

Product Specification

XBLW LM385

Micropoer Voltage Reerence Diodes

WEB | www.xinboleic.com



Descriptions

The LM385 series are micropower two-terminal bandgap voltage regulator diodes. Designed to operate over a wide current range of 10uA to 20mA, these devices feature exceptionally low dynamic impedance, low noise and stable operation over time and temperature. Tight voltage tolerances are achieved by on-chip trimming. The large dynamic operating range enables these devices to be used in applications with widely varying supplies with excellent regulation. Extremely low operating current make these devices ideal for micropower circuitry like portable instrumentation, regulators and other analog circuitry where extended battery life is required.

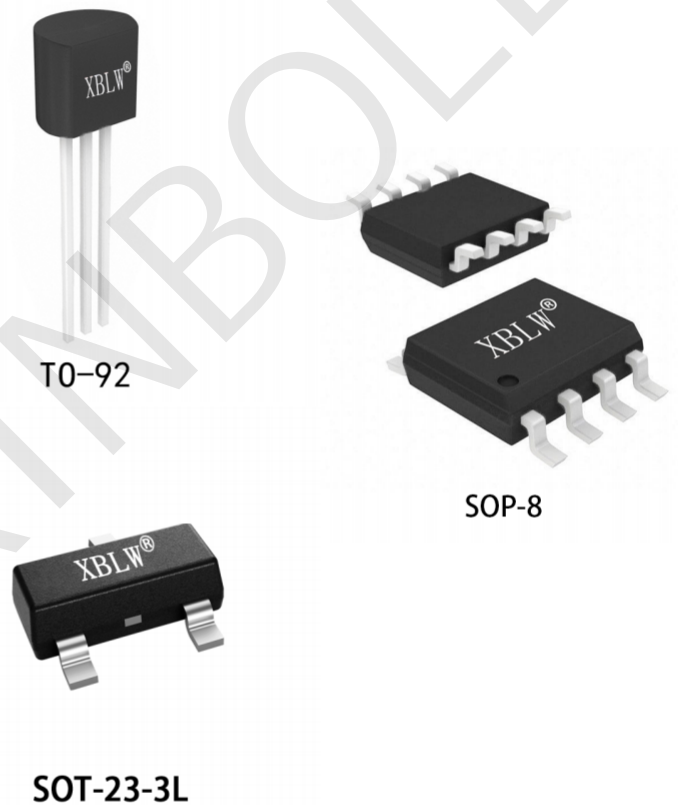
The LM385 series are packaged in SOP-8, SOT23-3L and TO-92 plastic case and are available in versions of 1.24V、2.5V.

Features

- Operating Current from 10uA to 20mA
- 1% Initial Tolerance
- Low Temperature Coefficient
- 0.6Ω Dynamic Impedance
- Low Voltage Reference 1.24V

Applications

- Instrumentation
- Process Control
- Energy Management
- Data Acquisition Systems
- Battery-Powered Equipment
- Precision Audio Components

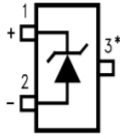


Ordering Information

| Product Model | Package Type | Marking | Packing | Packing Qty |
|-------------------|--------------|-----------|---------|--------------|
| XBLW LM385Z-1.2 | TO-92 | LM385Z1.2 | Bag | 2000Pcs/Bag |
| XBLW LM385M3X-1.2 | SOT23-3L | R11 | Tape | 3000Pcs/Reel |
| XBLW LM385MX-1.2 | SOP-8 | LM385M1.2 | Tape | 2500Pcs/Reel |
| XBLW LM385Z-2.5 | TO-92 | LM385Z2.5 | Bag | 2000Pcs/Bag |
| XBLW LM385M3X-2.5 | SOT23-3L | R12 | Tape | 3000Pcs/Reel |
| XBLW LM385MX-2.5 | SOP-8 | LM385M2.5 | Tape | 2500Pcs/Reel |

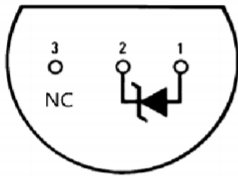
Pin Configurations Bottom View

Fixed Voltage versions

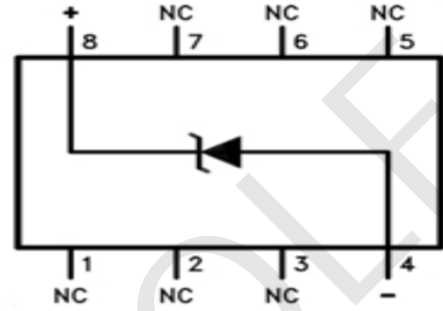


* Pin 3 is attached to the Die Attach Pad (DAP) and should be connected to Pin 2 or left floating.

SOT23-3L



TO-92



SOP-8

Function Block

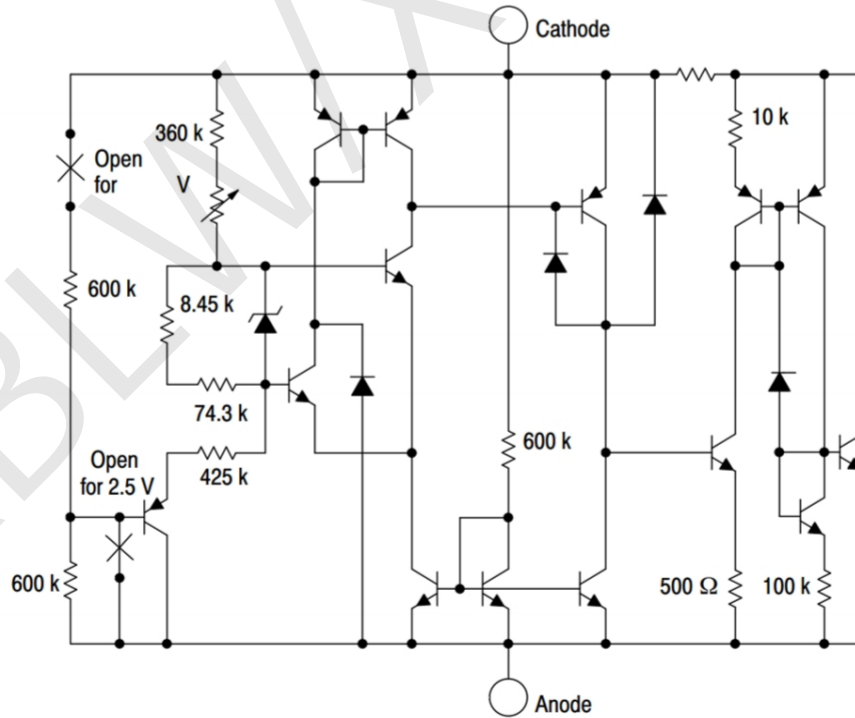


Figure1 Function Block Diagram of LM385

Absolute Maximum Ratings

(TA = 25°C, unless otherwise noted)

| Characteristics | Symbol | Value | Unit |
|---|--------|---------------------|------|
| Reverse Current | IR | 30 | mA |
| Forward Current | IF | 10 | mA |
| Operating Ambient Temperature Range | TA | -40 to +85 | °C |
| Operating Junction Temperature | TJ | +150 | °C |
| Storage Temperature Range | Tstg | -65 ~ +150 | °C |
| Electrostatic Discharge Sensitivity (ESD) Human Body Model (HBM) Machine Model (MM) Charged Device Model (CDM) | ESD | 4000 400 2000 | V |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

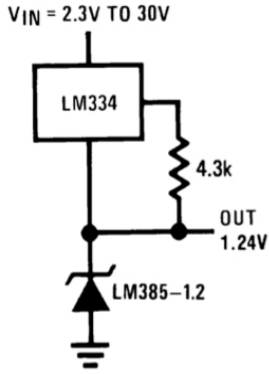
Electrical Characteristics

(TA = 25°C, unless otherwise noted)

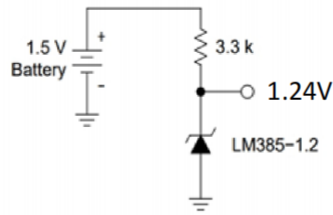
| Characteristics | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--|-----------|-------------------------------------|----------------|----------------|----------------|---------|
| Reverse Breakdown Voltage LM385-1.2 LM385-2.5 | V(BR)R | IRmin ≤ IR ≤ 20mA | 1.220 2.475 | 1.240 2.500 | 1.250 2.525 | V |
| Reverse Breakdown Voltage LM385-1.2 LM385-2.5 | | IRmin ≤ IR ≤ 20mA -40°C to +85°C | 1.210 2.450 | | 1.260 2.550 | V |
| Minimum Operating Current | IRmin | | | 6 | 10 | uA |
| | | -40°C to +85°C | | | 20 | uA |
| Reverse Breakdown Voltage Change with Current | ΔV(BR)R | IRmin ≤ IR ≤ 1mA | | | 1.5 | mV |
| | | -40°C to +85°C | | | 5 | mV |
| | | 1mA ≤ IR ≤ 20mA | | 4 | 10 | mV |
| | | -40°C to +85°C | | | 20 | mV |
| Reverse Dynamic Impedance | Z | IR = 100uA | | 0.6 | | Ω |
| Average Temperature Coefficient | ΔV(BR)/ΔT | 10uA ≤ IR ≤ 20 mA -40°C to +85°C | | 80 | | ppm/°C |
| Wideband Noise (RMS) | n | IR = 100uA, 10Hz ≤ f ≤ 10 kHz | | 60 | | uV |
| Long Term Stability | S | IR = 100uA, TA = +25°C ± 0.1°C | | 20 | | ppm/kHR |

Typical Application Circuit

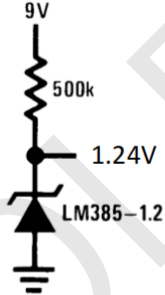
Fixed Vref Type Circuit



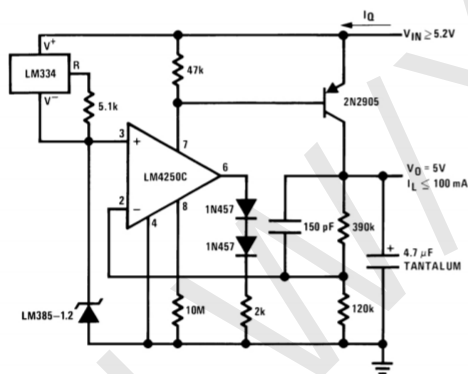
Wide Input Range Reference



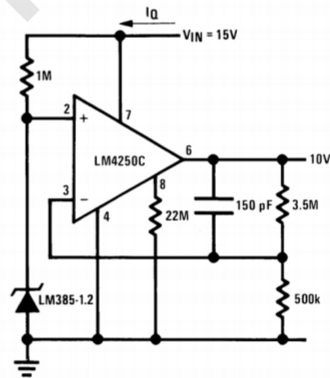
Reference from 1.5V Battery



Micropower Reference from 9V Battery



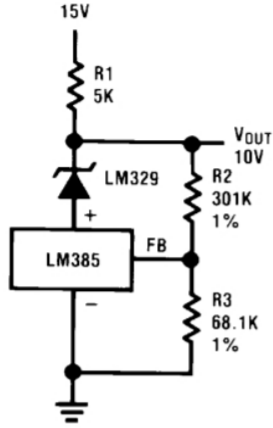
Micropower* 5V Regulator



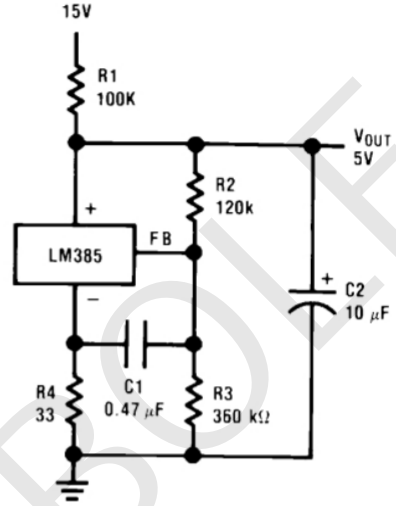
Micropower* 10V Reference

Adjustable Type Circuit

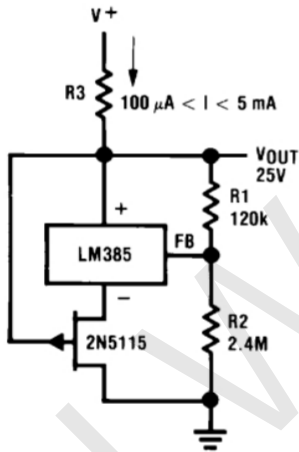
Precision 10V Reference



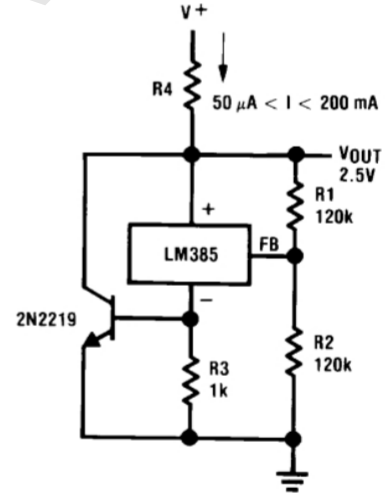
Low AC Noise Reference



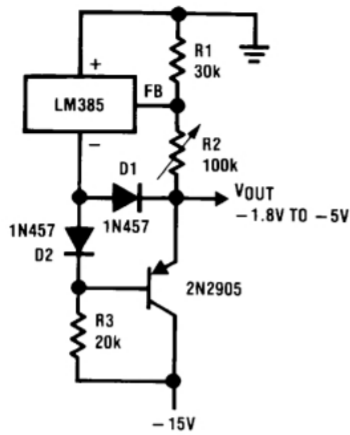
25V Low Current Shunt Regulator



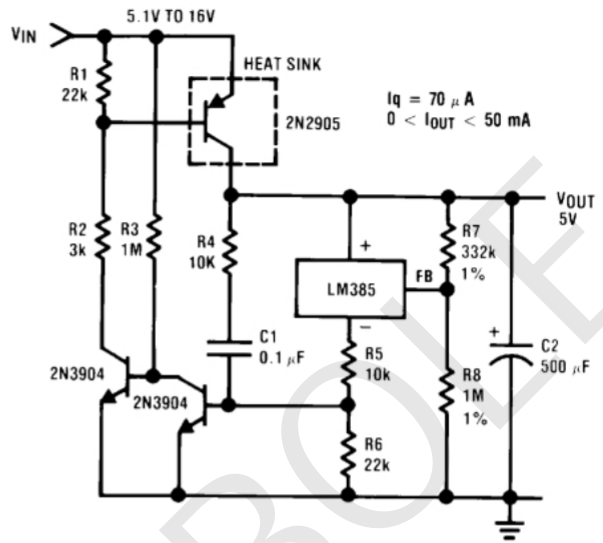
200 mA Shunt Regulator



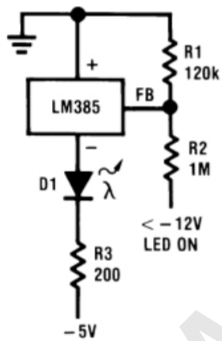
Series-Shunt 20 mA Regulator



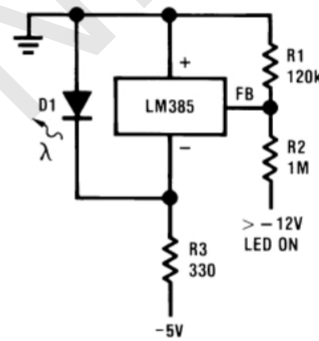
High Efficiency Low Power Regulator



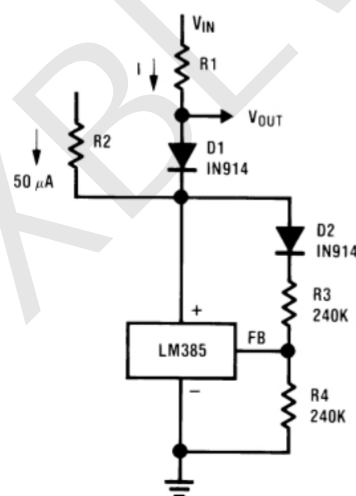
Voltage Level Detector



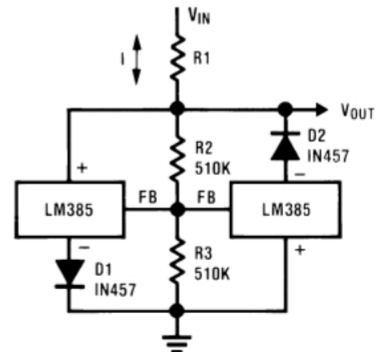
Voltage Level Detector



Fast Positive Clamp
 $2.4V + \Delta V_{D1}$

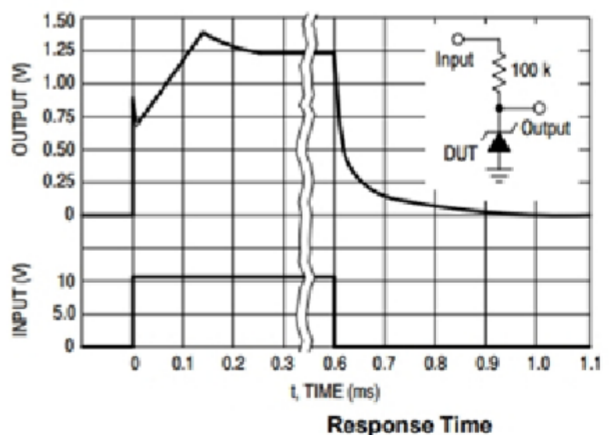
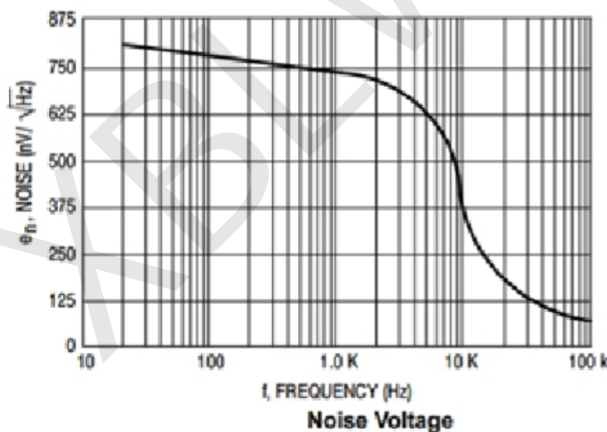
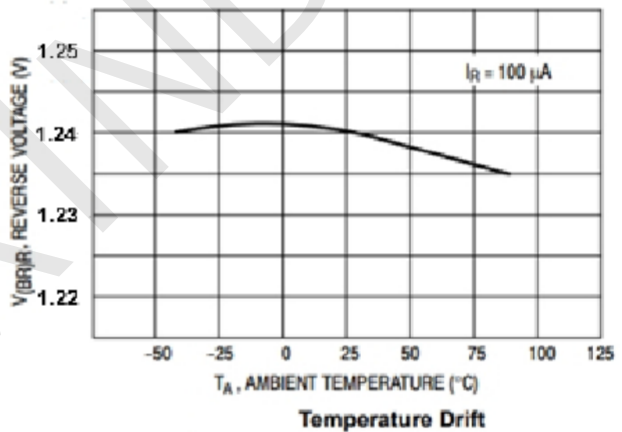
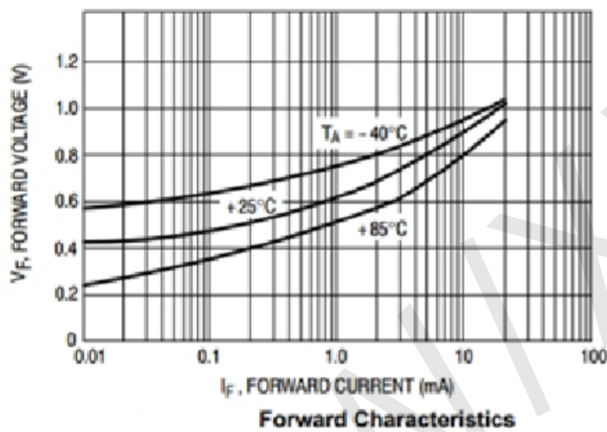
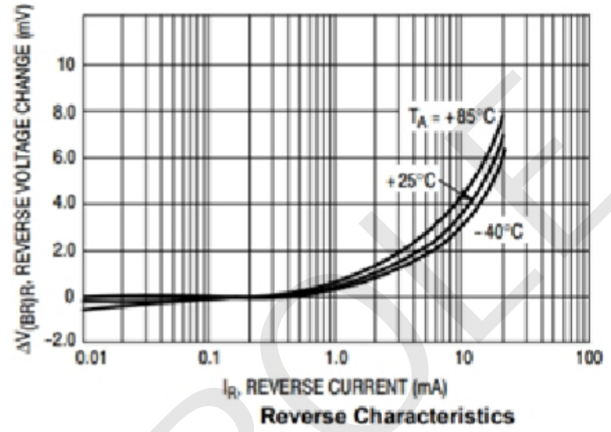
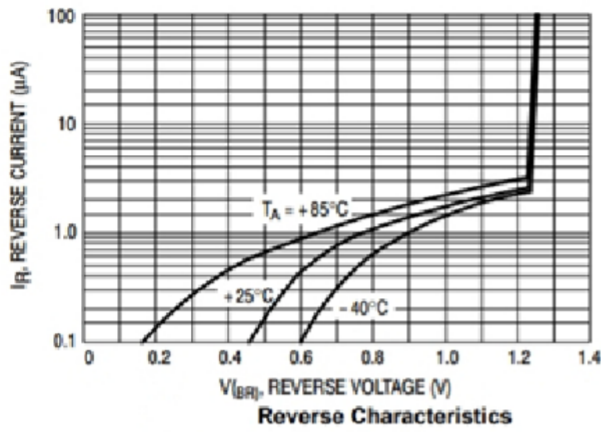


Bidirectional Clamp
 $\pm 2.4V$

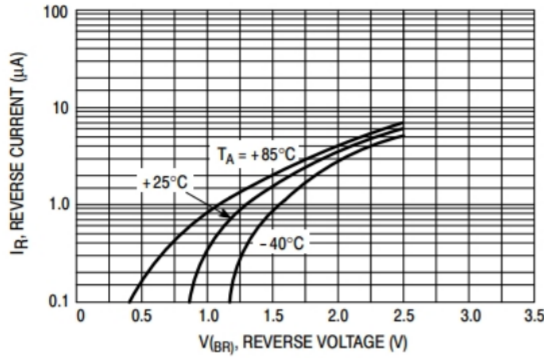


Characteristics Curves

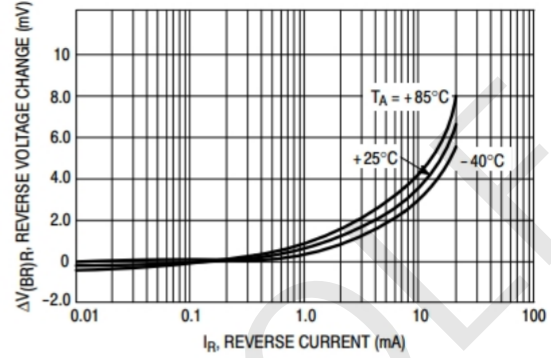
LM385-1.2/ADJ



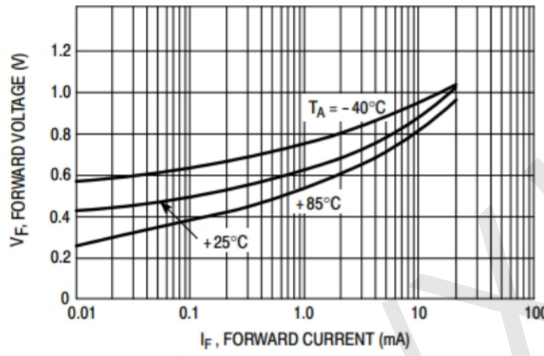
LM385-2.5



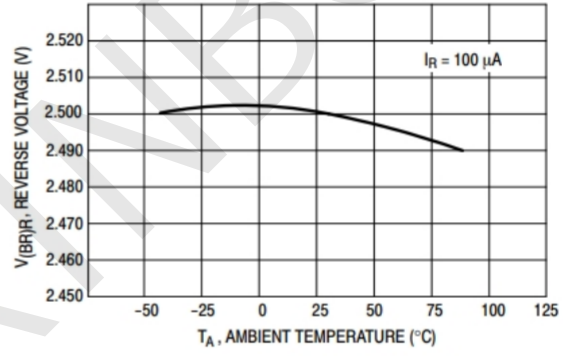
Reverse Characteristics



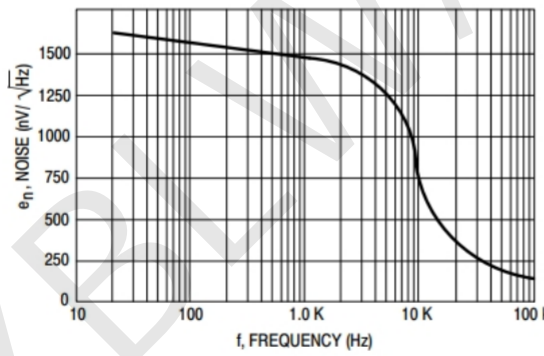
Reverse Characteristics



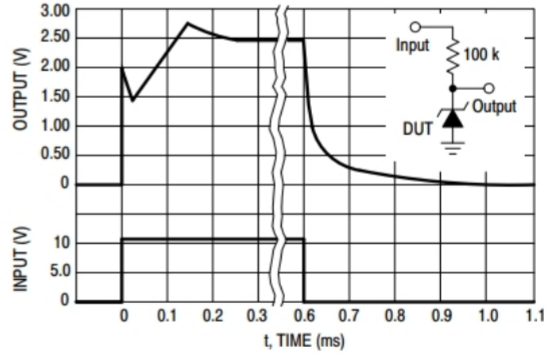
Forward Characteristics



Temperature Drift



Noise Voltage

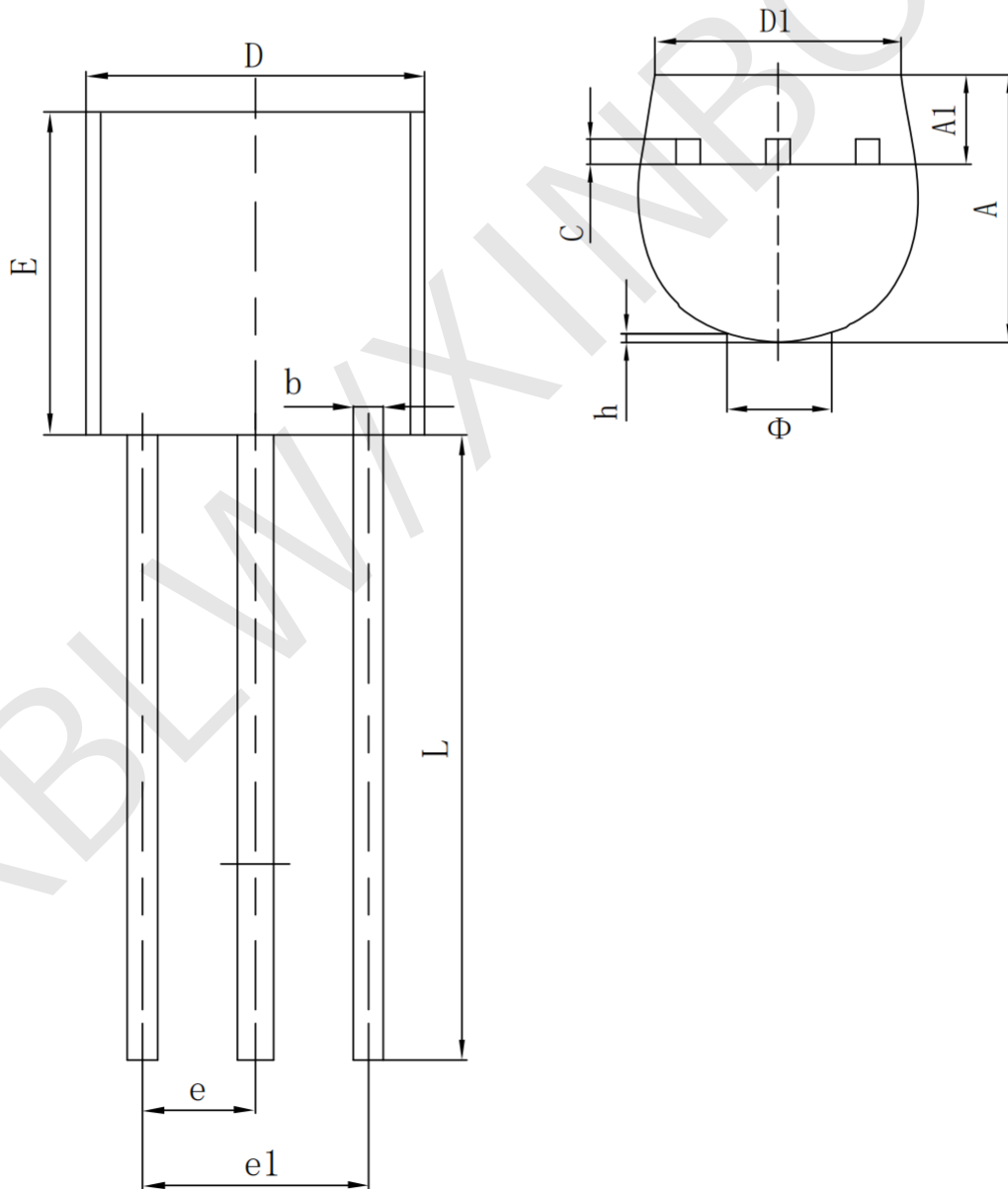


Response Time

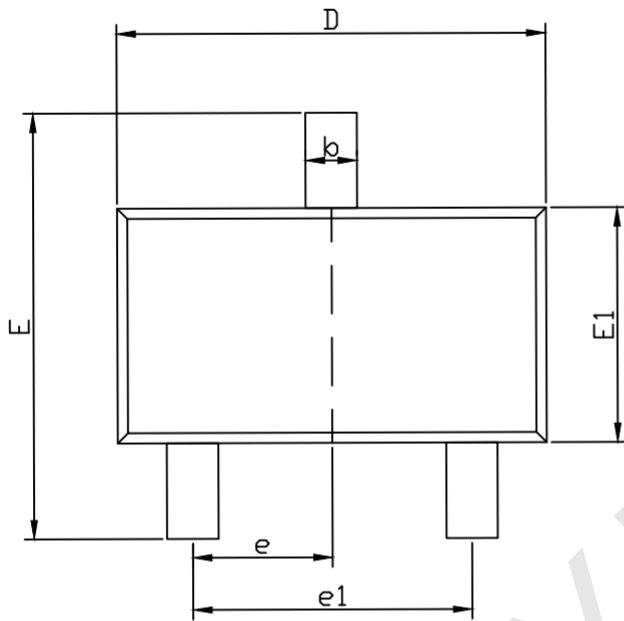
Package Information

· T0-92

| Symbol | Size | Dimensions In Millimeters | | Symbol | Size | Dimensions In Inches | |
|--------|------|---------------------------|---------|--------|------|----------------------|---------|
| | | Min(mm) | Max(mm) | | | Min(in) | Max(in) |
| A | | 3.300 | 3.700 | A | | 0.130 | 0.146 |
| A1 | | 1.100 | 1.400 | A1 | | 0.043 | 0.055 |
| b | | 0.380 | 0.550 | b | | 0.015 | 0.022 |
| c | | 0.360 | 0.510 | c | | 0.014 | 0.020 |
| D | | 4.300 | 4.700 | D | | 0.169 | 0.185 |
| D1 | | 3.430 | | D1 | | 0.135 | |
| E | | 4.300 | 4.700 | E | | 0.169 | 0.185 |
| e | | 1.270(TYP) | | e | | 0.050(TYP) | |
| e1 | | 2.440 | 2.640 | e1 | | 0.096 | 0.104 |
| L | | 14.10 | 14.50 | L | | 0.555 | 0.571 |
| Φ | | | 1.600 | Φ | | | 0.063 |
| h | | 0.000 | 0.380 | h | | 0.000 | 0.015 |

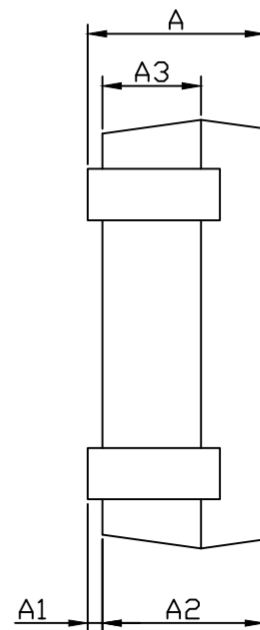
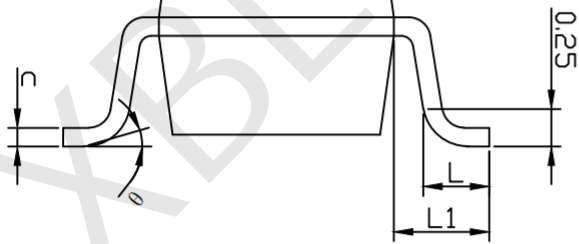


- SOT23-3L



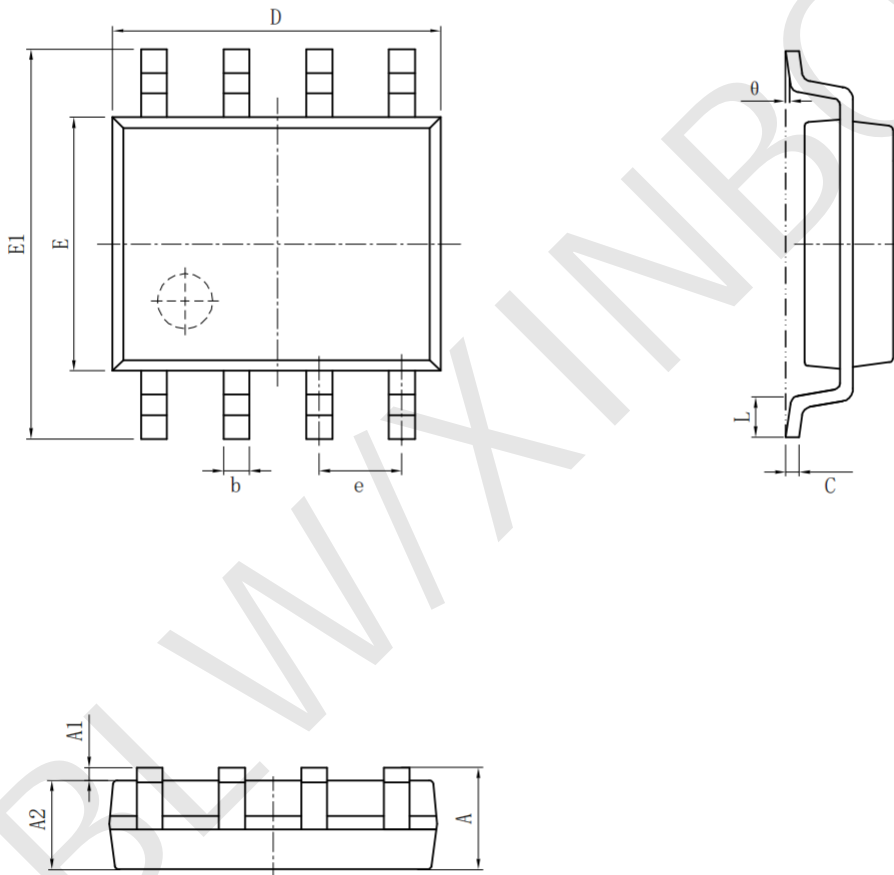
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|--------|---------|------|------|
| A | - | - | 1.25 |
| *A1 | 0.01 | - | 0.08 |
| A2 | 1.00 | 1.10 | 1.20 |
| A3 | 0.60 | 0.65 | 0.70 |
| b | 0.33 | - | 0.41 |
| c | 0.11 | - | 0.20 |
| D | 2.82 | 2.92 | 3.02 |
| *E | 2.60 | 2.80 | 3.00 |
| *E1 | 1.50 | 1.60 | 1.70 |
| *e | 0.90 | 0.95 | 1.00 |
| e1 | 1.90BSC | | |
| L | 0.30 | - | 0.60 |
| *L1 | 0.55 | 0.60 | 0.75 |
| θ | 0° | - | 8° |



• SOP-8

| Size Symbol | Dimensions In Millimeters | | Size Symbol | Dimensions In Inches | |
|----------------|---------------------------|----------|----------------|----------------------|----------|
| | Min (mm) | Max (mm) | | Min (in) | Max (in) |
| A | 1.350 | 1.750 | A | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | A1 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | A2 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | b | 0.013 | 0.020 |
| c | 0.170 | 0.250 | c | 0.006 | 0.010 |
| D | 4.700 | 5.100 | D | 0.185 | 0.200 |
| E | 3.800 | 4.000 | E | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | E1 | 0.228 | 0.224 |
| e | 1.270 (BSC) | | e | 0.050 (BSC) | |
| L | 0.400 | 1.270 | L | 0.016 | 0.050 |
| θ | 0° | 8° | θ | 0° | 8° |



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