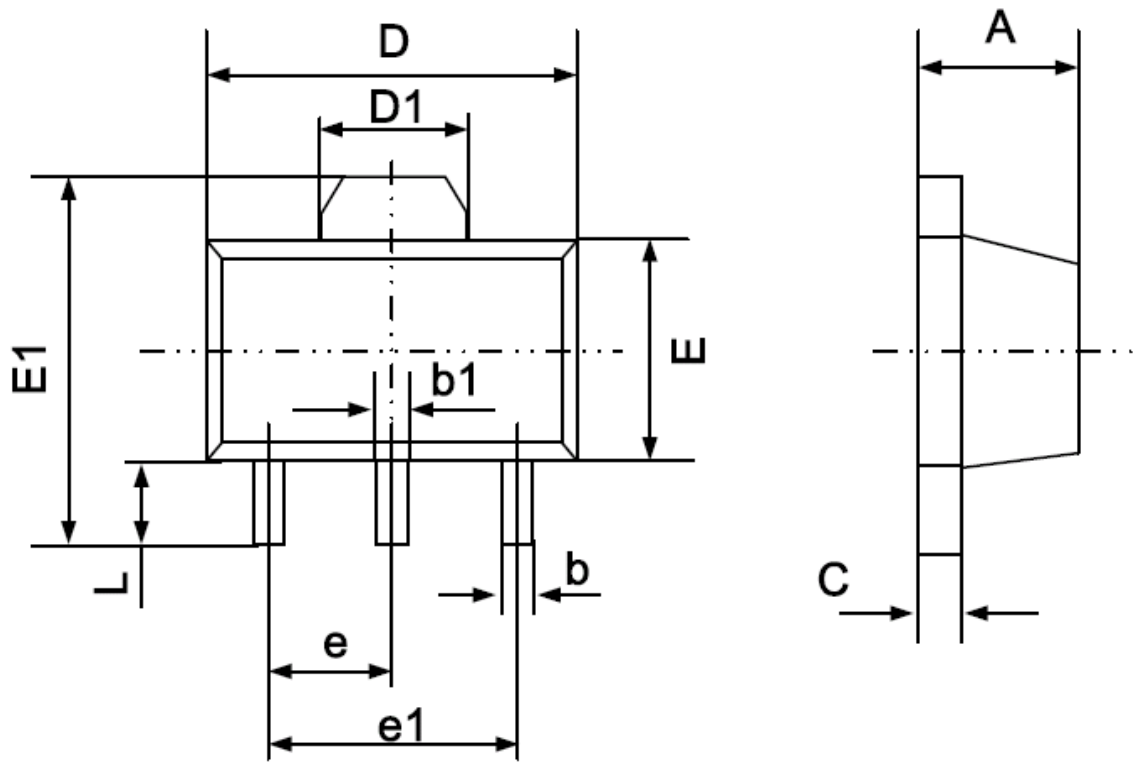
Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

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



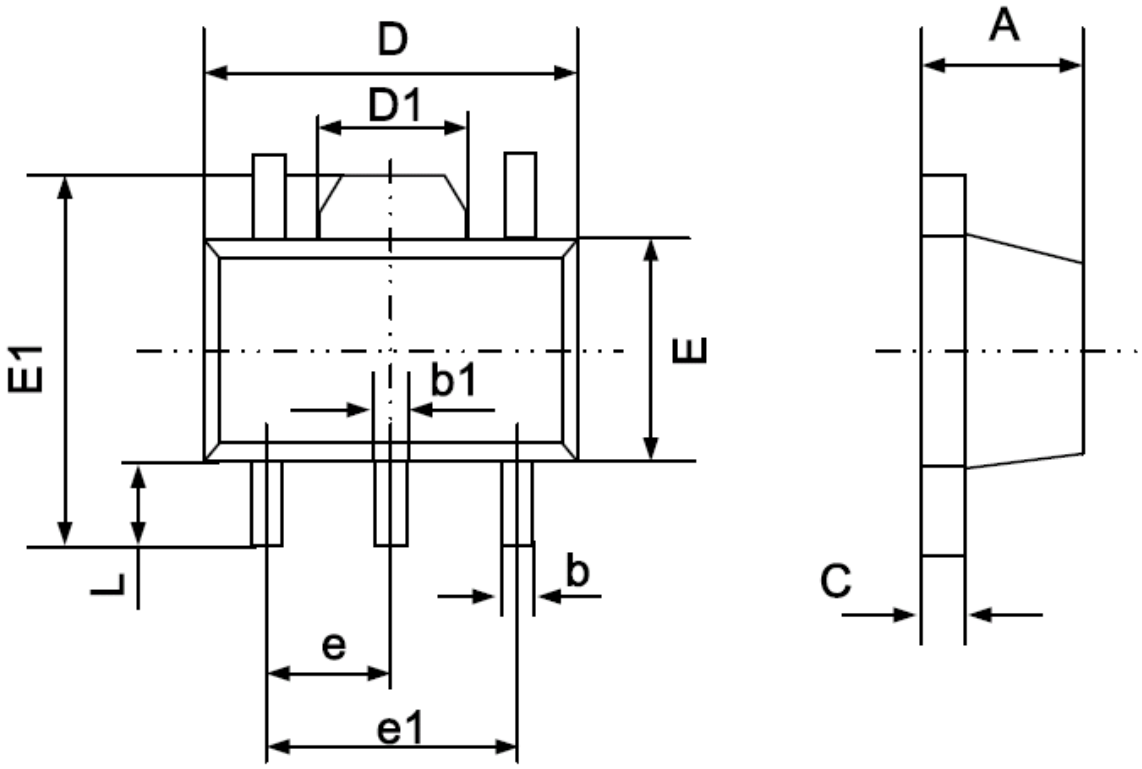
Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

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



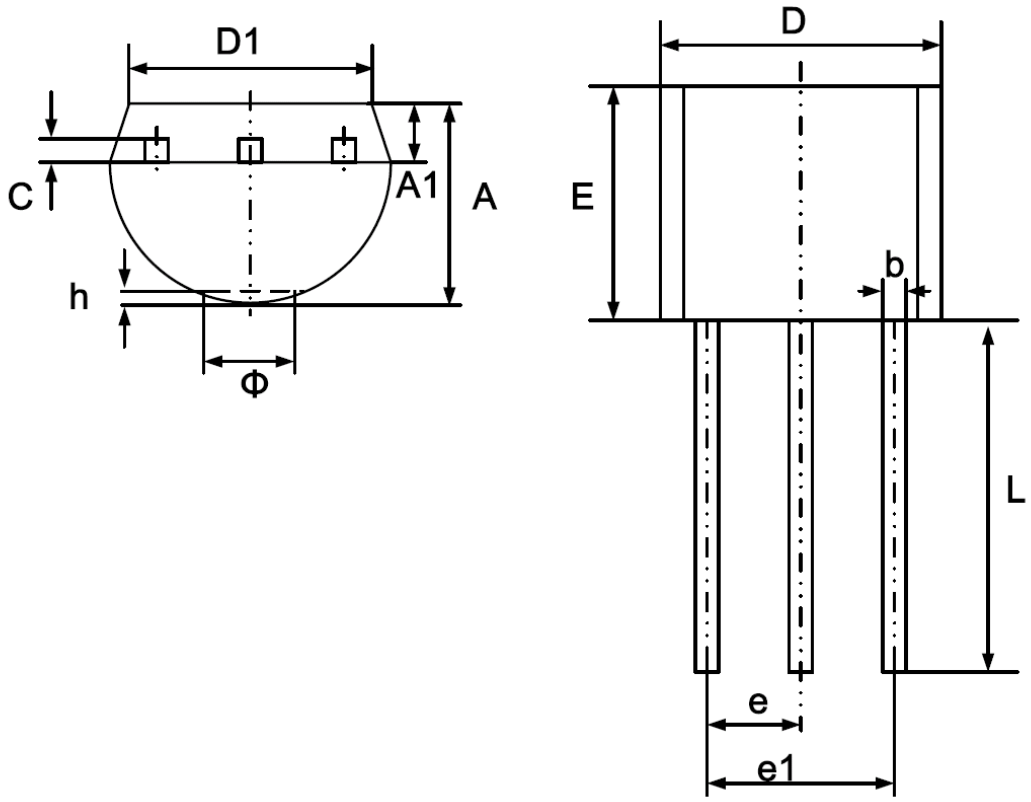
Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.400	1.600
b	0.320	0.520
b1	0.400	0.580
c	0.350	0.440
D	4.400	4.600
D1	1.550 REF	
E	2.300	2.600
E1	3.940	4.250
e	1.500 TYP	
e1	3.000 TYP	
L	0.900	1.200

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



Symbol	Dimensions In Millimeters	
	Min	Max
A	1.400	1.600
b	0.320	0.520
b1	0.360	0.560
c	0.350	0.440
D	4.400	4.600
D1	1.400	1.800
E	2.300	2.600
E1	3.940	4.250
e	1.500 TYP	
e1	2.900	3.100
L	0.900	1.100

- **TO-92 PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	3.300	3.800
A1	1.100	1.400
b	0.380	0.600
c	0.300	0.500
D	4.400	4.800
D1	3.430	
E	4.300	4.700
e	1.270 TYP	
e1	2.440	2.640
L	13. 00	15.00
Φ		1.600
h	0.000	0.380