

Features

- Vin Range up to 40V
- Output range:1.5V~5.0V
- Maximum output current: 250mA
- PSRR: 80dB @1KHz
- Dropout voltage:400mV @ IO_{UT}=100mA
- Ultra low quiescent current: 1.5μA Typ.
- Output voltage tolerances of ±2% Over the temperature range
- Internal thermal overload protection
- Built-in Short-Circuit Protection, Current Limiter

Applications

- E-meters, Water Meters and Gas Meters
- Cellphones, radiophone, digital cameras
- Fire Alarm, Smoke Detector
- Appliances and White Goods

General Description

The TX7136 is ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 1.5μA quiescent current at no load, the TX7136 is ideally suited for standby micro-control-unit systems, especially for always-on applications like E-meters, fire alarms, smoke detectors and other battery-operated systems. The TX7136 retains all of the features that are common to low dropout regulators including a low dropout

PMOS pass device, short circuit protection, and thermal shutdown.

The TX7136 has 40V maximum operating voltage limit, and -40° C to 125° C operating temperature range, and ±2% output voltage tolerance over the entire output current, input voltage, and temperature range.

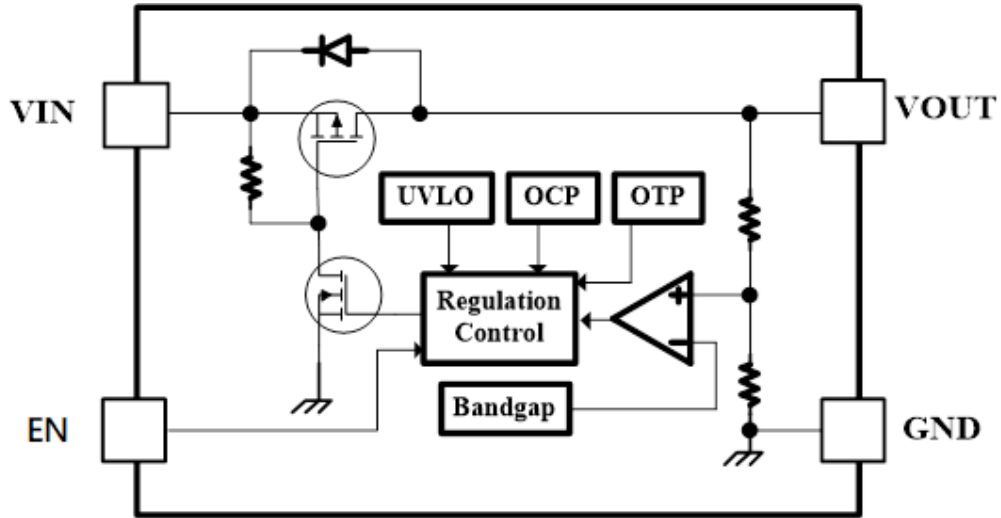
The TX7136 regulators are available in standard TO92 through-hole and SOT23-3, SOT23-5, SOT223, SOT89, DFN1*1-4, ESOP8 surface mount packages.

Order Information

TX7136-①②③④⑤

Designator	Symbol	Description
①②	Integer	Output Voltage(1.5~5.0V)
③④	M	Package: SOT23-3
	M5	Package: SOT23-5
	P	Package: SOT89A
	PB	Package: SOT89B
	GB	Package: SOT223B
	FC	Package: DFN1*1-4
	P8	Package: SOP8
⑤	T	Package: TO92
	R	RoHS / Pb Free
	G	Halogen Free

Block Diagram



Pin Assignment

SOT23-3 (Top View)

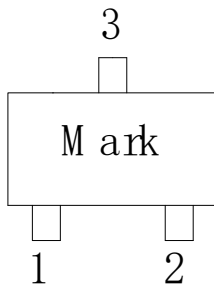


Table1: TX7136 series (SOT23-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

SOT23-5 (Top View)

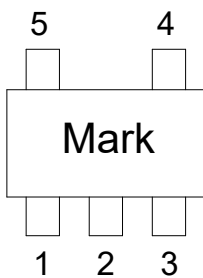


Table2: TX7136 series (SOT23-5 PKG)

PIN NO	PIN NAME	FUNCTION
1	VIN	Input voltage pin
2	GND	GND pin
3	EN	Enable
4	NC	Not connected
5	VOUT	Output voltage pin

TO92 (Top View)



Table3: TX7136 series (TO92 PKG)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

SOT89 (Top View)

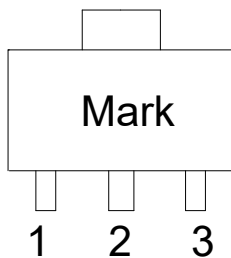


Table4: TX7136 series (SOT89A PKG)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

Table5: TX7136 series (SOT89B PKG)

PIN NO.	PIN NAME	FUNCTION
1	VIN	Input voltage pin
2	GND	GND pin
3	VOUT	Output voltage pin

SOT223 (Top View)

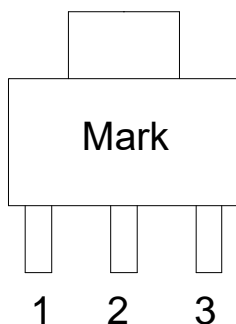


Table6: TX7136 series (SOT223B PKG)

PIN NO.	PIN NAME	FUNCTION
1	VIN	Input voltage pin
2	GND	GND pin
3	VOUT	Output voltage pin

DFN1*1-4 (Top View)

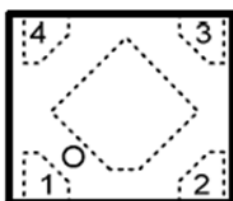


Table7: TX7136 series (DFN1*1-4 PKG)

PIN NO	PIN NAME	FUNCTION
1	VOUT	Output voltage pin
2	GND	GND pin
3	EN	Enable
4	VIN	Input voltage pin

ESOP8(Top View)

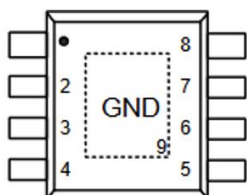


Table8: TX7136 series (ESOP8 PKG)

PIN NO	PIN NAME	FUNCTION
1	VIN	Input voltage pin
2,4,5,6	NC	Not connected
3	VOUT	Output voltage pin
7,9	GND	GND pin
8	EN	Enable

Absolute Maximum Ratings

Input Voltage.....	-0.3V to 45V	Storage Temperature	-65°C to 150°C
V _{EN}	-0.3V to V _{in}	Lead Temperature(Soldering, 10 sec.).....	300°C
V _{OUT}	-0.3V to 7V	Junction Temperature.....	-40°C to 125°C

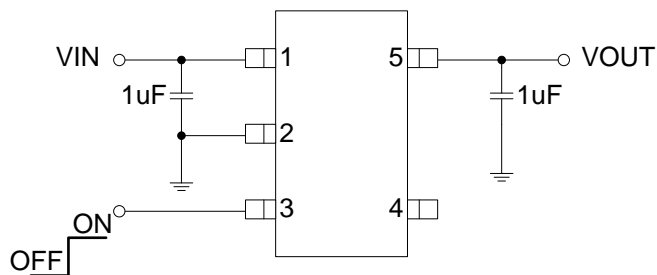
Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Electrical Characteristics

The following specifications apply for V_{IN}=12V, I_{OUT}=1mA, C_{IN}=C_{OUT}=1μF, T_J=25°C, unless specified otherwise

SYMBOL	ITEMS	CONDITIONS	MIN	TYP	MAX	UNIT
V _{IN}	Input Voltage		2.7	--	40	V
V _{OUT}	Output Range		1.5	---	5.5	V
ΔV _{OUT}	Output Voltage Accuracy		-2	V _{OUT}	2	%
I _Q	Quiescent Current	T _J = 25°C	---	1.5	2.5	μA
I _{LIMIT}	Current Limit		270	320	---	mA
V _{DROP}	Dropout Voltage	I _{OUT} =100mA	---	400	---	mV
		I _{OUT} =250mA	---	1200	---	
ΔV _{LINE}	Line Regulation	V _{IN} = V _{OUT} + 1V to 40V, or V _{IN} = 5V to 40V, if V _{OUT} < 4V	---	2	10	mV
ΔV _{LOAD}	Load Regulation	I _{OUT} = 1mA to 100mA	---	0.25	---	%
		I _{OUT} = 1mA to 250mA	---	1	---	
PSRR	Power Supply Rejection Rate	F=1KHz	---	80	---	dB
		F=10KHz	---	60	---	
V _{ENH}	EN logic high voltage		0.9	---	---	V
V _{ENL}	EN logic low voltage		---	---	0.4	V
I _{EN}	EN Input Current		---	0.3	---	μA
T _{SD}	Thermal Shutdown		---	140	---	°C
T _{HY}	Thermal Shutdown Hysteresis		---	20	---	°C

Application Circuits



Typical Performance Characteristics

$C_{IN}=1\mu F$, $C_{OUT}=1\mu F$, $V_{IN}=12V$, $V_{OUT}=3.3V$ $T_J=25^\circ C$, unless specified otherwise)

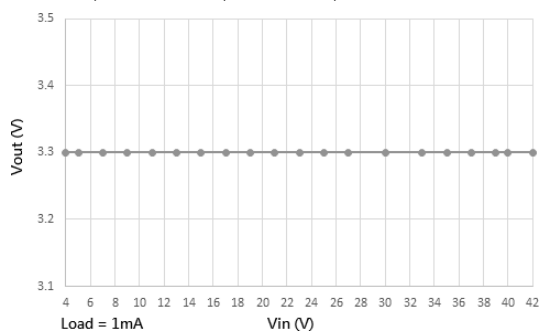


Fig 1. V_{OUT} vs V_{IN}

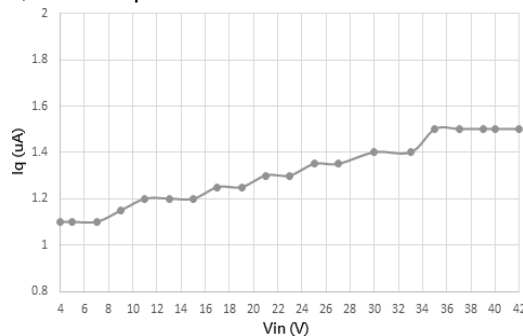


Fig 2. I_Q vs V_{IN}

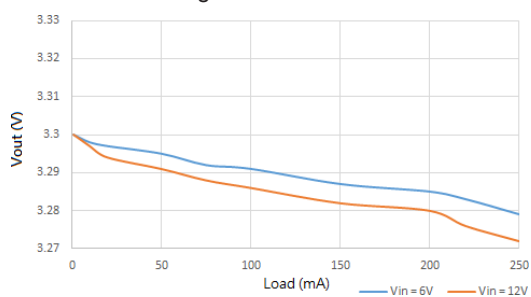


Fig 3. V_{OUT} vs Load

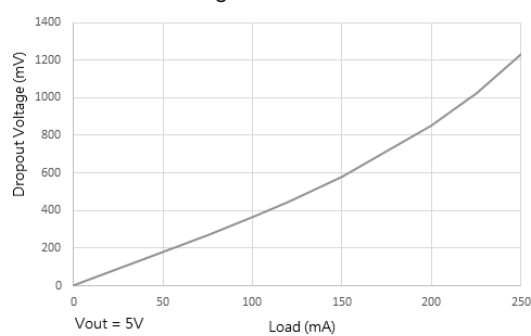


Fig 4. Dropout vs Load

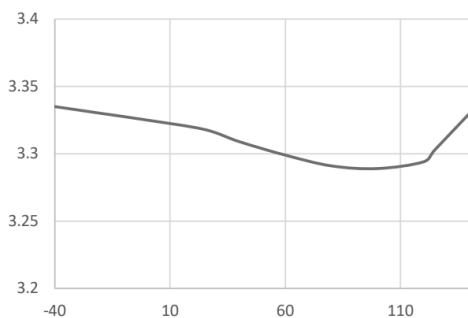


Fig 5. V_{OUT} (3.3V) vs Temperature

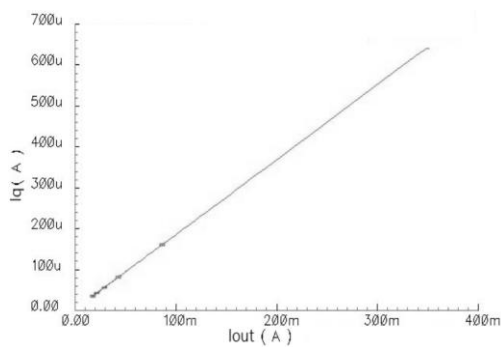


Fig 6. I_Q vs Load

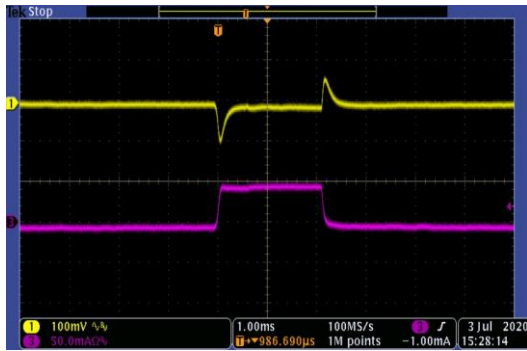


Fig 7. V_{out} Load Transient (0 to 50mA)

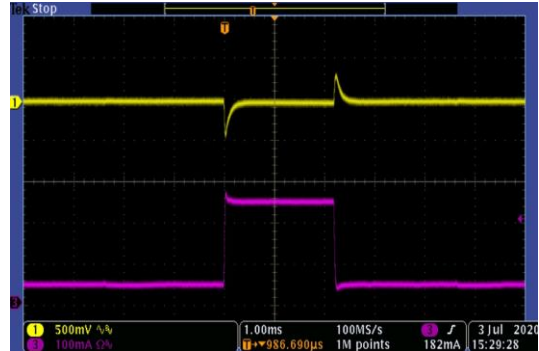


Fig 8. V_{out} Load Transient (50 to 250mA)

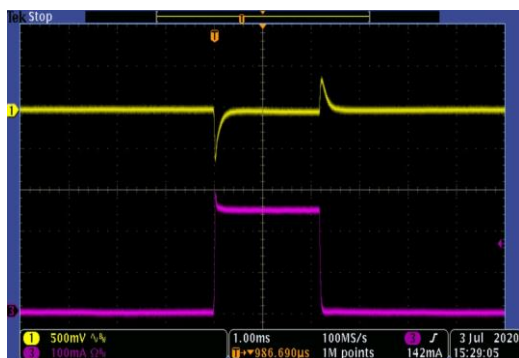


Fig 9. V_{out} Load Transient (1 to 250mA)

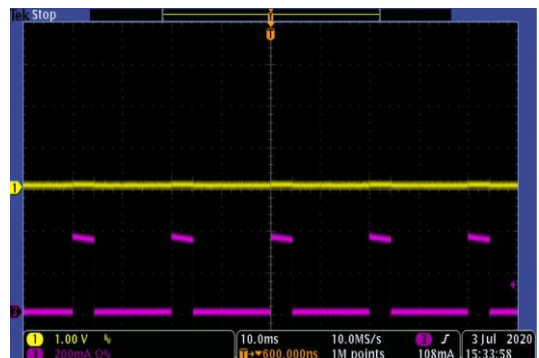


Fig 10. V_{out} Short to GND

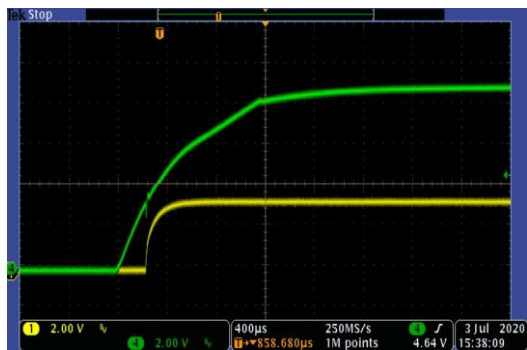


Fig 11. V_{in} Start up

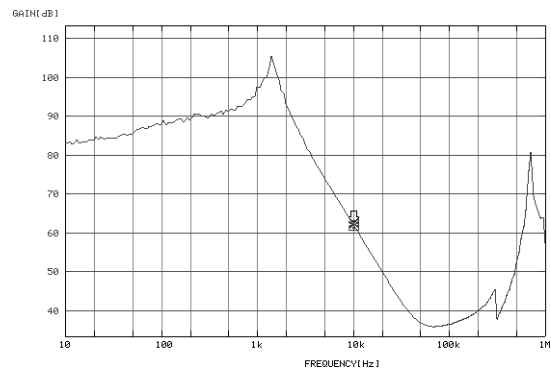
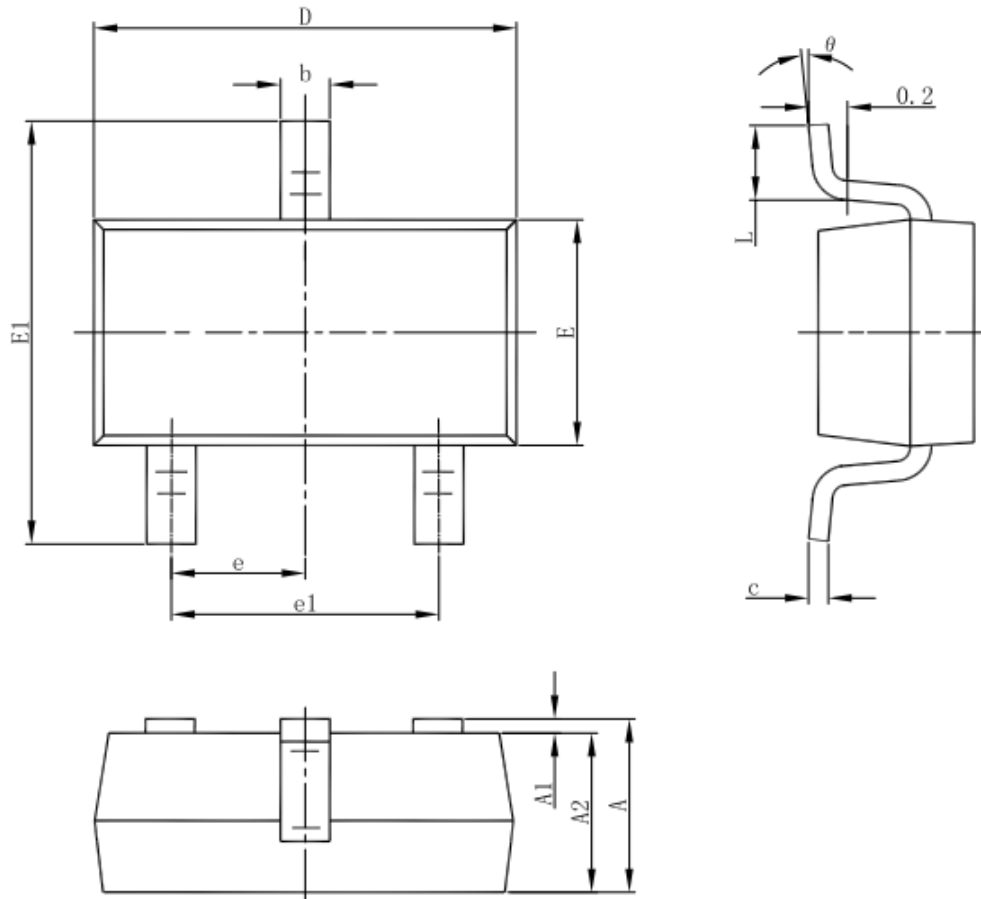


Fig 12. PSRR vs. Frequency ($V_{in}=9V$, $V_{out}=3.3V$)

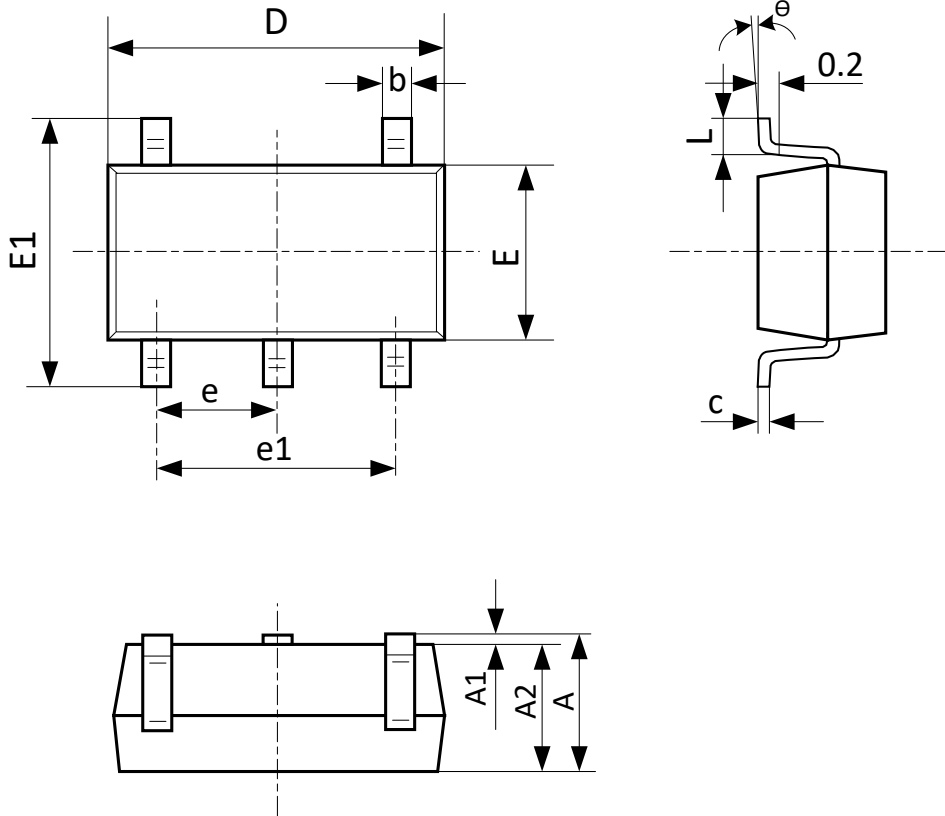
Package Information

3-pin SOT23-3 Outline Dimensions



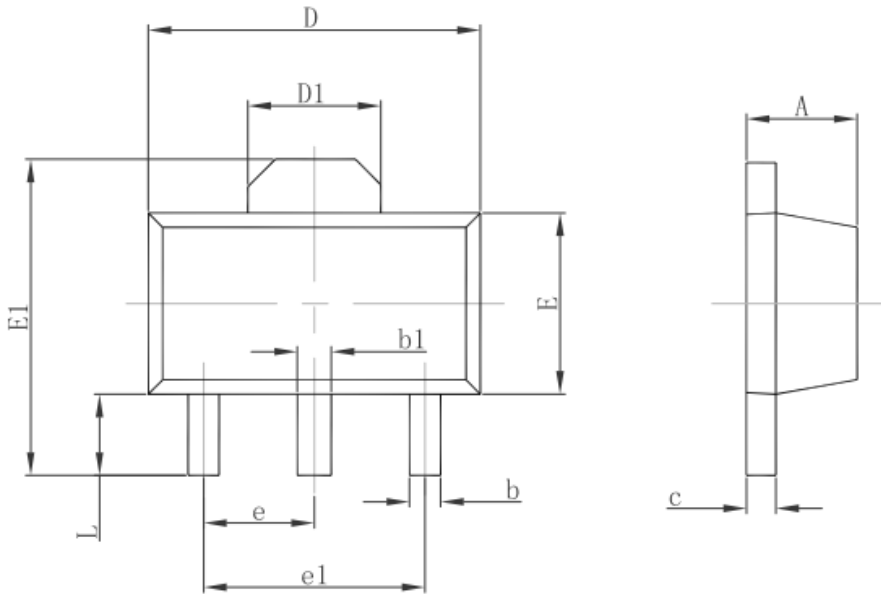
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

SOT23-5 Outline Dimensions



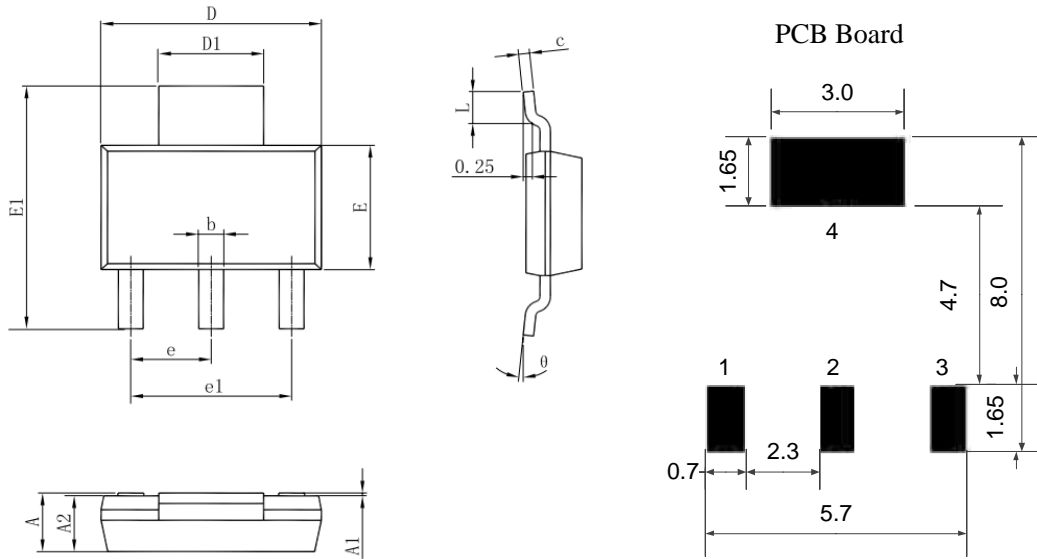
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

SOT-89-3L PACKAGE OUTLINE DIMENSIONS



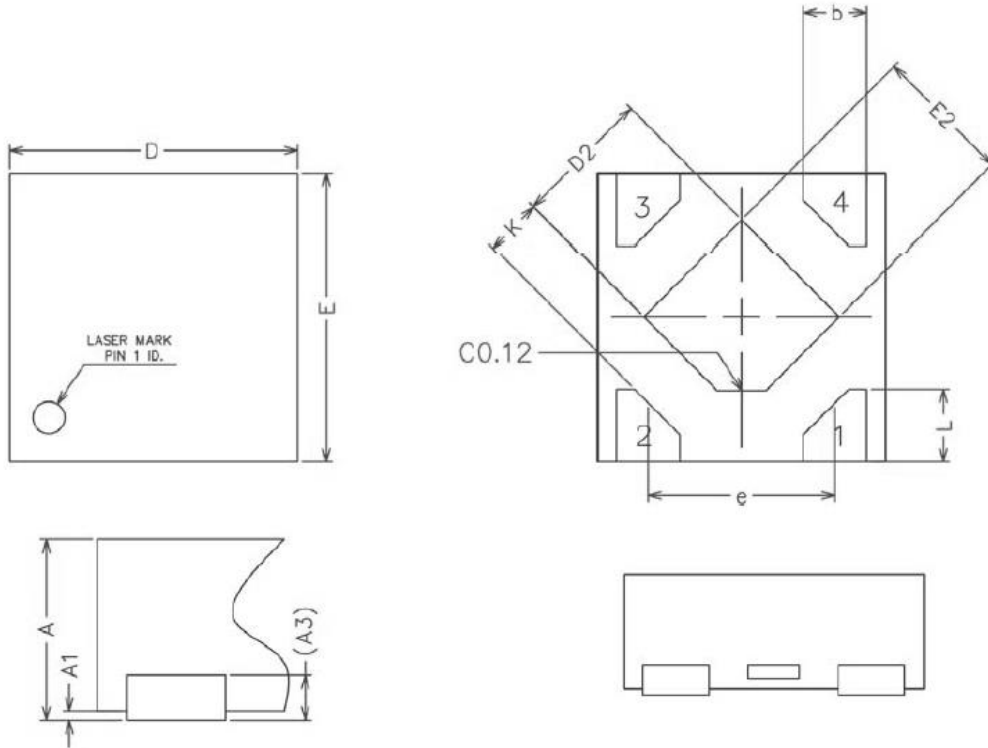
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.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

SOT-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°

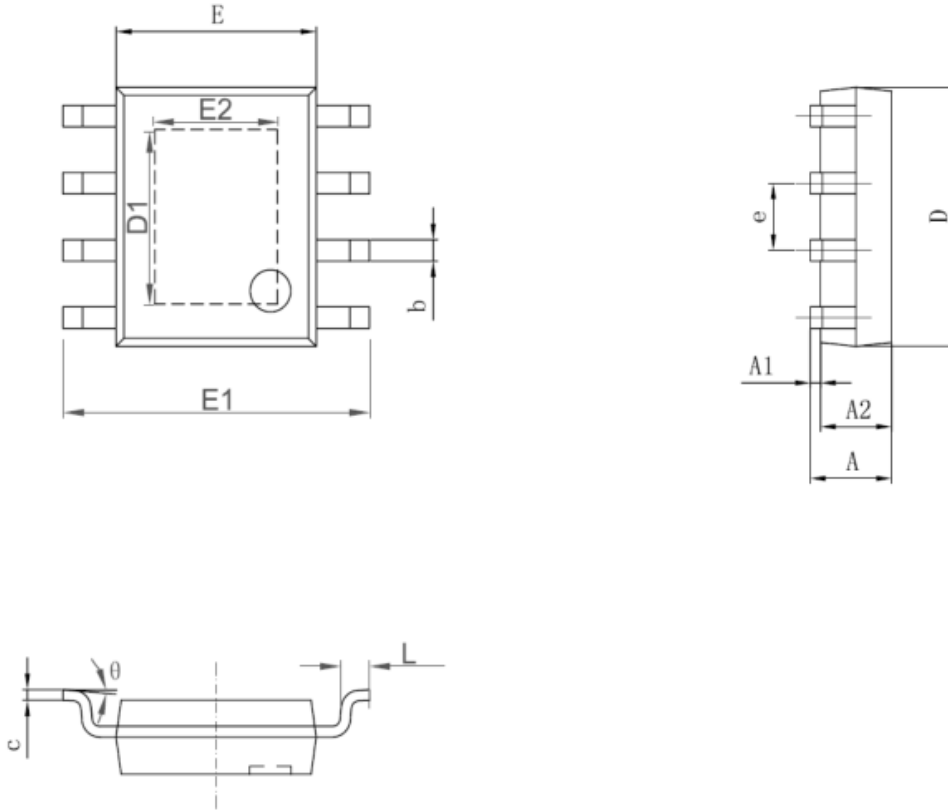
DFN1*1-4 Outline Dimensions



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

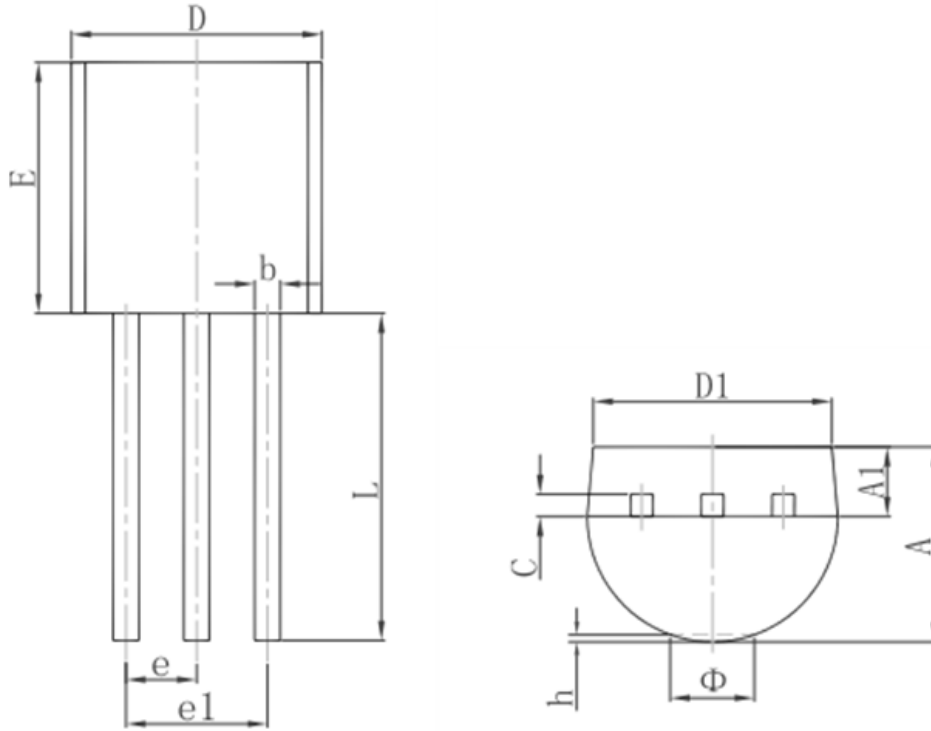
SYMBOL	MIN	NOM	MAX
A	0.34	0.37	0.40
A1	0.00	0.02	0.05
A3	0.100REF		
b	0.17	0.22	0.27
D	0.95	1.00	1.05
E	0.95	1.00	1.05
D2	0.43	0.48	0.53
E2	0.43	0.48	0.53
L	0.20	0.25	0.30
e	—	0.65	—
K	0.15	—	—

ESOP8 Outline Dimensions



字符	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.050	0.150	0.002	0.006
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.200
D1	3.202	3.402	0.126	0.134
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	2.313	2.513	0.091	0.099
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

3-pin TO92 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	4.300	4.700	0.169	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