
30V 100mA Linear Regulator

General Description

The EHP878L three terminal positive regulator is available with 3.3V or 5V fixed output voltage, making it useful in a wide range of applications. Used as a Zener-diode and resistor combination replacement, the EHP878L usually provides an effective output impedance improvement of two orders of magnitude and lower quiescent current. These regulators can provide local, on-card regulation, eliminating distribution problems associated with single-point regulation. The available voltages allow the EHP878L to be used in logic systems, instrumentation and other solid-state electronic equipment.

The EHP878L is available in TO-92 package, SOT-23-3 package, SOT-89-3 package, and SOP-8 package. With adequate heat sinking, the regulator can deliver 100mA output current. Current limiting is included to limit the peak output current to a safe value. Safe area protection for the output transistors is provided to limit internal power dissipation. If internal power dissipation is too high for the heat sinking provided, the thermal shutdown circuit prevents the IC from overheating.

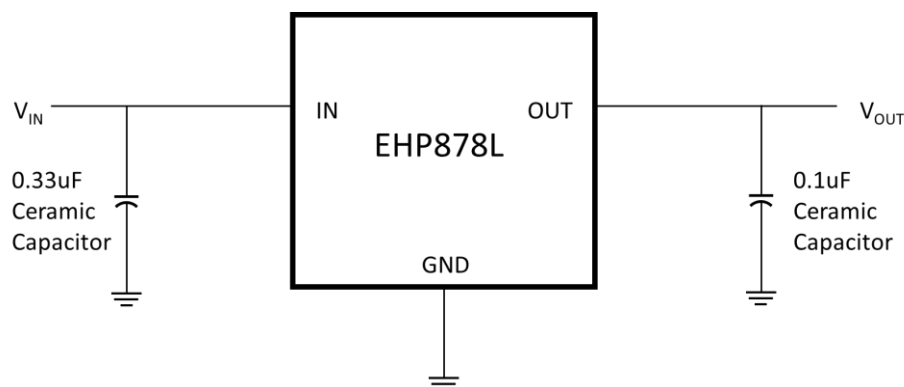
Applications

- Battery Powered Equipment
- Low Power Microcontrollers
- LED Lighting
- Low Wattage Power Supplies

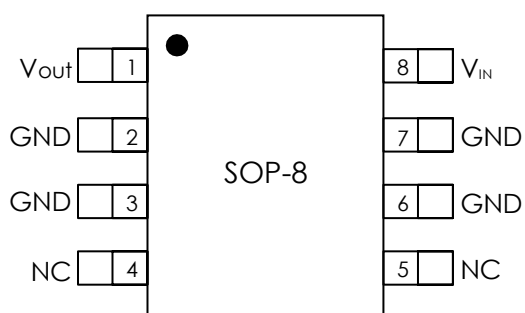
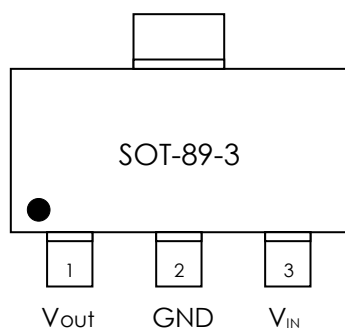
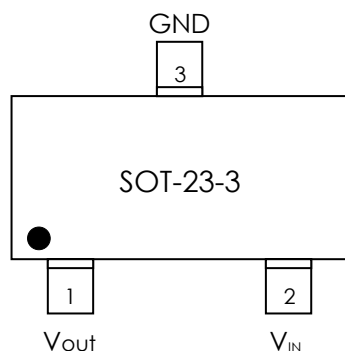
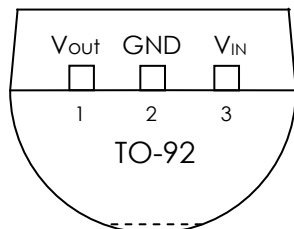
Features

- Output voltage tolerances of $\pm 5\%$ over the temperature range
- 100 mA output current driving capacity
- Output transistor safe area protection
- Internal thermal shutdown protection
- Internal short-circuit current limit
- Available in TO-92, SOT-23-3, SOT-89-3 and SOP-8 packages

Typical Application



Connection Diagrams



Order information

EHP878L-XXTM03NRA/B
EHP878L-XXTN03NRA/B

XX	Output voltage
TM03	TO-92 2.54mm
TN03	TO-92 1.27mm
NR	RoHS & Halogen free package Rating: -40 to 85°C Package in Ammo pack
A	Ammo pack
B	Bulk pack

EHP878L-XXVD03NRR

XX	Output voltage
VD03	SOT-23-3 Package
NRR	RoHS & Halogen free package Rating: -40 to 85°C Package in Tape & Reel

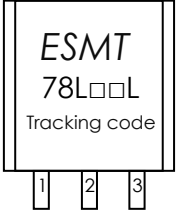
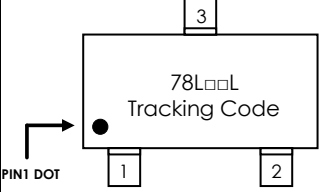
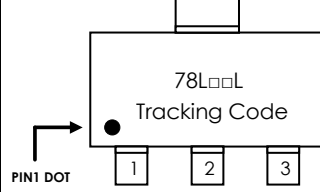
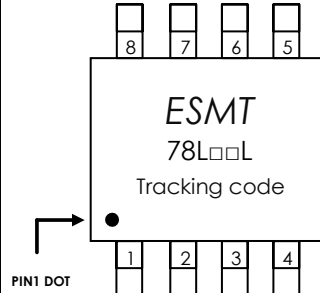
EHP878L-XXVLX3NRR

XX	Output voltage
VLX3	SOT-89-3 Package
NRR	RoHS & Halogen free package Rating: -40 to 85°C Package in Tape & Reel

EHP878L-XXSO08NRR

XX	Output voltage
SO08	SOP-8 Package
NRR	RoHS & Halogen free package Rating: -40 to 85°C Package in Tape & Reel

Order, Marking & Packing Information

Package	Vout	Product ID.	Marking	Packing
TO-92	3.3V	EHP878L-33TM03NRA		Ammo pack 2Kpcs
	5.0V	EHP878L-50TM03NRA		
	3.3V	EHP878L-33TN03NRA		
	5.0V	EHP878L-50TN03NRA		
	3.3V	EHP878L-33TM03NRB		Bulk pack 1Kpcs
	5.0V	EHP878L-50TM03NRB		
	3.3V	EHP878L-33TN03NRB		
	5.0V	EHP878L-50TN03NRB		
SOT-23-3	3.3V	EHP878L-33VD03NRR		Tape & Reel 3Kpcs
	5.0V	EHP878L-50VD03NRR		
SOT-89-3	3.3V	EHP878L-33VLX3NRR		Tape & Reel 1Kpcs
	5.0V	EHP878L-50VLX3NRR		
SOP-8	3.3V	EHP878L-33SO08NRR		Tape & Reel 3Kpcs
	5.0V	EHP878L-50SO08NRR		

□□=Voltage Code

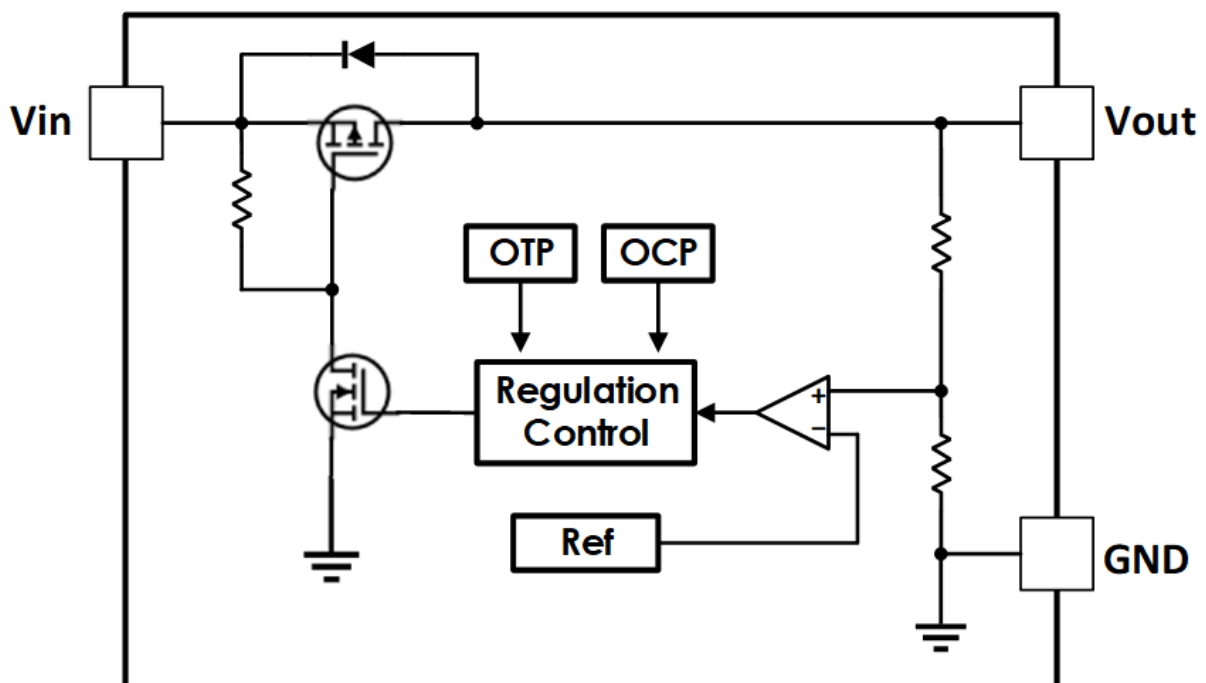
33=3.3V

05=5V

Pin Functions

Name	TO-92	SOT-23-3	SOT-89-3	SOP-8	Function
V _{IN}	3	2	3	8	Supply Voltage Input Require a minimum input capacitor of close to 0.33μF to ensure stability and sufficient decoupling from the ground pin.
GND	2	3	2,4	2,3,6,7	Ground Pin
NC	N/A	N/A	N/A	4,5	No connection
V _{OUT}	1	1	1	1	Output Voltage

Function Block Diagram



Absolute Maximum Ratings (Notes 1, 2)

V_{IN}	-0.3V to 35V	Lead Temperature (Soldering, 10 sec.)	260 °C
Storage Temperature Range	-65°C to 150°C	ESD Rating	
Junction Temperature	150°C	Human Body Model	2KV

Operating Ratings (Note 1, 2)

Supply Voltage	7V to 30V
Junction Temperature Range	-40°C to 125°C

Thermal Resistance:

Symbol	θ_{JA} (Note 3)	θ_{JC} (Note 4)
TO-92	159(°C/W)	76(°C/W)
SOT-23-3	250(°C/W)	81(°C/W)
SOT-89-3	152(°C/W)	81(°C/W)
SOP-8	90(°C/W)	52(°C/W)

Electrical Characteristics

$V_{IN}=10V$, $I_{OUT}=40mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_J=25^{\circ}C$, unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{OUT}	EHP878L-33 Output Voltage	$T_J = 25^{\circ}C$	3.168	3.3	3.432	V
		$V_{IN} = 7V$ to $20V$, $I_{OUT} = 1mA$ to $40mA$ $T_J = 0^{\circ}C$ to $125^{\circ}C$ (Note 5)	3.135		3.465	
		$I_{OUT} = 1mA$ to $70mA$ $T_J = 0^{\circ}C$ to $125^{\circ}C$ (Note 5)	3.135		3.465	
V_{OUT}	EHP878L-50 Output Voltage	$T_J = 25^{\circ}C$	4.8	5	5.2	V
		$V_{IN} = 8V$ to $20V$, $I_{OUT} = 1mA$ to $40mA$ $T_J = 0^{\circ}C$ to $125^{\circ}C$ (Note 5)	4.75		5.25	
		$I_{OUT} = 1mA$ to $70mA$ $T_J = 0^{\circ}C$ to $125^{\circ}C$ (Note 5)	4.75		5.25	
ΔV_{LINE}	Line Regulation	$V_{IN} = 8V$ to $20V$,		15	30	mV
ΔV_{LOAD}	Load Regulation	$I_{OUT} = 1mA$ to $100mA$		20	60	mV
		$I_{OUT} = 1mA$ to $40mA$		10	30	
I_Q	Quiescent Current	$T_J = 25^{\circ}C$		0.3		mA
		$T_J = 125^{\circ}C$			1	
ΔI_Q	Quiescent Current Change	$V_{IN} = 8$ to $20V$, $T_J = 0^{\circ}C$ to $125^{\circ}C$			0.2	mA
		$I_{OUT} = 1mA$ to $40mA$ $T_J = 0^{\circ}C$ to $125^{\circ}C$			0.1	
PSRR	Ripple Rejection	$f = 120Hz$, $V_{IN} = 8V$ to $20V$, $T_J = 25^{\circ}C$		60		dB
V_{DROP}	Dropout Voltage			0.8		V
$\Delta V_{OUT}/\Delta T$	V_{OUT} Temp. Coefficient	$I_{OUT} = 5mA$		0.5		mV/ $^{\circ}C$
I_{PK}	Peak Output Current			170		mA
T_{SD}	Thermal Shutdown			165		$^{\circ}C$
T_{HY}	Thermal Shutdown Hysteresis			25		$^{\circ}C$

Note 1: Absolute Maximum ratings indicate limits beyond which damage may occur. Electrical specifications do not apply when operating the device outside of its rated operating conditions.

Note 2: All voltages are with respect to the potential at the ground pin.

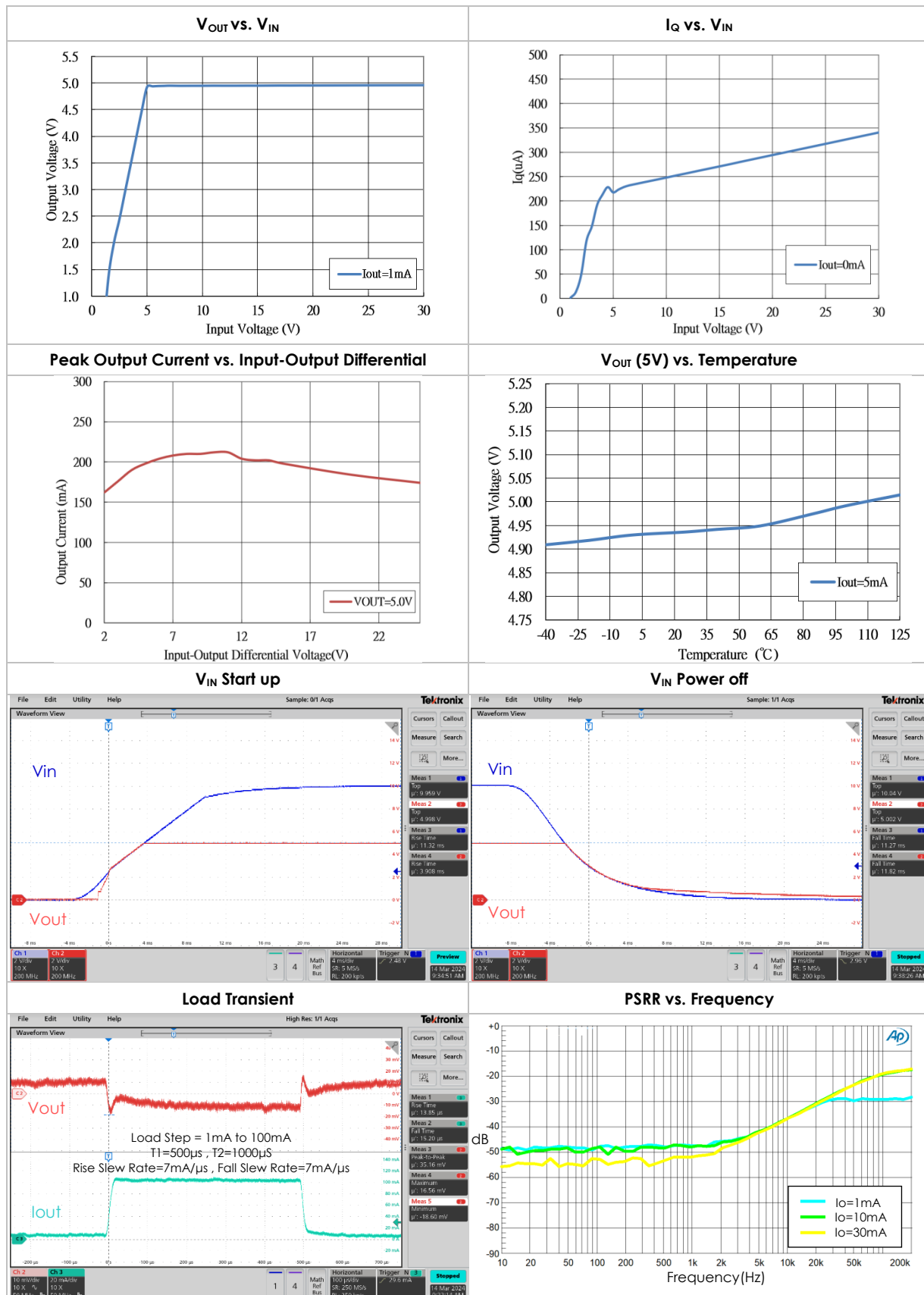
Note 3: θ_{JA} is measured in the natural convection at $T_J=25^{\circ}C$ on a high effective thermal conductivity test board (2 layers, 2SOP).

Note 4: θ_{JC} represents the resistance to the heat flows the chip to package top case.

Note 5: Power dissipation $<0.5W$

Typical Performance Characteristics

$V_{IN}=10V$, $I_{OUT}=40mA$, $C_{IN}=0.33\mu F$, $C_{OUT}=0.1\mu F$, $T_J=25^{\circ}C$, Unless otherwise specified.



Application Information

Input Capacitor

Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators. A 0.33 μ F capacitor on the input is suitable for most applications.

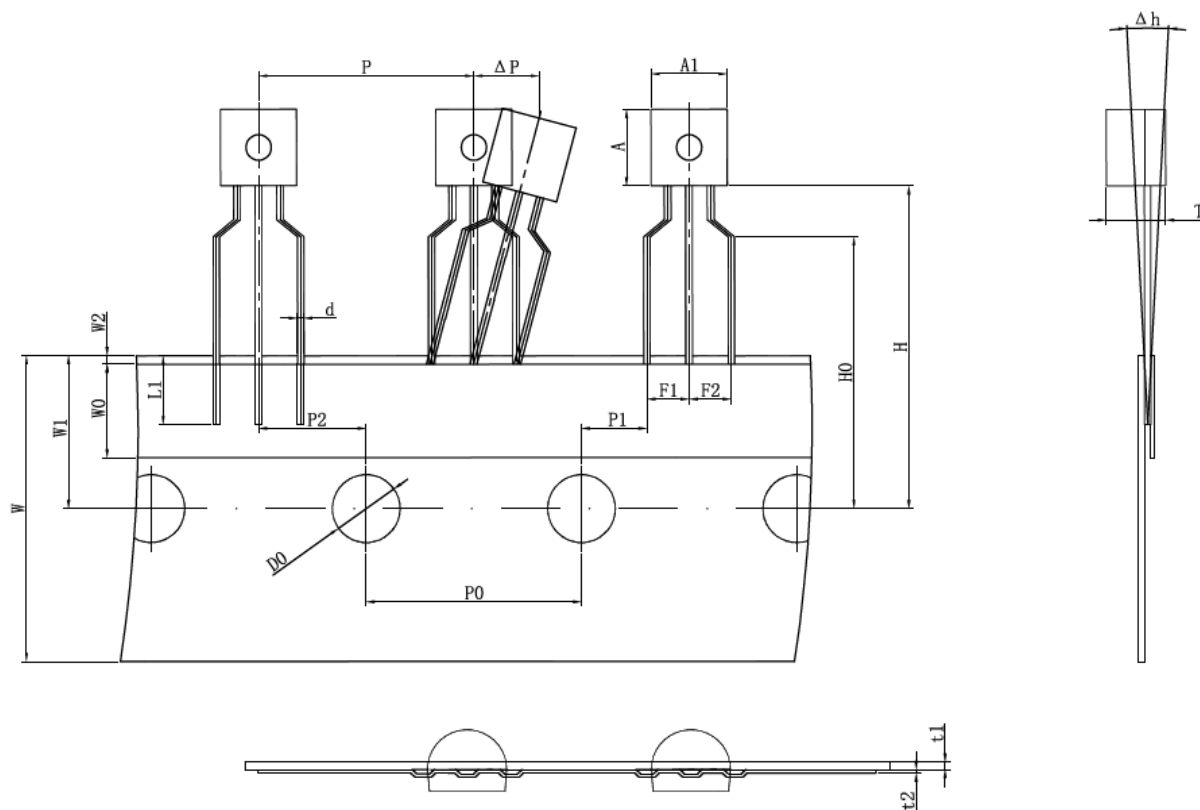
Output Capacitor

A minimum load capacitance of 0.1 μ F to limit high-frequency noise.

Shutdown

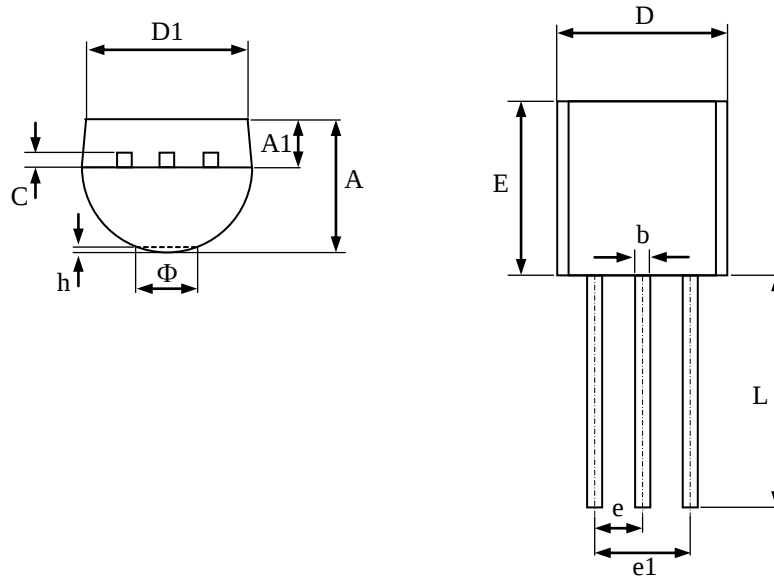
The device automatically shuts down if its internal temperature becomes too high

Package Outline Drawing TO-92 2.54mm (TM)



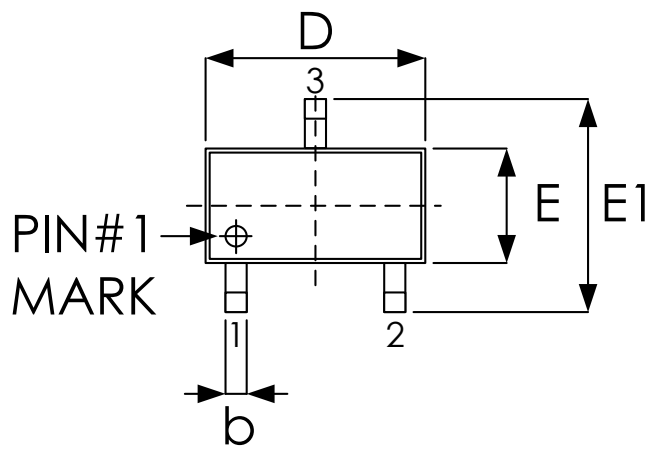
Item	Symbol	Value & Tolerance
Body width	A1	4.5 ± 0.2
Body height	A	4.5 ± 0.2
Body thickness	T	3.5 ± 0.1
Lead wire diameter	d	0.46 +0.09,-0.08
Pitch of component	P	12.7 ± 0.3
Feed hole pitch	P0	12.7 ± 0.2
Hole center to component center	P2	6.35 ± 0.3
Lead to lead distance	F1,F2	2.5 ± 0.3
Component alignment, F-R	Δh	0 ± 1.0
Type width	W	18.0 + 1.0, - 0.5
Hole down tape width	W0	6.0 ± 0.5
Hole position	W1	9.0 ± 0.5
Hole down tape position	W2	1.0 MAX.
Height of component from tape center	H	19.0 +2.0,-1.0
Lead wire clinch height	H0	16.0 ± 0.5
Lead wire(tape portion)	L1	2.5 MIN.
Feed hole diameter	D0	4.0 ± 0.2
Taped Lead Thickness	t1	0.4 ± 0.05
Carrier Tape Thickness	t2	0.2 ± 0.05
Position of hole	P1	3.85 ± 0.3
Component alignment	ΔP	0 ± 1.0

Unit: mm

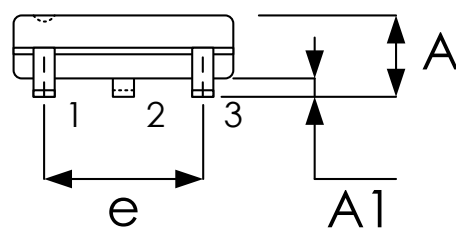
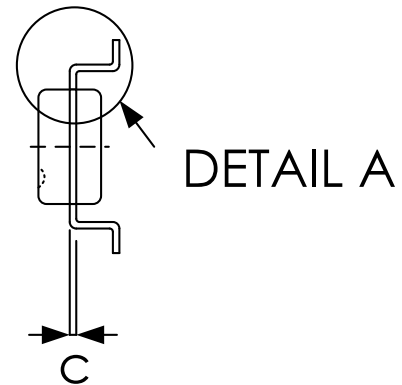
Package Outline Drawing
TO-92 1.27mm (TN)

Symbol	Dimension in mm	
	Min.	Max.
A	3.30	3.70
A1	1.10	1.40
b	0.36	0.56
c	0.28	0.51
D	4.30	4.70
D1	3.43	4.30
E	4.30	4.70
e	1.27 TYP.	
e1	2.44	2.64
L	14.10	14.50
Φ		1.60
h	0.00	0.38

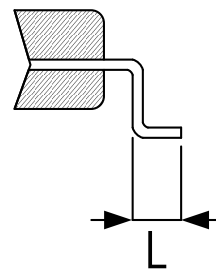
Package Outline Drawing SOT-23-3



TOP VIEW

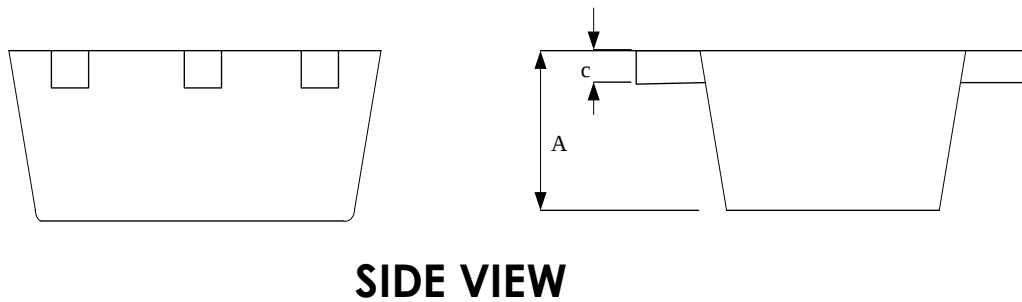
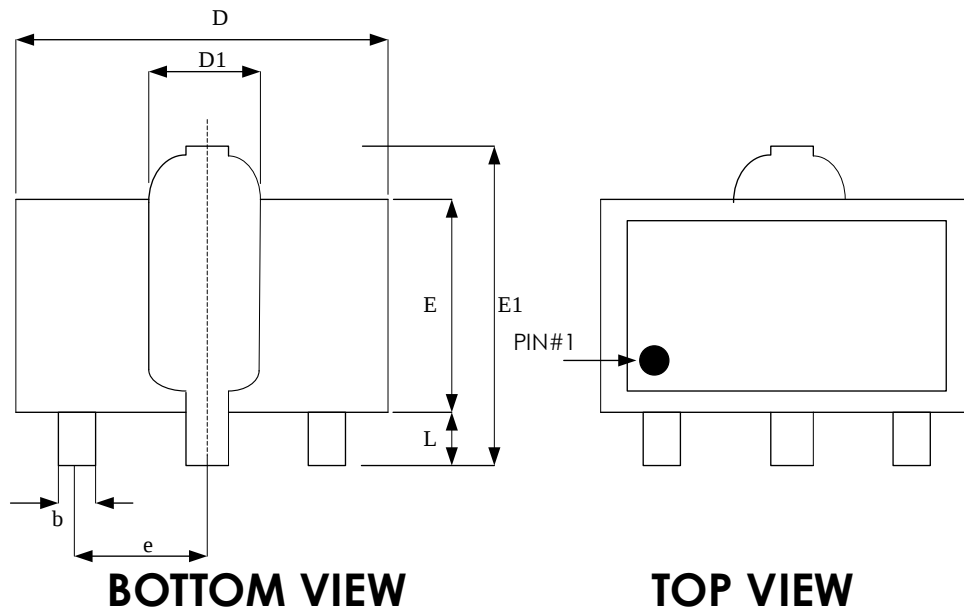


SIDE VIEW



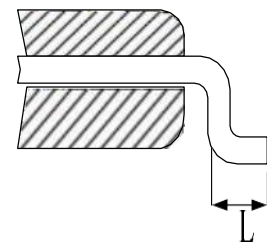
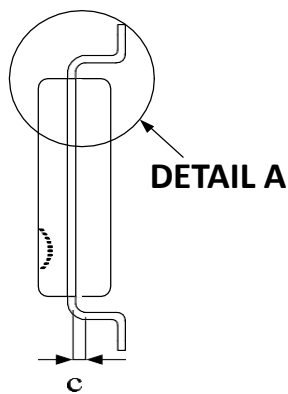
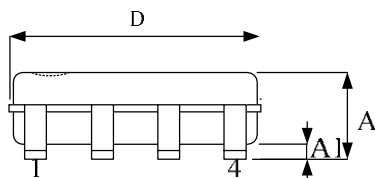
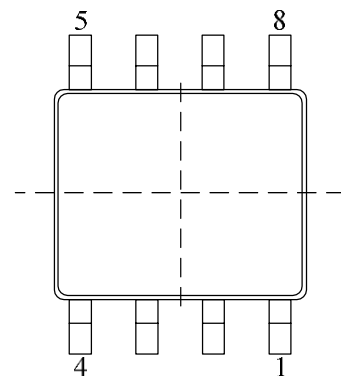
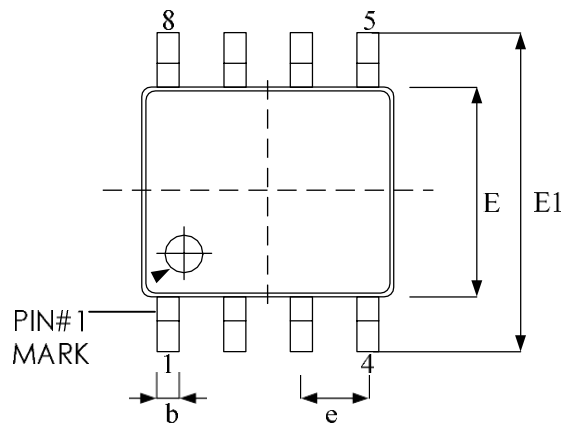
DETAIL A

Symbol	Dimension in mm	
	Min.	Max.
A	0.90	1.45
A1	0.00	0.15
b	0.30	0.50
c	0.08	0.25
D	2.7	3.10
E	1.04	1.80
E1	2.60	3.00
E	1.50 BSC	
L	0.30	0.60

**Package Outline Drawing
SOT-89-3**

Symbol	Dimension in mm	
	Min.	Max.
A	1.40	1.60
b	0.40	0.56
c	0.35	0.41
D	4.40	4.60
D1	1.50	1.83
E	2.29	2.60
E1	3.94	4.25
e	1.50 BSC	
L	0.89	1.20

Package Outline Drawing SOP-8 (150mil)



Symbol	Dimension in mm	
	Min.	Max.
A	-	1.70
A1	0.00	0.15
b	0.31	0.51
c	0.10	0.25
D	4.80	5.00
E	3.81	4.00
E1	5.79	6.20
e	1.27 BSC	
L	0.40	1.27

Revision History

Revision	Date	Description
1.0	2024.04.12	Original
1.1	2024.05.07	Added TO-92 packing information, and related product id.
1.2	2024.11.20	Modify Order, Marking & Packing Information.
1.3	2024.12.30	Modify Order information & Order, Marking & Packing Information in SOT89-3.
1.4	2025.09.19	Modify Order information & Order, Marking & Packing Information in TO92. Modify TO-92 Package Outline Drawing. Bulk pack: 1Kpcs

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