## Adjustable/Fixed Low Dropout Linear Regulator

# AMS1117

**1A Adjustable/Fixed Low Dropout Linear Regulator**

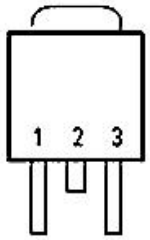
## DESCRIPTION

The AMS1117 is a three-terminal output current up to 1A Output low pressure difference linear regulator, 1.2V, 1.8V, 2.5V, 3.3V, 5.0V and adjustable output voltage and other versions, Its voltage drop is only 1.2V at 1A. With its excellent nature Energy and extreme economic performance, suitable for all kinds of electrical production Product.

PIN CONFIGURATION

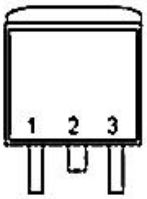
TO-252
TOP VIEW

1: ADJ (GND)
2: VOUT (TAB)
3: VIN



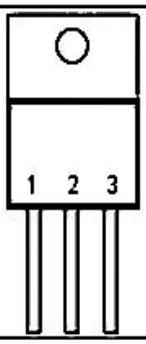

TO-263
TOP VIEW

1: ADJ (GND)
2: VOUT (TAB)
3: VIN



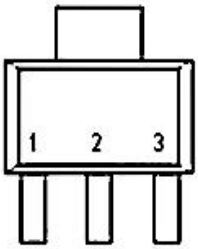

TO-220
FRONT VIEW

1: ADJ (GND)
2: VOUT (TAB)
3: VIN



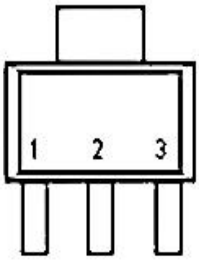

SOT-223
TOP VIEW

1: ADJ (GND)
2: VOUT (TAB)
3: VIN




SOT-89
TOP VIEW

1: ADJ (GND)
2: VOUT (TAB)
3: VIN



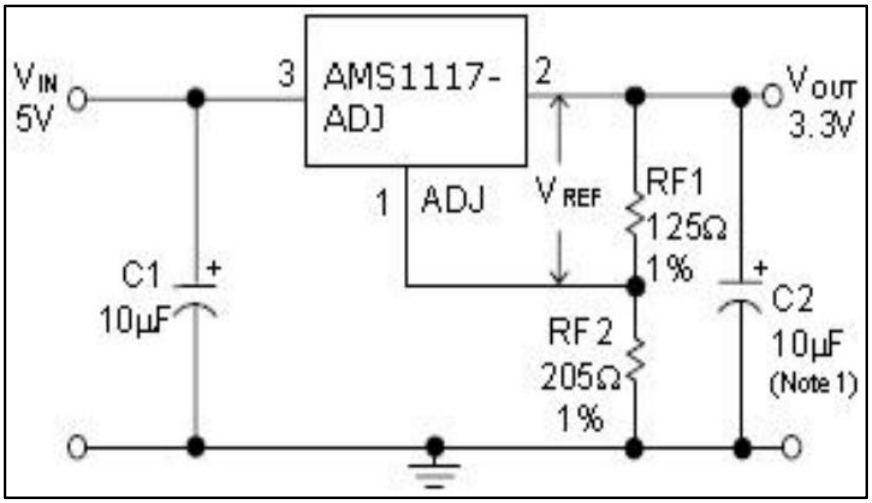

## FEATURES:

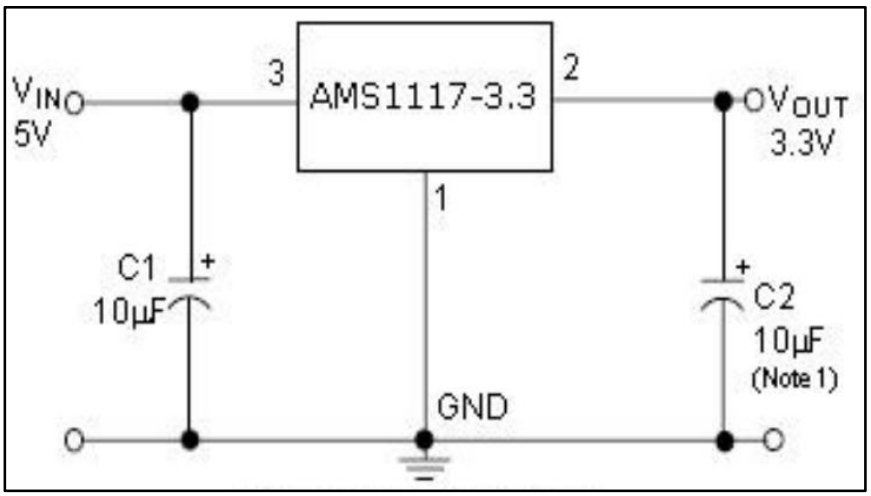
- The voltage drop of 1A output current is 1.2V
- Current limiting function
- Overheat protection
- Fixed output voltage 1.2V, 1.8V, 2.5V, 3.3V, 5.0V and adjustable output voltage version
- The voltage accuracy is 2% with a fixed output voltage of 1.2V
- Fixed output voltage 1.8V, 2.5V, 3.3V, 5.0V And adjustable output voltage accuracy is 1.5%
- Temperature range: -40 ° C to +125 ° C

## APPLICATION：

- Palm pilots and laptops
- Battery chargers
- SCSI- ii Active terminal
- mobile telephone
- Battery supply system
- Switching power supply rear voltage regulator

## Typical application circuit




**Vref=Vout-Vadj=1.25V（typical value）**

**Vout=Vref*(1+RF2/RF1)+Iadj*RF2**

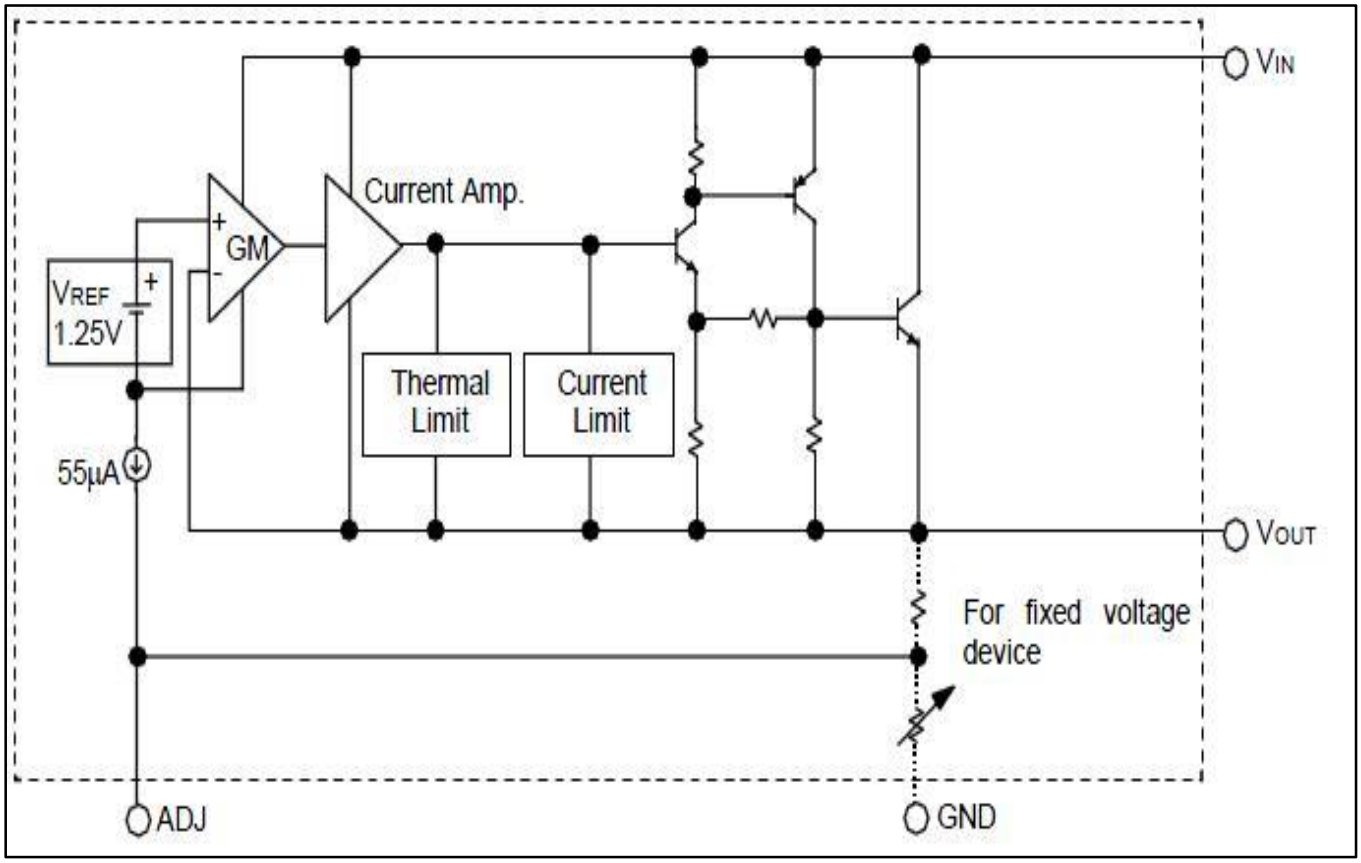
**Iadj=55uA（typical value）**

## Absolute Maximum ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Input Voltage | **Vin** | 18 | V |
| Pin temperature (welding 5 seconds) | **Tlead** | 260 | ℃ |
| Working junction temperature range | **Tj** | 150 | ℃ |
| ESD capability (minimum) | **ESD** | 2000 | V |
| Power Dissipation | **PD** | Note1 | mW |
| Operating Junction Temperature Range | **TOPR** | -40~+125 | ℃ |
| Storage Temperature Range | **TSTG** | -65~+150 | ℃ |

**Note1:** Maximum permissible power consumption is a function of the maximum operating junction temperature Tj(Max), pair air thermal resistance and ambient temperature. Maximum permissible power consumption At a given ambient temperature, exceeding the maximum allowable power consumption will cause the chip temperature to be too high, and the regulator will therefore enter overheat protection State. The pair air thermal resistance of different packaging types is different, depending on the packaging technology.

## The internal block diagram :




## Recommended working conditions :

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Input Voltage | **Vin** | 12 | V |
| Working junction temperature range | **Tj** | -40~+125 | ℃ |

## ELECTRICAL CHARACTERISTICS

**(Tamb=25℃, normal junction temperature range -40~+125℃ unless otherwise specified)**

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| reference voltage | **Vref** | AMS1117-ADJ, IOUT=10mA, VIN-VOUT=2V, TJ=25°C<br>10mA≤IOUT≤1A,<br>1.4V≤VIN-VOUT≤10V | 1.231<br>1.225 | 1.250<br>1.250 | 1.268<br>1.275 | V |
| **Output Voltage** | **VOUT** | AMS1117-1.2, IOUT=10mA, VIN=3.2V ,TJ=25°C 10mA≤ IOUT≤1A, 3.0V≤VIN≤10V | 1.176<br>1.152 | 1.200<br>1.200 | 1.224<br>1.248 | V |
| | | AMS1117-1.5, IOUT=10mA, VIN=3.5V ,TJ=25°C 10mA≤ IOUT≤1A, 3.0V≤VIN≤10V | 1.477<br>1.470 | 1.500<br>1.500 | 1.522<br>1.530 | V |
| | | AMS1117-1.8, IOUT=10mA, VIN=3.8V, TJ=25°C ,<br>0≤IOUT≤1A, 3.2V≤VIN≤10V | 1.773<br>1.746 | 1.800<br>1.800 | 1.827<br>1.854 | V |
| | | AMS1117-2.5, IOUT=10mA, VIN=4.5V,TJ=25°C ,<br>0≤IOUT≤1A,，3.9V≤VIN ≤ 10V | 2.462<br>2.450 | 2.500<br>2.500 | 2.538<br>2.550 | V |
| | | AMS1117-3.3, IOUT=10mA, VIN=5V,TJ=25°C , 0≤IOUT≤ 1A， 4.75V≤VIN≤10V | 3.250<br>3.235 | 3.300<br>3.300 | 3.349<br>3.365 | V |
| | | AMS1117-5.0, IOUT=10mA, VIN=7V, TJ=25°C , 0≤ IOUT≤1A,，6.5V≤VIN≤12V | 4.925<br>4.900 | 5.000<br>5.000 | 5.075<br>5.100 | V |
| Temperature stability of output voltage | **TSout** | | | 0.3 | | % |
| linearity control | **Rline** | VINMIN ≤VIN≤ 12V,<br>VOUT=Fixed/Adj,<br>Iout=10mA | | 6 | 15 | mV |
| load regulation | **Rload** | 10mA≤IOUT≤1A,<br>VOUT=Fixed/Adj | | 6 | 18 | mV |
| differential pressure | **Vdrop** | IOUT=100mA<br>IOUT=500mA<br>IOUT=1A | | 1.00<br>1.05<br>1.20 | 1.20<br>1.25<br>1.30 | V |

## ELECTRICAL CHARACTERISTICS

**(Tamb=25℃, normal junction temperature range -40~+125℃ unless otherwise specified)**

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| quiescent current | **Iq** | 4.25V≤VIN≤ 6.5V | | 5 | 10 | mA |
| Ripple rejection ratio | **PSRR** | fRIPPLE=120Hz, (VIN-VOUT)=3V, VRIPPLE=1VPP | 50 | 60 | | dB |
| Adjustable current | **Iadj** | | | 60 | 120 | uA |
| Adjustable pin current change | | 0≤ IOUT≤800mA, 1.4V ≤VIN-VOUT≤10V | | 0.2 | 5 | uA |
| Temperature protection | **TSD** | | | 150 | | ℃ |
| current-limiting protection | **Ilimit** | | 1.4 | 1.6 | 1.8 | A |
| temperature stability | | | | 0.5 | | % |
| RMS output noise | | % of VOUT, 10Hz≤f≤10kHz | | 0.005 | | % |
| Thermal resistance coefficient (No heat sink) | | SOT-223-3L | | 120 | | ℃/W |
| | | TO-252-2L | | 100 | | |

# Typical Performance Characteristics

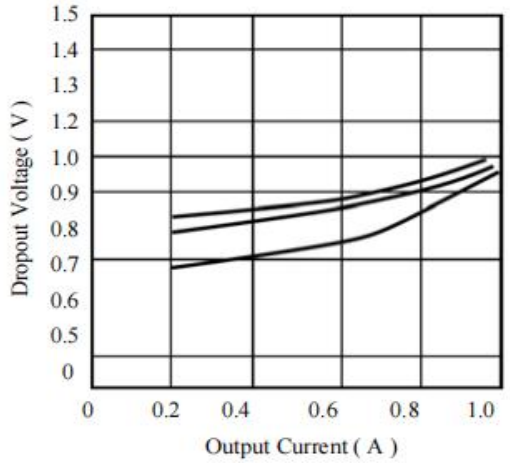



**Figure 4.** Dropout Voltage VS. Output Current

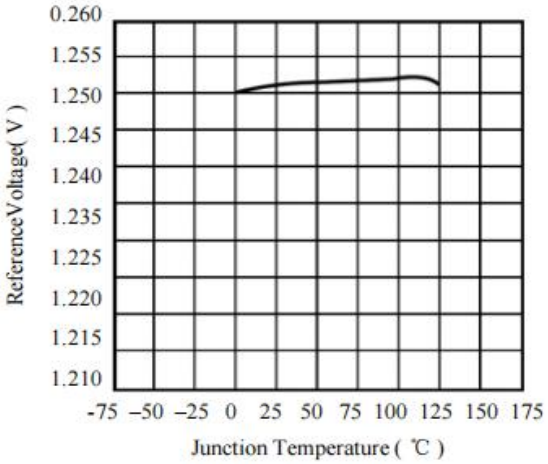



**Figure 5.** Reference Voltage VS. Temperature

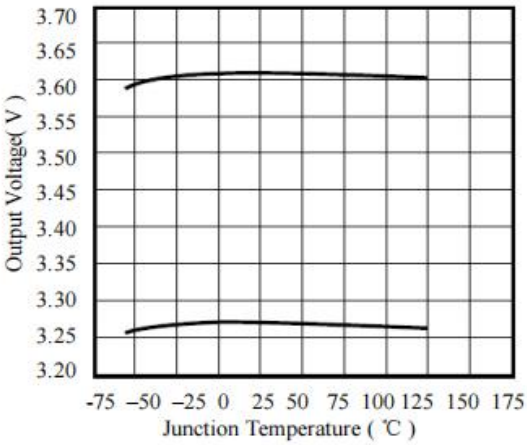



**Figure 6.** Output Voltage VS. Temperature

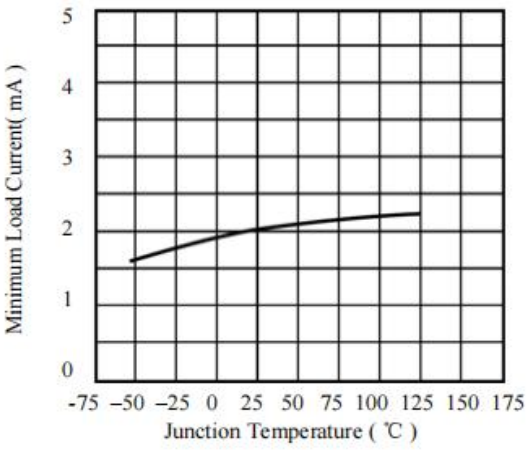



**Figure 7.** Minimum Load Current VS. Temperature

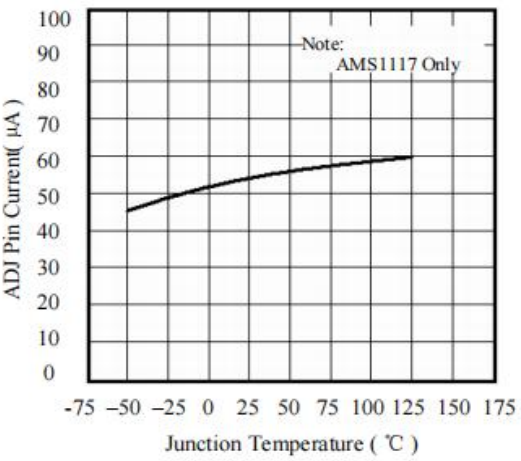
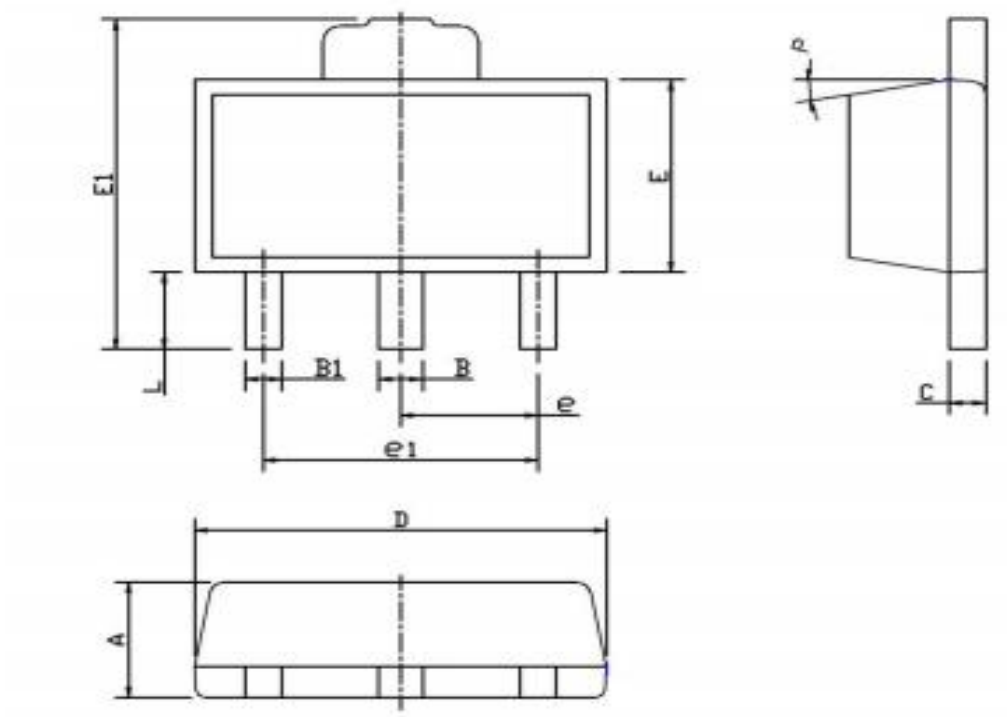



**Figure 8.** ADJ Pin Current VS. Temperature

# Mechanical Dimensions

**2.01 SOT-89 封装图：**

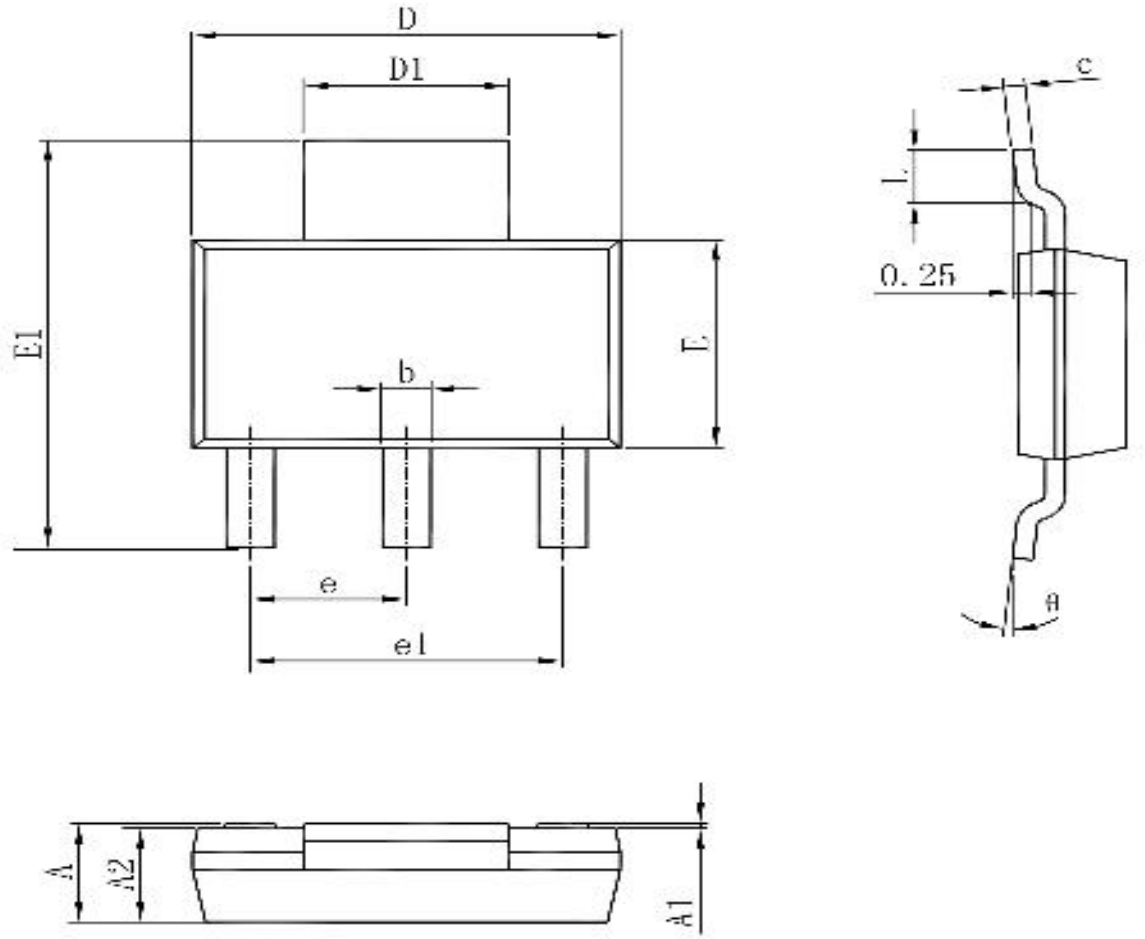



**2.02 SOT-89 尺寸：**

| SOT-89 | | Unit：mm | |
|---|---|---|---|
| Symbol | Min | TYP | Max |
| A | 1.40 | 1.50 | 1.65 |
| B | 0.38 | 0.48 | 0.65 |
| B1 | 0.30 | 0.40 | 0.55 |
| C | 0.30 | 0.40 | 0.50 |
| D | 4.35 | 4.50 | 4.75 |
| E | 2.35 | 2.45 | 2.60 |
| E1 | 3.90 | 4.10 | 4.35 |
| e | 1.35 | 1.50 | 1.65 |
| e1 | 2.80 | 3.00 | 3.20 |
| L | 0.70 | 0.90 | 1.10 |
| p | 8° | 10° | 12° |

## Mechanical Dimensions

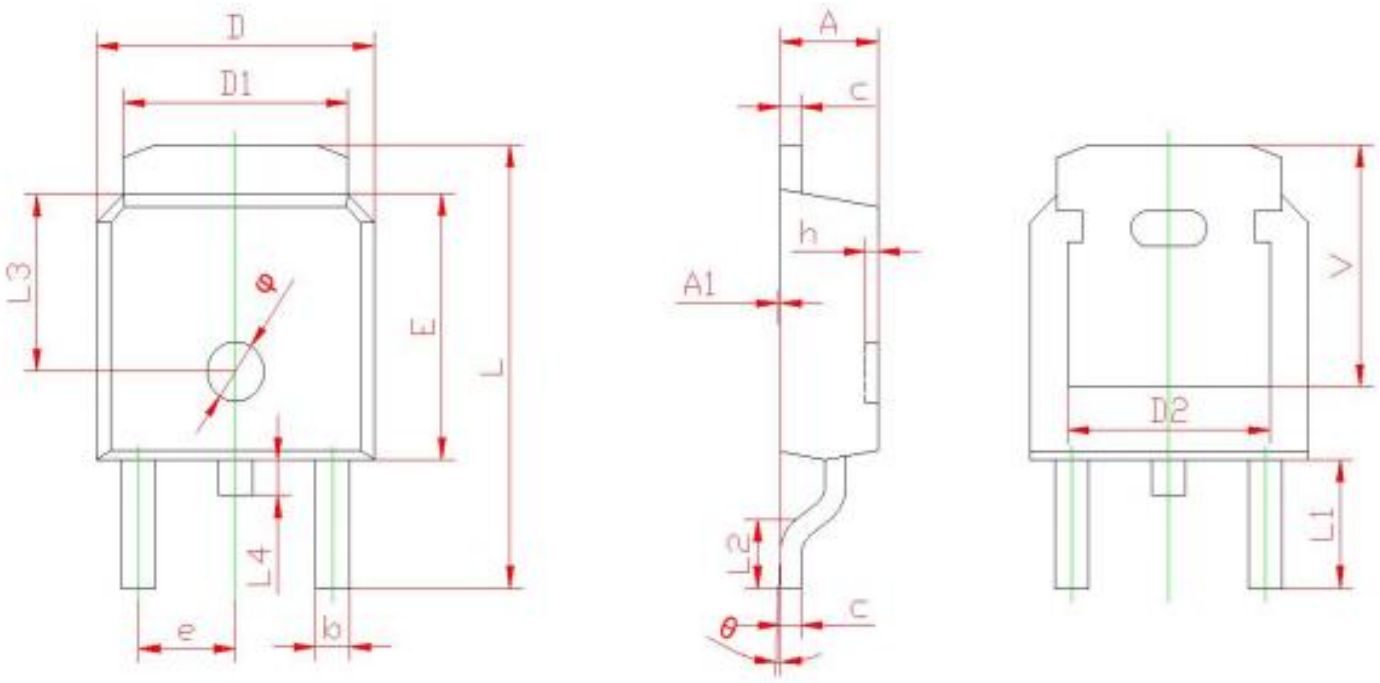
SOT-223 PACKAGE OUTLINE DIMENSIONS




| 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° |

## Mechanical Dimensions

**TO-252 PACKAGE OUTLINE DIMENSIONS**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 4.800 REF | | 0.189 REF | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 REF | | 0.114 REF | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 4.00 REF | | 0.157 REF | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| φ | 1.200 | 1.400 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.500 REF | | 0.217 REF | |