# 1A LOW DROPOUT LINEAR REGULATOR AZ1117

## General Description

The AZ1117 is a series of low dropout three-terminal regulators with a dropout of 1.15V at 1A output current.

The AZ1117 series provides current limiting and thermal shutdown. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within 1% for 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V and adjustable versions or 2% for 1.2V version. Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The AZ1117 has an adjustable version, that can provide the output voltage from 1.25V to 12V with only 2 external resistors.

The AZ1117 series is available in the industry standard SOT-223, SOT-89, TO-220-3, TO-252-2 (1), TO-252-2 (3) and TO-263-3 power packages.

## Features

- Low Dropout Voltage: 1.15V at 1A Output Current
- Trimmed Current Limit
- On-chip Thermal Shutdown
- Three-terminal Adjustable or Fixed 1.2V, 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V
- Operation Junction Temperature: -40 to 125°C

## Applications

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-video Player
- NIC/Switch
- Telecom Equipment
- ADSL Modem
- Printer and other Peripheral Equipment

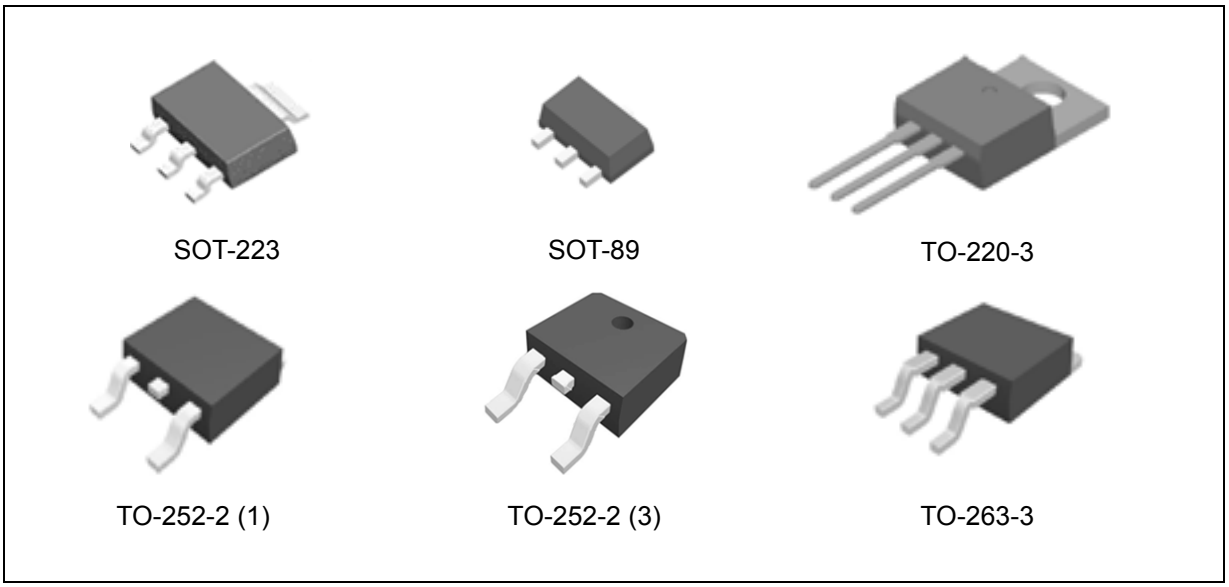
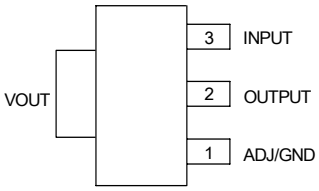


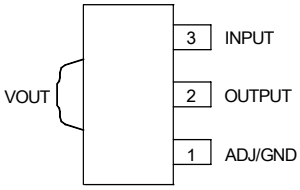

Figure 1. Package Types of AZ1117

## Pin Configuration

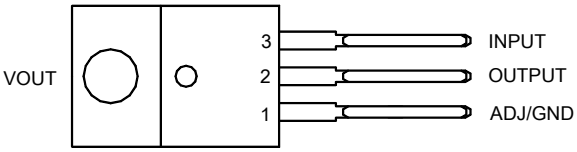
H Package
(SOT-223)



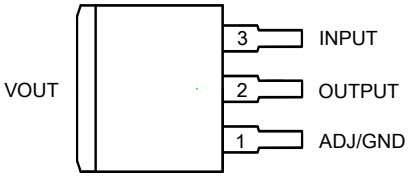

R Package
(SOT-89)




T Package
(TO-220-3)

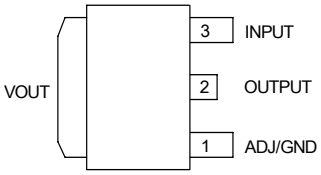



S Package
(TO-263-3)




D Package

(TO-252-2 (1))




(TO-252-2 (3))

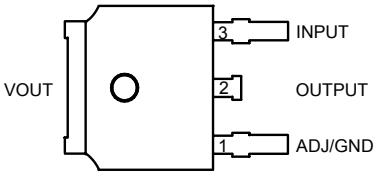



Figure 2. Pin Configuration of AZ1117

## Functional Block Diagram

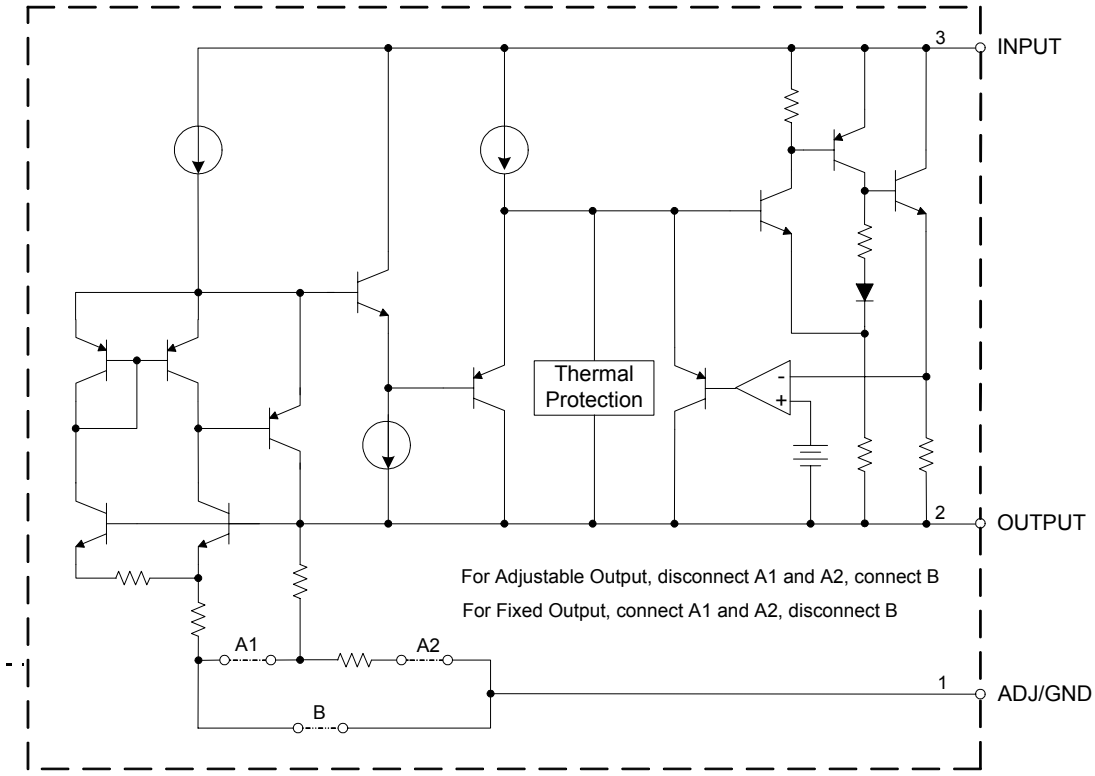
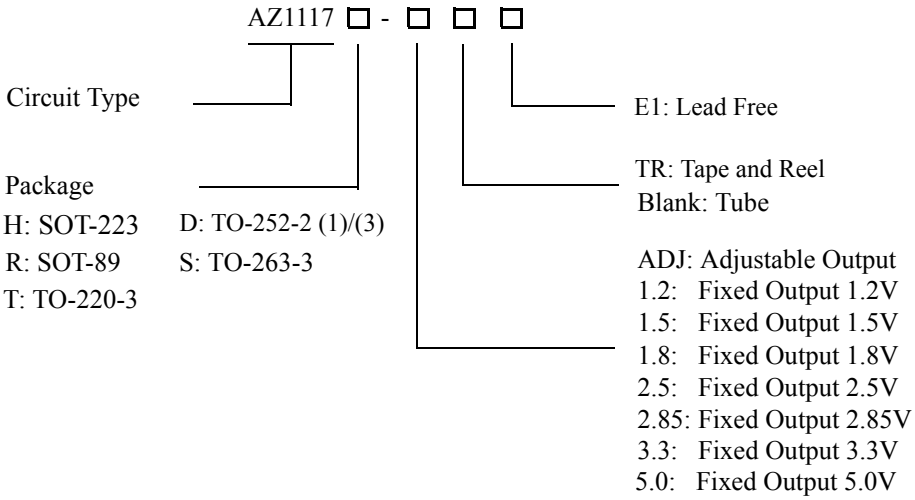



Figure 3. Functional Block Diagram of AZ1117

## Ordering Information




| Package | Temperature Range | Part Number | Marking ID | Packing Type |
|---|---|---|---|---|
| | | Lead Free | Lead Free | |
| SOT-223 | -40 to 125°C | AZ1117H-ADJTRE1 | EH11A | Tape & Reel |
| | | AZ1117H-1.2TRE1 | EH18A | Tape & Reel |
| | | AZ1117H-1.5TRE1 | EH12A | Tape & Reel |
| | | AZ1117H-1.8TRE1 | EH13A | Tape & Reel |
| | | AZ1117H-2.5TRE1 | EH14A | Tape & Reel |
| | | AZ1117H-2.85TRE1 | EH15A | Tape & Reel |
| | | AZ1117H-3.3TRE1 | EH16A | Tape & Reel |
| | | AZ1117H-5.0TRE1 | EH17A | Tape & Reel |
| SOT-89 | -40 to 125°C | AZ1117R-ADJTRE1 | E17A | Tape & Reel |
| | | AZ1117R-1.2TRE1 | E17G | Tape & Reel |
| | | AZ1117R-1.5TRE1 | E17B | Tape & Reel |
| | | AZ1117R-1.8TRE1 | E17C | Tape & Reel |
| | | AZ1117R-2.5TRE1 | E17D | Tape & Reel |
| | | AZ1117R-2.85TRE1 | E17H | Tape & Reel |
| | | AZ1117R-3.3TRE1 | E17E | Tape & Reel |
| | | AZ1117R-5.0TRE1 | E17F | Tape & Reel |
| TO-220-3 | -40 to 125°C | AZ1117T-ADJE1 | AZ1117T-ADJE1 | Tube |
| | | AZ1117T-1.2E1 | AZ1117T-1.2E1 | Tube |
| | | AZ1117T-1.5E1 | AZ1117T-1.5E1 | Tube |
| | | AZ1117T-1.8E1 | AZ1117T-1.8E1 | Tube |
| | | AZ1117T-2.5E1 | AZ1117T-2.5E1 | Tube |
| | | AZ1117T-2.85E1 | AZ1117T-2.85E1 | Tube |
| | | AZ1117T-3.3E1 | AZ1117T-3.3E1 | Tube |
| | | AZ1117T-5.0E1 | AZ1117T-5.0E1 | Tube |

## Ordering Information (Continued)

| Package | Temperature Range | Part Number | Marking ID | Packing Type |
|---|---|---|---|---|
| TO-252-2 (1)/ TO-252-2 (3) | -40 to 125°C | AZ1117D-ADJE1 | AZ1117D-ADJE1 | Tube |
| | | AZ1117D-ADJTRE1 | AZ1117D-ADJE1 | Tape & Reel |
| | | AZ1117D-1.2E1 | AZ1117D-1.2E1 | Tube |
| | | AZ1117D-1.2TRE1 | AZ1117D-1.2E1 | Tape & Reel |
| | | AZ1117D-1.5E1 | AZ1117D-1.5E1 | Tube |
| | | AZ1117D-1.5TRE1 | AZ1117D-1.5E1 | Tape & Reel |
| | | AZ1117D-1.8E1 | AZ1117D-1.8E1 | Tube |
| | | AZ1117D-1.8TRE1 | AZ1117D-1.8E1 | Tape & Reel |
| | | AZ1117D-2.5E1 | AZ1117D-2.5E1 | Tube |
| | | AZ1117D-2.5TRE1 | AZ1117D-2.5E1 | Tape & Reel |
| | | AZ1117D-2.85E1 | AZ1117D-2.85E1 | Tube |
| | | AZ1117D-2.85TRE1 | AZ1117D-2.85E1 | Tape & Reel |
| | | AZ1117D-3.3E1 | AZ1117D-3.3E1 | Tube |
| | | AZ1117D-3.3TRE1 | AZ1117D-3.3E1 | Tape & Reel |
| | | AZ1117D-5.0E1 | AZ1117D-5.0E1 | Tube |
| | | AZ1117D-5.0TRE1 | AZ1117D-5.0E1 | Tape & Reel |
| TO-263-3 | -40 to 125°C | AZ1117S-ADJE1 | AZ1117S-ADJE1 | Tube |
| | | AZ1117S-ADJTRE1 | AZ1117S-ADJE1 | Tape & Reel |
| | | AZ1117S-1.2E1 | AZ1117S-1.2E1 | Tube |
| | | AZ1117S-1.2TRE1 | AZ1117S-1.2E1 | Tape & Reel |
| | | AZ1117S-1.5E1 | AZ1117S-1.5E1 | Tube |
| | | AZ1117S-1.5TRE1 | AZ1117S-1.5E1 | Tape & Reel |
| | | AZ1117S-1.8E1 | AZ1117S-1.8E1 | Tube |
| | | AZ1117S-1.8TRE1 | AZ1117S-1.8E1 | Tape & Reel |
| | | AZ1117S-2.5E1 | AZ1117S-2.5E1 | Tube |
| | | AZ1117S-2.5TRE1 | AZ1117S-2.5E1 | Tape & Reel |
| | | AZ1117S-2.85E1 | AZ1117S-2.85E1 | Tube |
| | | AZ1117S-2.85TRE1 | AZ1117S-2.85E1 | Tape & Reel |
| | | AZ1117S-3.3E1 | AZ1117S-3.3E1 | Tube |
| | | AZ1117S-3.3TRE1 | AZ1117S-3.3E1 | Tape & Reel |
| | | AZ1117S-5.0E1 | AZ1117S-5.0E1 | Tube |
| | | AZ1117S-5.0TRE1 | AZ1117S-5.0E1 | Tape & Reel |

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant.

## Absolute Maximum Ratings (Note 1)

| Parameter | Symbol | Value | | Unit |
|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | 20 | | V |
| Operating Junction Temperature | $T_J$ | 150 | | °C |
| Storage Temperature | $T_S$ | -65 to 150 | | °C |
| Lead Temperature (Soldering, 10sec) | $T_{LEAD}$ | 260 | | °C |
| Thermal Resistance (No Heatsink, Note 2) | $\theta_{JA}$ | SOT-223 | 120 | °C/W |
| | | SOT-89 | 165 | |
| | | TO-220-3 | 60 | |
| | | TO-252-2 (1) | 100 | |
| | | TO-252-2 (3) | 100 | |
| | | TO-263-3 | 60 | |
| ESD (Human Body Model) | ESD | 2000 | | V |
| ESD (Machine Model) | ESD | 250 | | V |

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Note 2: Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(max)}$, the junction-to-ambient thermal resistance, $\theta_{JA}$, and the ambient temperature, $T_A$. The maximum allowable power dissipation at any ambient temperature is calculated using: $P_{D(max)}=(T_{J(max)} - T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

## Recommended Operating Conditions

| Parameter | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | | 15 | V |
| Operating Junction Temperature Range | $T_J$ | -40 | 125 | °C |

## Electrical Characteristics

### AZ1117-ADJ Electrical Characteristics

Operating Conditions: $V_{IN}$≤10V, $T_J$ =25°C, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Reference Voltage | $V_{REF}$ | $I_{OUT}$ = 10mA, $V_{IN}$-$V_{OUT}$ = 2V<br>10mA≤ $I_{OUT}$ ≤ 1A, 1.4V≤ $V_{IN}$-$V_{OUT}$ ≤ 8V,<br>P≤ Maximum Power Dissipation | 1.238<br>1.225 | 1.250<br>1.250 | 1.262<br>1.270 | V |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=10mA, 1.5V≤$V_{IN}$-$V_{OUT}$≤10V | | 0.035 | 0.2 | % |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$-$V_{OUT}$=2V, 10mA≤ $I_{OUT}$≤1A | | 0.2 | 0.4 | % |
| Dropout Voltage | $V_{DROP}$ | $\Delta V_{REF}$=1%, $I_{OUT}$=0.1A | | 1.00 | 1.1 | V |
| | | $\Delta V_{REF}$ =1%, $I_{OUT}$=0.5A | | 1.08 | 1.18 | V |
| | | $\Delta V_{REF}$=1%, $I_{OUT}$=1.0A | | 1.15 | 1.25 | V |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$-$V_{OUT}$=2V | 1.25 | 1.35 | | A |
| Adjust Pin Current | $I_{ADJ}$ | | | 60 | 120 | μA |
| Adjust Pin Current Change | $\Delta I_{ADJ}$ | 1.4V≤$V_{IN}$-$V_{OUT}$≤10V, 10mA≤$I_{OUT}$ ≤1A | | 0.2 | 5 | μA |
| Minimum Load Current (ADJ) | $I_{LOAD}$(MIN) | 1.5V≤$V_{IN}$-$V_{OUT}$≤10V (ADJ only) | | 1.7 | 5 | mA |
| Quiescent Current | $I_Q$ | $V_{IN}$=$V_{OUT}$ +1.25V | | 5 | 10 | mA |
| Ripple Rejection | PSRR | f=120Hz, $C_{OUT}$=22μF Tantalum,<br>$V_{IN}$-$V_{OUT}$=3V, $I_{OUT}$ =1A | 60 | 75 | | dB |
| Temperature Stability | | | | 0.5 | | % |
| Long-term Stability | | $T_A$=125°C, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of $V_{OUT}$) | | $T_A$=25°C, 10Hz≤f≤10kHz | | 0.003 | | % |
| Thermal Shutdown | | Junction Temperature | | 150 | | °C |
| Thermal Shutdown Hysteresis | | | | 25 | | °C |
| Thermal Resistance | $\theta_{JC}$ | SOT-223 | | 25 | | °C/W |
| | | SOT-89 | | 30 | | |
| | | TO-220-3 | | 10 | | |
| | | TO-252-2 (1) | | 17 | | |
| | | TO-252-2 (3) | | 17 | | |
| | | TO-263-3 | | 10 | | |

## Electrical Characteristics (Continued)

### AZ1117-1.2 Electrical Characteristics

Operating Conditions: $V_{IN}$≤10V, $T_J$ =25°C, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $I_{OUT}$=10mA, $V_{IN}$=3.2V<br>10mA≤$I_{OUT}$≤1A, 3.0V≤$V_{IN}$≤10V | 1.176<br>1.152 | 1.2<br>1.2 | 1.224<br>1.248 | V |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=10mA, 1.5V≤$V_{IN}$-$V_{OUT}$≤10V | | 1 | 6 | mV |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$-$V_{OUT}$=2V, 10mA≤ $I_{OUT}$≤1A | | 1 | 10 | mV |
| Dropout Voltage | $V_{DROP}$ | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.1A | | 1.00 | 1.1 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.5A | | 1.08 | 1.18 | V |
| | | $\Delta V_{OUT}$ =1%, $I_{OUT}$=1.0A | | 1.15 | 1.25 | V |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$-$V_{OUT}$=2V | 1.25 | 1.35 | | A |
| Quiescent Current | $I_Q$ | $V_{IN}$=$V_{OUT}$ +1.25V | | 5 | 10 | mA |
| Ripple Rejection | PSRR | f =120Hz, $C_{OUT}$ =22μF Tantalum,<br>$V_{IN}$-$V_{OUT}$=3V, $I_{OUT}$ =1A | 60 | 75 | | dB |
| Temperature Stability | | | | 0.5 | | % |
| Long-term Stability | | $T_A$=125°C, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of $V_{OUT}$) | | $T_A$=25°C, 10Hz≤ f≤10kHz | | 0.003 | | % |
| Thermal Shutdown | | Junction Temperature | | 150 | | °C |
| Thermal Shutdown Hysteresis | | | | 25 | | °C |
| Thermal Resistance | $\theta_{JC}$ | SOT-223 | | 25 | | °C/W |
| | | SOT-89 | | 30 | | |
| | | TO-220-3 | | 10 | | |
| | | TO-252-2 (1) | | 17 | | |
| | | TO-252-2 (3) | | 17 | | |
| | | TO-263-3 | | 10 | | |

## Electrical Characteristics (Continued)

### AZ1117-1.5 Electrical Characteristics

Operating Conditions: $V_{IN}$≤10V, $T_J$ =25°C, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $I_{OUT}$=10mA, $V_{IN}$=3.5V<br>10mA≤$I_{OUT}$≤1A, 3.0V≤$V_{IN}$≤10V | 1.485<br>1.470 | 1.5<br>1.5 | 1.515<br>1.530 | V |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=10mA, 1.5V≤ $V_{IN}$-$V_{OUT}$ ≤10V | | 1 | 6 | mV |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$-$V_{OUT}$ =2V, 10mA≤ $I_{OUT}$≤1A | | 1 | 10 | mV |
| Dropout Voltage | $V_{DROP}$ | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.1A | | 1.00 | 1.1 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.5A | | 1.08 | 1.18 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=1.0A | | 1.15 | 1.25 | V |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$-$V_{OUT}$ =2V | 1.25 | 1.35 | | A |
| Quiescent Current | $I_Q$ | $V_{IN}$=$V_{OUT}$+1.25V | | 5 | 10 | mA |
| Ripple Rejection | PSRR | f=120Hz, $C_{OUT}$ =22μF Tantalum,<br>$V_{IN}$-$V_{OUT}$ =3V, $I_{OUT}$=1A | 60 | 75 | | dB |
| Temperature Stability | | | | 0.5 | | % |
| Long-term Stability | | $T_A$=125°C, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of $V_{OUT}$) | | $T_A$=25°C, 10Hz≤f≤10kHz | | 0.003 | | % |
| Thermal Shutdown | | Junction Temperature | | 150 | | °C |
| Thermal Shutdown Hysteresis | | | | 25 | | °C |
| Thermal Resistance | $\theta_{JC}$ | SOT-223 | | 25 | | °C/W |
| | | SOT-89 | | 30 | | |
| | | TO-220-3 | | 10 | | |
| | | TO-252-2 (1) | | 17 | | |
| | | TO-252-2 (3) | | 17 | | |
| | | TO-263-3 | | 10 | | |

## Electrical Characteristics (Continued)

### AZ1117-1.8 Electrical Characteristics

Operating Conditions: $V_{IN}$≤10V, $T_J$ =25°C, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $I_{OUT}$=10mA, $V_{IN}$=3.8V<br>10mA≤ $I_{OUT}$≤1A, 3.2V≤$V_{IN}$≤10V | 1.782<br>1.746 | 1.8<br>1.8 | 1.818<br>1.854 | V |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=10mA, 1.5V≤$V_{IN}$-$V_{OUT}$≤10V | | 1 | 6 | mV |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$-$V_{OUT}$=2V, 10mA≤ $I_{OUT}$≤1A | | 1 | 10 | mV |
| Dropout Voltage | $V_{DROP}$ | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.1A | | 1.00 | 1.1 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.5A | | 1.08 | 1.18 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=1.0A | | 1.15 | 1.25 | V |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$-$V_{OUT}$=2V | 1.25 | 1.35 | | A |
| Quiescent Current | $I_Q$ | $V_{IN}$=$V_{OUT}$ +1.25V | | 5 | 10 | mA |
| Ripple Rejection | PSRR | f =120Hz, $C_{OUT}$ =22μF Tantalum,<br>$V_{IN}$-$V_{OUT}$=3V, $I_{OUT}$ =1A | 60 | 75 | | dB |
| Temperature Stability | | | | 0.5 | | % |
| Long-term Stability | | $T_A$=125°C, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of $V_{OUT}$) | | $T_A$=25°C, 10Hz ≤ f ≤ 10kHz | | 0.003 | | % |
| Thermal Shutdown | | Junction Temperature | | 150 | | °C |
| Thermal Shutdown Hysteresis | | | | 25 | | °C |
| Thermal Resistance | $\theta_{JC}$ | SOT-223 | | 25 | | °C/W |
| | | SOT-89 | | 30 | | |
| | | TO-220-3 | | 10 | | |
| | | TO-252-2 (1) | | 17 | | |
| | | TO-252-2 (3) | | 17 | | |
| | | TO-263-3 | | 10 | | |

## Electrical Characteristics (Continued)

### AZ1117-2.5 Electrical Characteristics

Operating Conditions: $V_{IN} \leq 10V$, $T_J = 25^oC$, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $I_{OUT}$ =10mA, $V_{IN}$=4.5V<br>10mA≤ $I_{OUT}$≤1A, 3.9V≤$V_{IN}$≤10V | 2.475<br>2.450 | 2.5<br>2.5 | 2.525<br>2.550 | V |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=10mA, 1.5V≤$V_{IN}$-$V_{OUT}$≤10V | | 1 | 6 | mV |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$-$V_{OUT}$ = 2V, 10mA≤ $I_{OUT}$≤1A | | 1 | 10 | mV |
| Dropout Voltage | $V_{DROP}$ | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.1A | | 1.00 | 1.1 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.5A | | 1.08 | 1.18 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=1.0A | | 1.15 | 1.25 | V |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$-$V_{OUT}$ =2V | 1.25 | 1.35 | | A |
| Quiescent Current | $I_Q$ | $V_{IN}$=$V_{OUT}$+1.25V | | 5 | 10 | mA |
| Ripple Rejection | PSRR | f =120Hz, $C_{OUT}$=22μF Tantalum,<br>$V_{IN}$-$V_{OUT}$=3V, $I_{OUT}$ =1A | 60 | 75 | | dB |
| Temperature Stability | | | | 0.5 | | % |
| Long-term Stability | | $T_A$=125°C, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of $V_{OUT}$) | | $T_A$=25°C, 10Hz≤f≤10kHz | | 0.003 | | % |
| Thermal Shutdown | | Junction Temperature | | 150 | | °C |
| Thermal Shutdown Hysteresis | | | | 25 | | °C |
| Thermal Resistance | $\theta_{JC}$ | SOT-223 | | 25 | | °C/W |
| | | SOT-89 | | 30 | | |
| | | TO-220-3 | | 10 | | |
| | | TO-252-2 (1) | | 17 | | |
| | | TO-252-2 (3) | | 17 | | |
| | | TO-263-3 | | 10 | | |

## Electrical Characteristics (Continued)

### AZ1117-2.85 Electrical Characteristics

Operating Conditions: $V_{IN}$≤10V, $T_J$ =25°C, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $I_{OUT}$=10mA, $V_{IN}$=4.85V<br>10mA≤$I_{OUT}$≤ 1A, 4.25V≤$V_{IN}$≤10V | 2.822<br>2.793 | 2.85<br>2.85 | 2.878<br>2.907 | V |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=10mA, 1.5V≤$V_{IN}$-$V_{OUT}$≤10V | | 1 | 6 | mV |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$-$V_{OUT}$=2V, 10mA≤ $I_{OUT}$≤1A | | 1 | 10 | mV |
| Dropout Voltage | $V_{DROP}$ | $\Delta V_{REF}$=1%, $I_{OUT}$=0.1A | | 1.00 | 1.1 | V |
| | | $\Delta V_{REF}$=1%, $I_{OUT}$=0.5A | | 1.08 | 1.18 | V |
| | | $\Delta V_{REF}$=1%, $I_{OUT}$=1.0A | | 1.15 | 1.25 | V |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$-$V_{OUT}$=2V | 1.25 | 1.35 | | A |
| Quiescent Current | $I_Q$ | $V_{IN}$=$V_{OUT}$+1.25V | | 5 | 10 | mA |
| Ripple Rejection | PSRR | f =120Hz, $C_{OUT}$=22μF Tantalum,<br>$V_{IN}$-$V_{OUT}$=3V, $I_{OUT}$ =1A | 60 | 75 | | dB |
| Temperature Stability | | | | 0.5 | | % |
| Long-term Stability | | $T_A$=125°C, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of $V_{OUT}$) | | $T_A$=25°C, 10Hz≤f≤10kHz | | 0.003 | | % |
| Thermal Shutdown | | Junction Temperature | | 150 | | °C |
| Thermal Shutdown Hysteresis | | | | 25 | | °C |
| Thermal Resistance | $\theta_{JC}$ | SOT-223 | | 25 | | °C/W |
| | | SOT-89 | | 30 | | |
| | | TO-220-3 | | 10 | | |
| | | TO-252-2 (1) | | 17 | | |
| | | TO-252-2 (3) | | 17 | | |
| | | TO-263-3 | | 10 | | |

## Electrical Characteristics (Continued)

### AZ1117-3.3 Electrical Characteristics

Operating Conditions: $V_{IN}$≤10V, $T_J$ =25°C, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $I_{OUT}$ =10mA, $V_{IN}$=5.0V<br>10mA≤ $I_{OUT}$≤1A, 4.75V≤$V_{IN}$≤10V | 3.267<br>3.235 | 3.3<br>3.3 | 3.333<br>3.365 | V |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=10mA, 1.5V≤$V_{IN}$-$V_{OUT}$≤10V | | 1 | 6 | mV |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$-$V_{OUT}$=2V, 10mA≤$I_{OUT}$ ≤1A | | 1 | 10 | mV |
| Dropout Voltage | $V_{DROP}$ | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.1A | | 1.00 | 1.1 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.5A | | 1.08 | 1.18 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=1.0A | | 1.15 | 1.25 | V |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$-$V_{OUT}$=2V | 1.25 | 1.35 | | A |
| Quiescent Current | $I_Q$ | $V_{IN}$=$V_{OUT}$ +1.25V | | 5 | 10 | mA |
| Ripple Rejection | PSRR | f=120Hz, $C_{OUT}$=22μF Tantalum,<br>$V_{IN}$-$V_{OUT}$=3V, $I_{OUT}$ =1A | 60 | 75 | | dB |
| Temperature Stability | | | | 0.5 | | % |
| Long-term Stability | | $T_A$=125°C, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of $V_{OUT}$) | | $T_A$=25°C, 10Hz≤f≤10kHz | | 0.003 | | % |
| Thermal Shutdown | | Junction Temperature | | 150 | | °C |
| Thermal Shutdown Hysteresis | | | | 25 | | °C |
| Thermal Resistance | $\theta_{JC}$ | SOT-223 | | 25 | | °C/W |
| | | SOT-89 | | 30 | | |
| | | TO-220-3 | | 10 | | |
| | | TO-252-2 (1) | | 17 | | |
| | | TO-252-2 (3) | | 17 | | |
| | | TO-263-3 | | 10 | | |

## Electrical Characteristics (Continued)

### AZ1117-5.0 Electrical Characteristics

Operating Conditions: $V_{IN}$≤10V, $T_J$ =25°C, unless otherwise specified.

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Output Voltage | $V_{OUT}$ | $I_{OUT}$ =10mA, $V_{IN}$=7.0V<br>10mA≤$I_{OUT}$≤1A, 6.5V≤$V_{IN}$≤12V | 4.950<br>4.900 | 5.0<br>5.0 | 5.050<br>5.100 | V |
| Line Regulation | $\Delta V_{OUT}$ | $I_{OUT}$=10mA, 1.5V≤$V_{IN}$-$V_{OUT}$≤10V | | 1 | 10 | mV |
| Load Regulation | $\Delta V_{OUT}$ | $V_{IN}$-$V_{OUT}$=2V, 10mA≤$I_{OUT}$≤1A | | 1 | 15 | mV |
| Dropout Voltage | $V_{DROP}$ | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.1A | | 1.00 | 1.1 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=0.5A | | 1.08 | 1.18 | V |
| | | $\Delta V_{OUT}$=1%, $I_{OUT}$=1.0A | | 1.15 | 1.25 | V |
| Current Limit | $I_{LIMIT}$ | $V_{IN}$-$V_{OUT}$=2V | 1.25 | 1.35 | | A |
| Quiescent Current | $I_Q$ | $V_{IN}$=$V_{OUT}$+1.25V | | 5 | 10 | mA |
| Ripple Rejection | PSRR | f =120Hz, $C_{OUT}$ =22μF Tantalum,<br>$V_{IN}$-$V_{OUT}$=3V, $I_{OUT}$ =1A | 60 | 75 | | dB |
| Temperature Stability | | | | 0.5 | | % |
| Long-term Stability | | $T_A$=125°C, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of $V_{OUT}$) | | $T_A$=25°C, 10Hz≤f≤10kHz | | 0.003 | | % |
| Thermal Shutdown | | Junction Temperature | | 150 | | °C |
| Thermal Shutdown Hysteresis | | | | 25 | | °C |
| Thermal Resistance | $\theta_{JC}$ | SOT-223 | | 25 | | °C/W |
| | | SOT-89 | | 30 | | |
| | | TO-220-3 | | 10 | | |
| | | TO-252-2 (1) | | 17 | | |
| | | TO-252-2 (3) | | 17 | | |
| | | TO-263-3 | | 10 | | |

## Typical Performance Characteristics

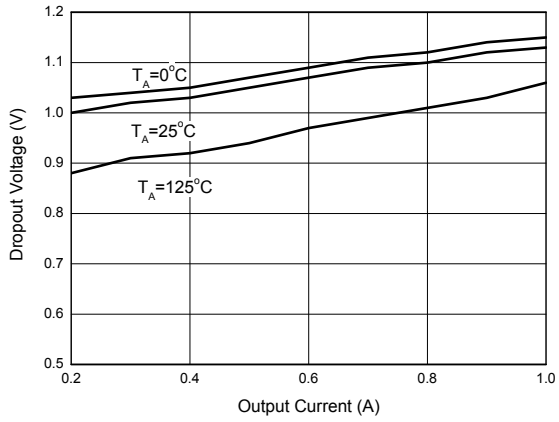



Figure 4. Dropout Voltage vs. Output Current

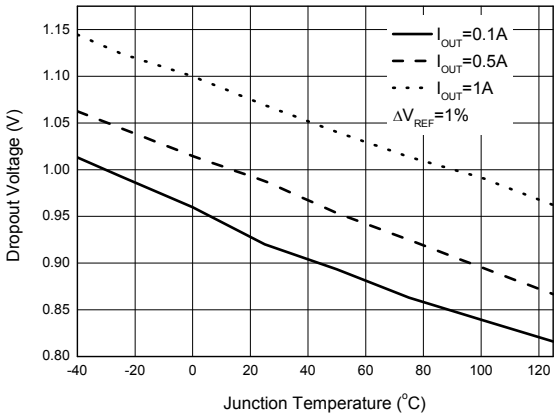



Figure 5. Dropout Voltage vs. Junction Temperature

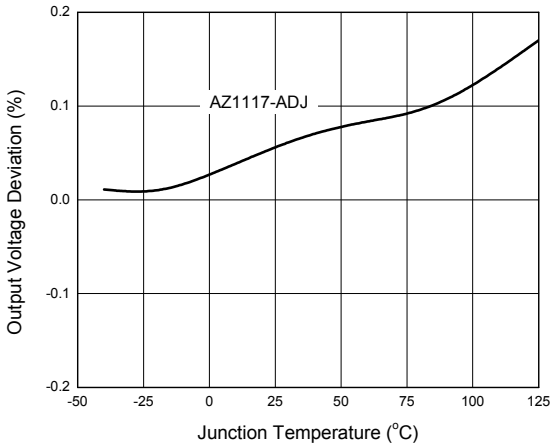



Figure 6. Load Regulation vs. Junction Temperature

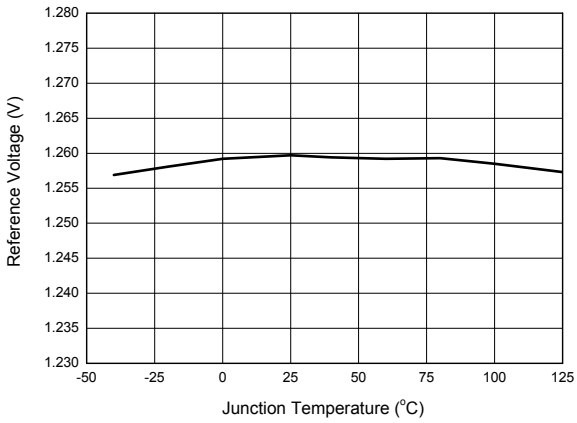



Figure 7. Reference Voltage vs. Junction Temperature

## Typical Performance Characteristics (Continued)

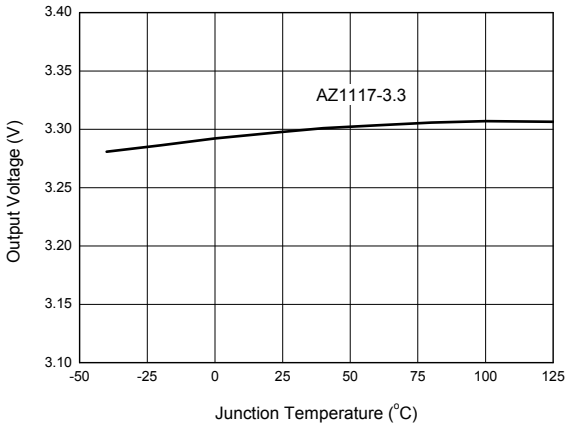



Figure 8. Output Voltage vs. Junction Temperature

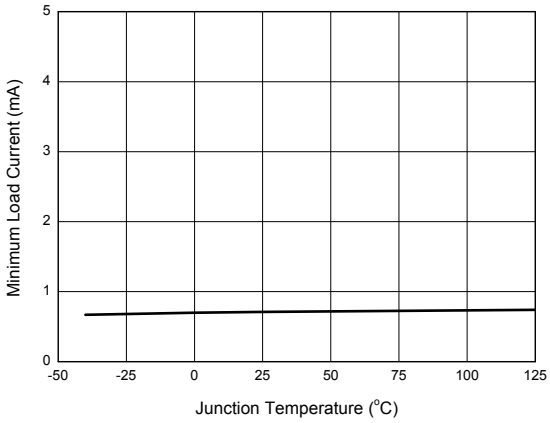



Figure 9. Minimum Load Current vs. Junction Temperature

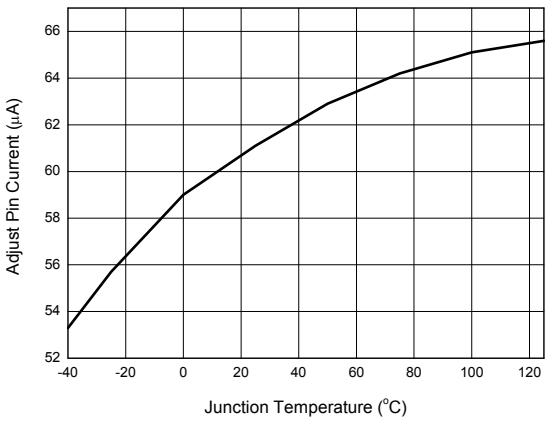



Figure 10. Adjust Pin Current vs. Junction Temperature

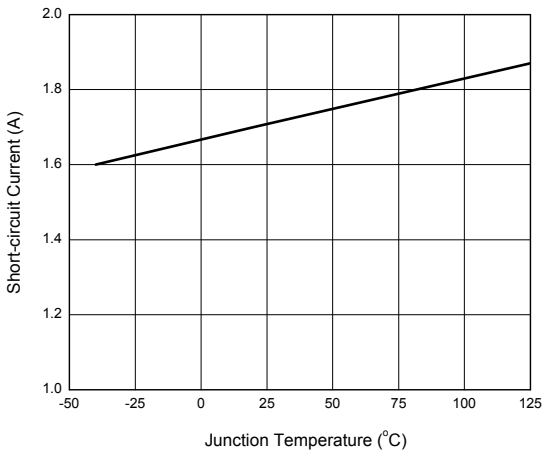



Figure 11. Short-circuit Current vs. Junction Temperature

## Typical Performance Characteristics (Continued)

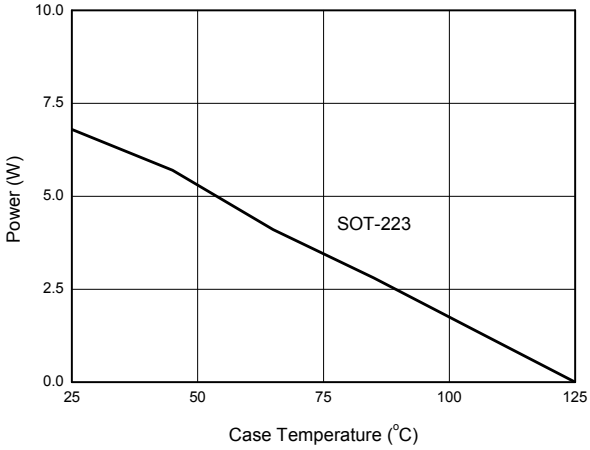



Figure 12. Maximum Power Dissipation

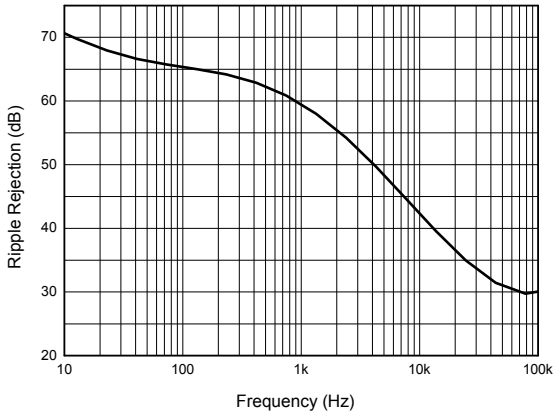



Figure 13. Ripple Rejection vs. Frequency

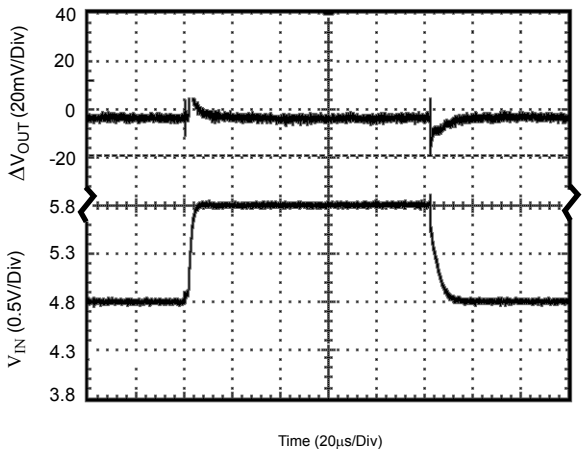



Figure 14. Line Transient Response
(Conditions: $V_{IN}$=4.8 to 5.8V, $V_{OUT}$=3.33V, $I_{OUT}$=0.1A, $C_{IN}$=1μF, $C_{OUT}$=10μF )

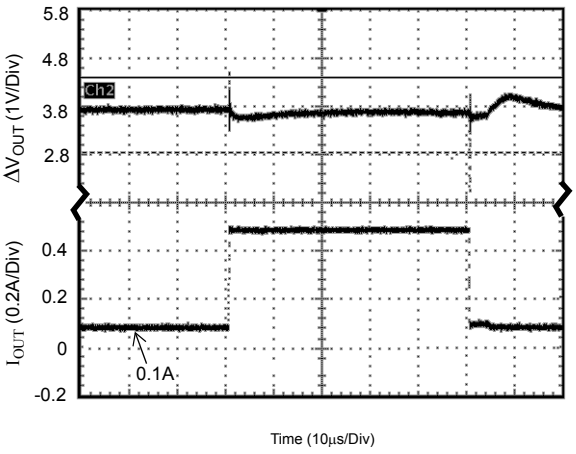



Figure 15. Load Transient Response
(Conditions: $V_{IN}$=4.8V, $V_{OUT}$=3.33V, $I_{OUT}$=0.1 to 0.5A, $C_{IN}$=$C_{OUT}$=10μF)

## Typical Applications

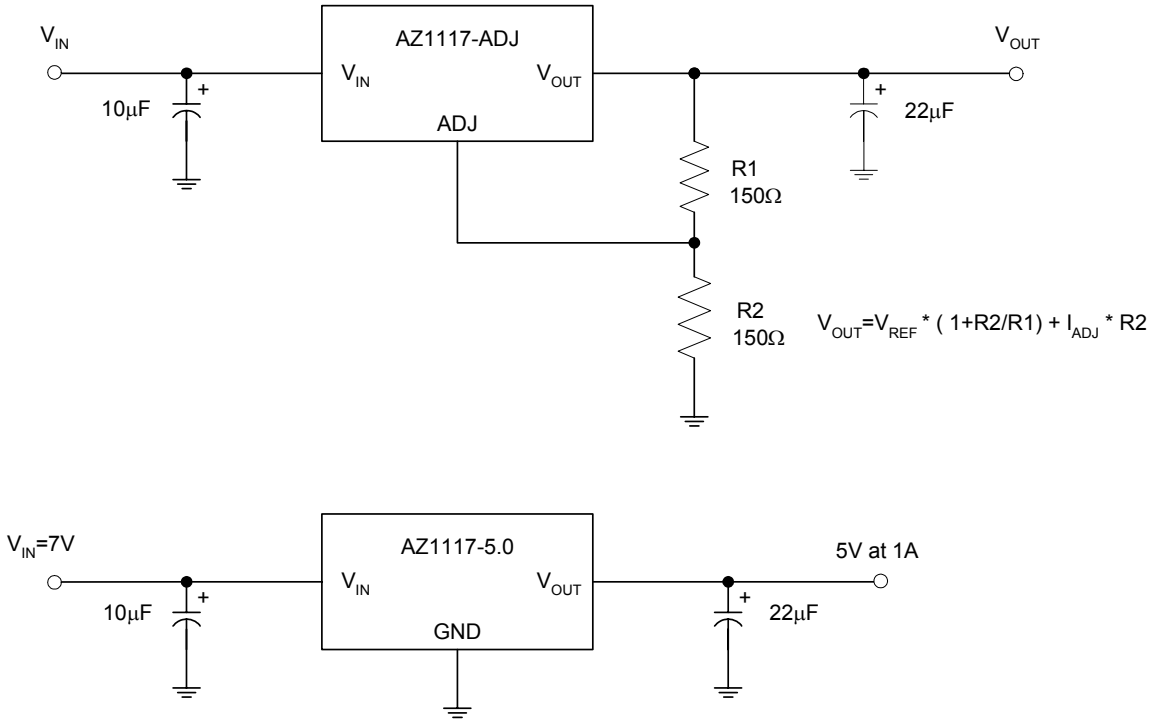
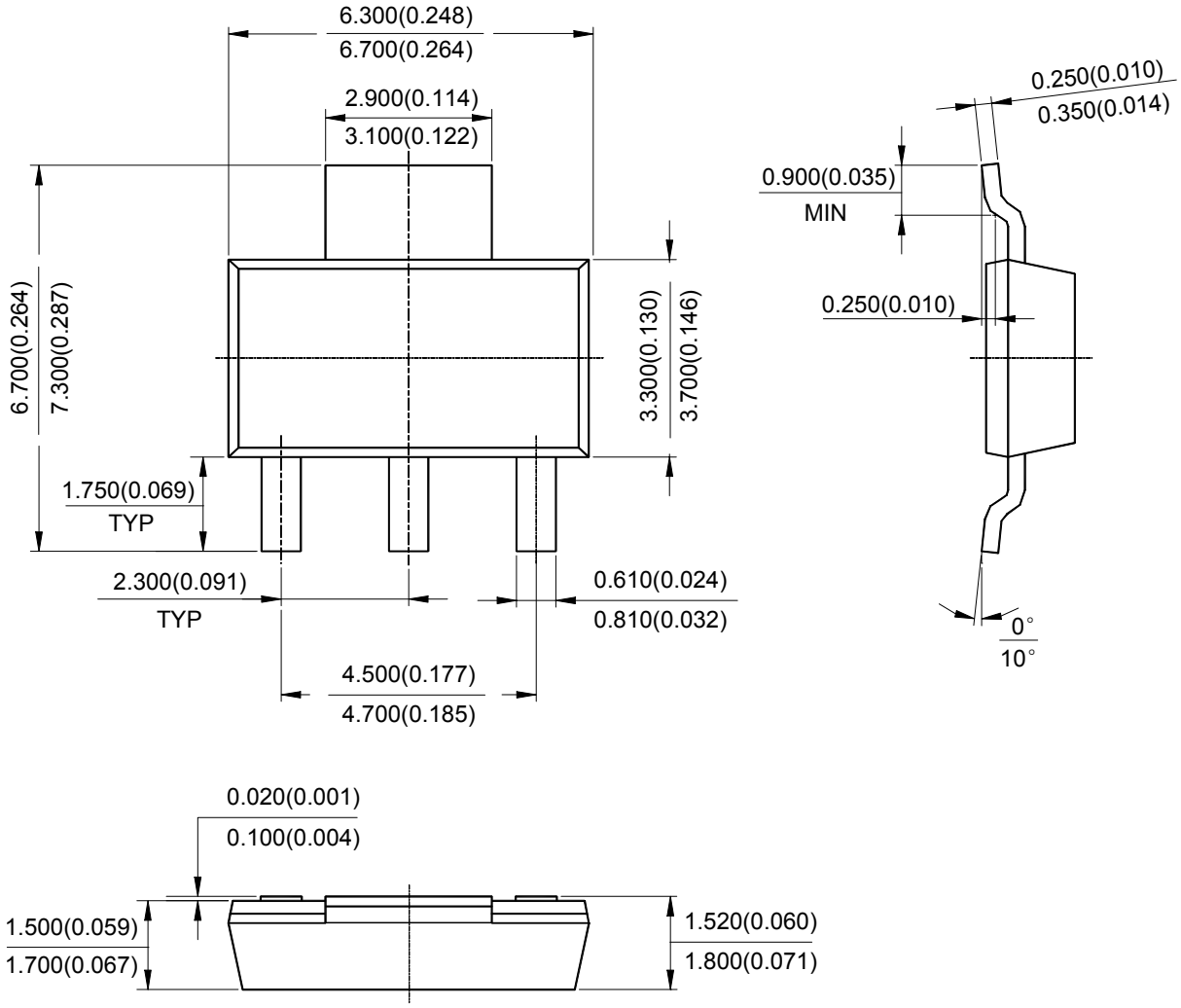



Figure 16. Typical Applications of AZ1117

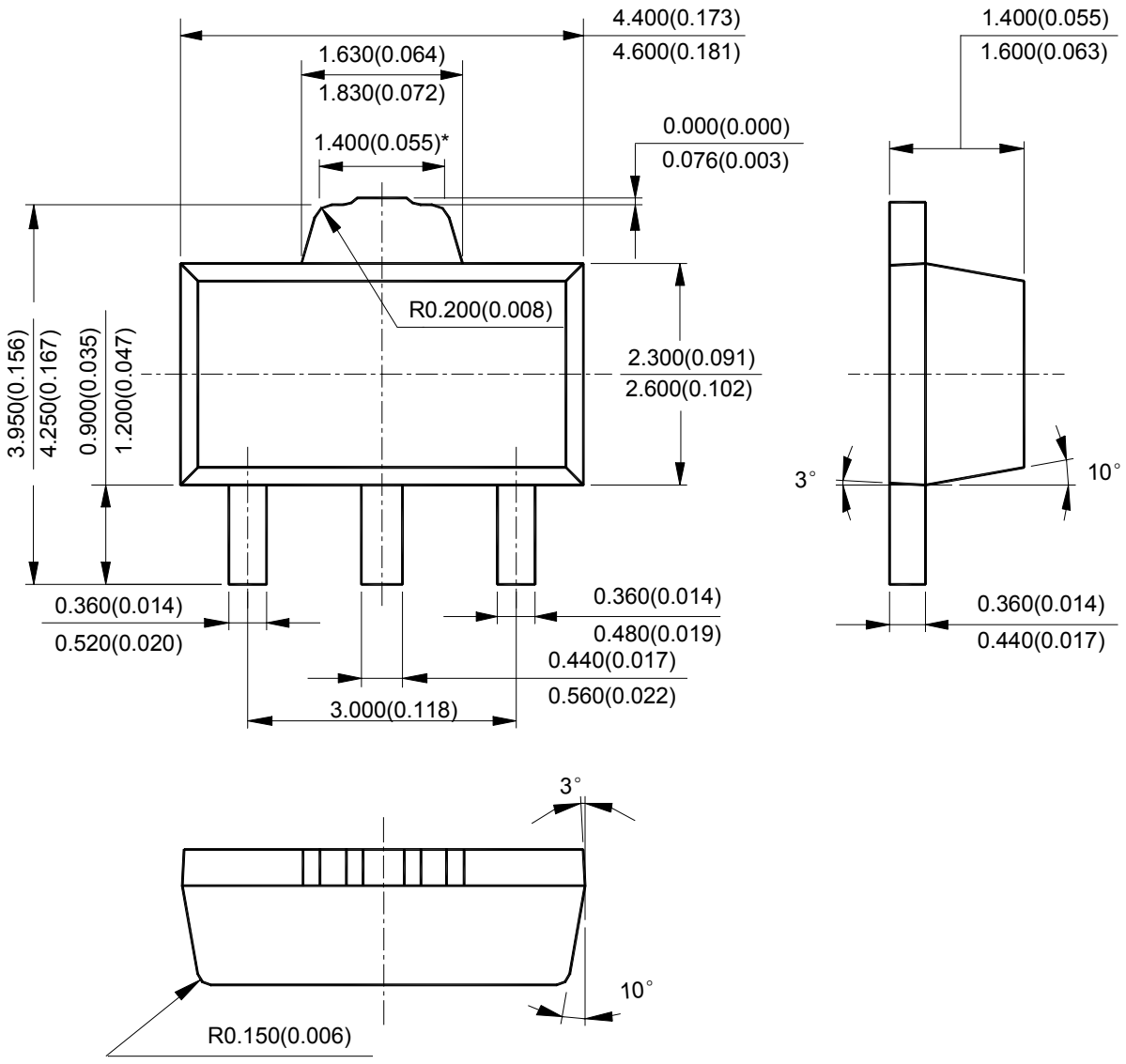
## Mechanical Dimensions

**SOT-223** **Unit: mm(inch)**



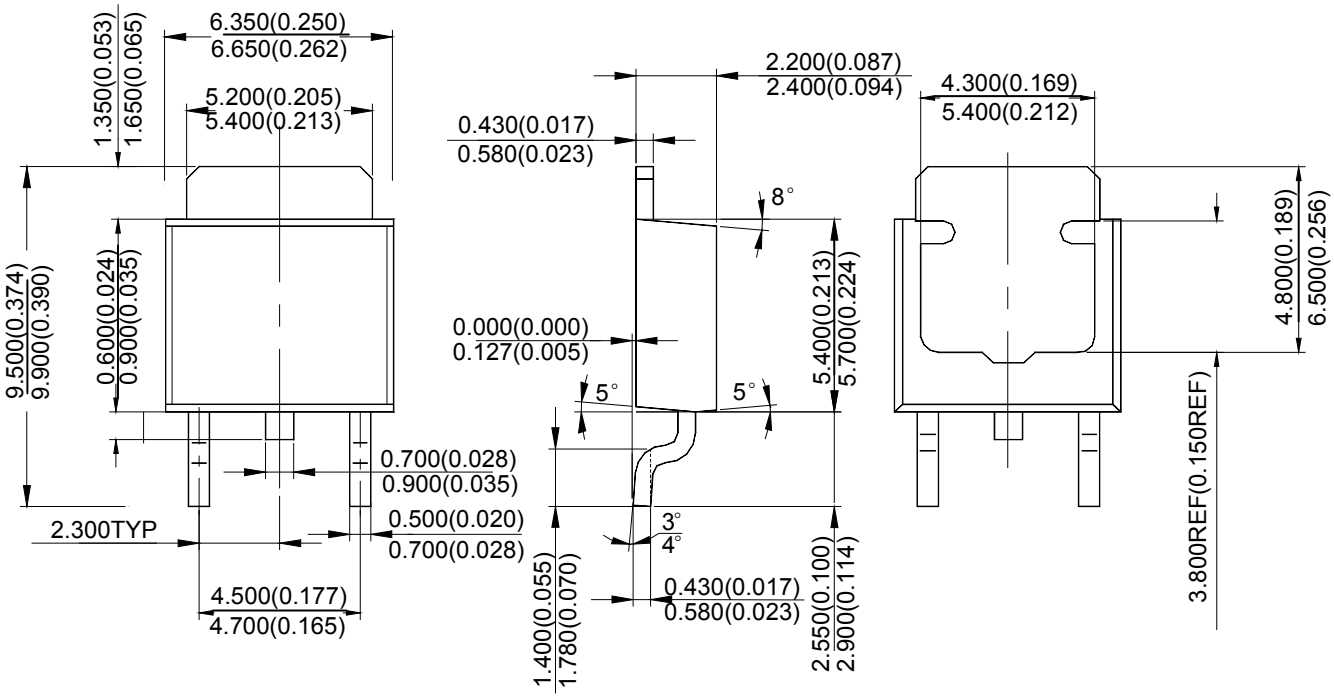
## Mechanical Dimensions (Continued)

**SOT-89** **Unit: mm(inch)**



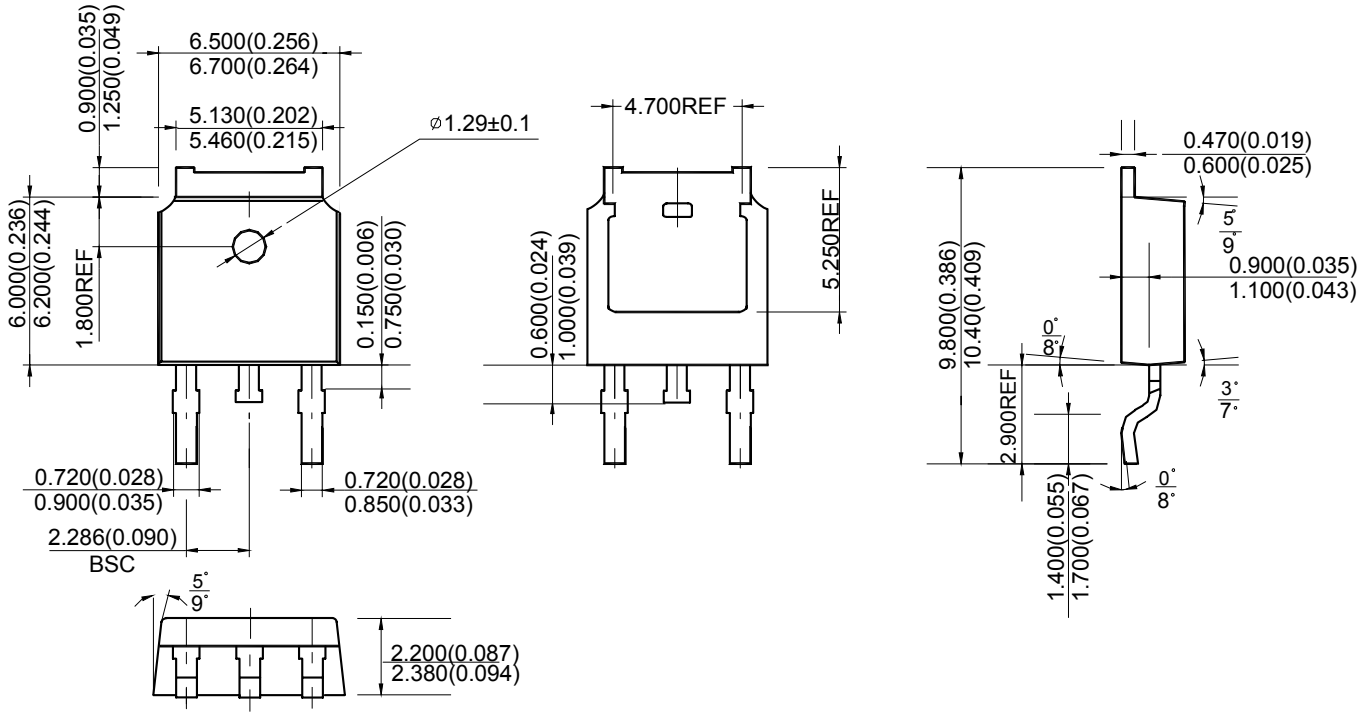
## Mechanical Dimensions (Continued)

**TO-252-2 (1)** **Unit: mm(inch)**



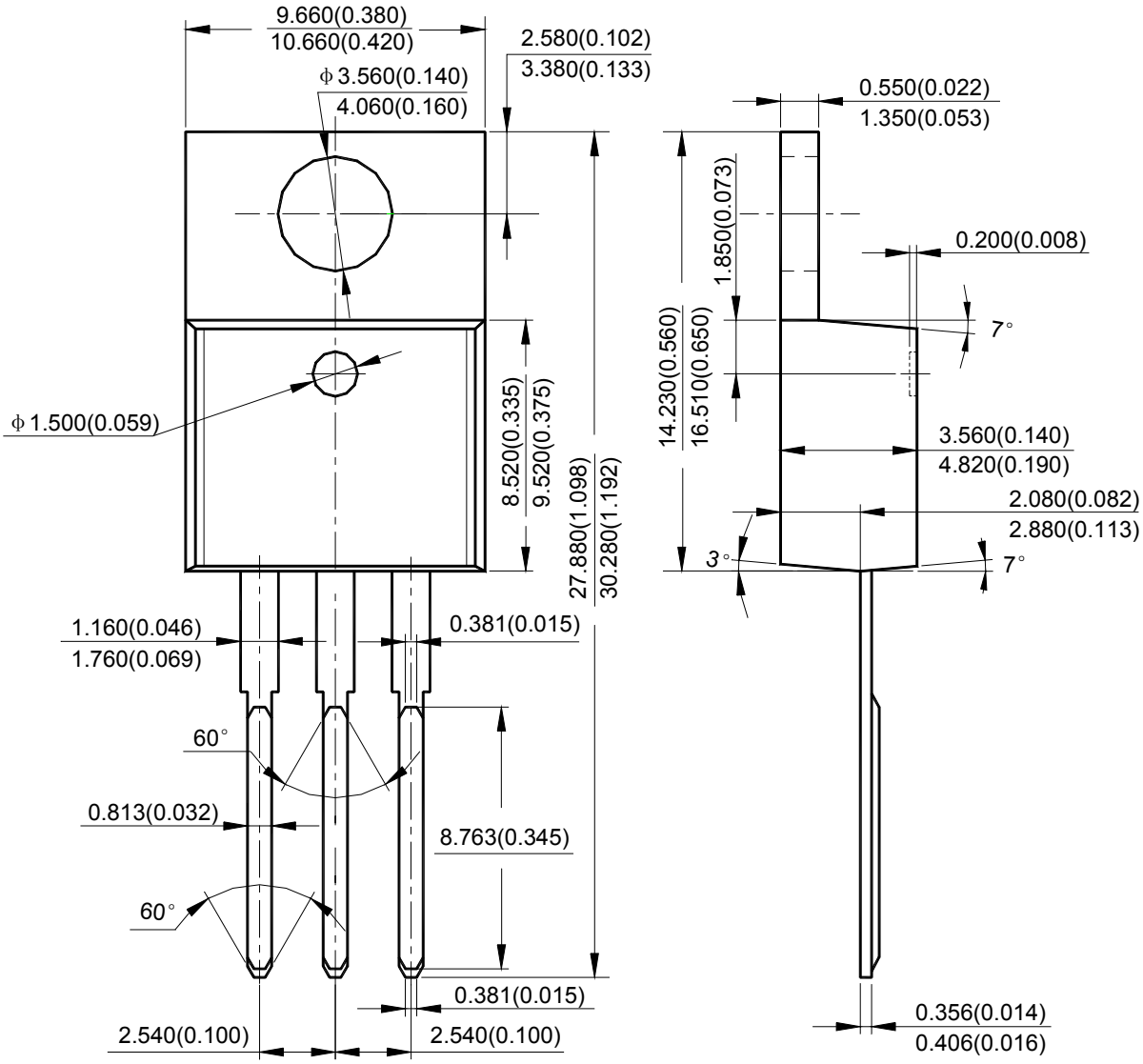
## Mechanical Dimensions (Continued)

**TO-252-2 (3)** **Unit: mm(inch)**



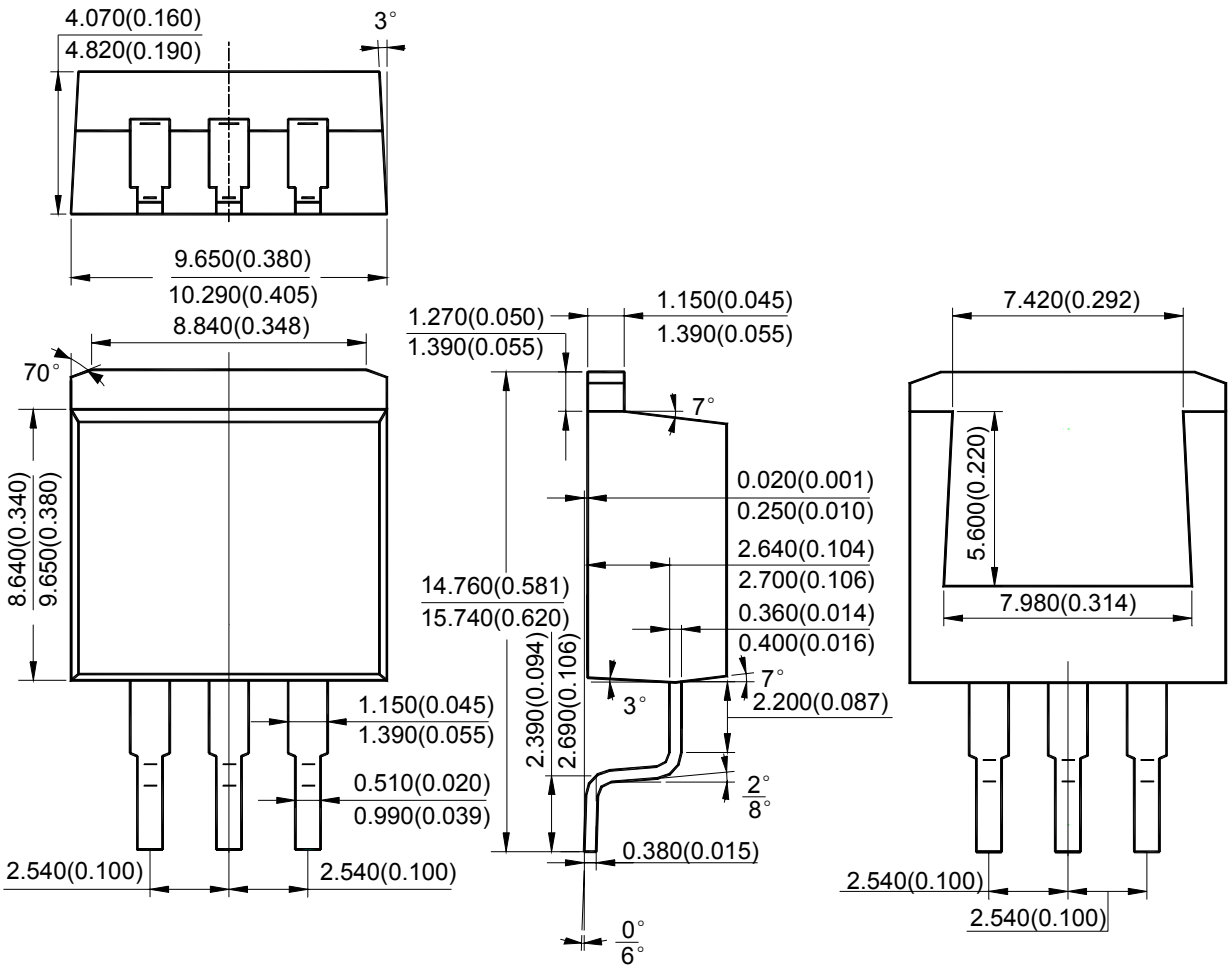
## Mechanical Dimensions (Continued)

**TO-220-3** **Unit: mm(inch)**



## Mechanical Dimensions (Continued)

**TO-263-3** **Unit: mm(inch)**



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**MAIN SITE**

**- Headquarters**
**BCD Semiconductor Manufacturing Limited**
No. 1600, Zi Xing Road, Shanghai ZiZhu Science-based Industrial Park, 200241, China
Tel: +86-21-24162266, Fax: +86-21-24162277

**- Wafer Fab**
**Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.**
800 Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

**REGIONAL SALES OFFICE**

**Shenzhen Office**
**Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office**
Room E, 5F, Noble Center, No.1006, 3rd Fuzhong Road, Futian District, Shenzhen, 518026, China
Tel: +86-755-8826 7951
Fax: +86-755-8826 7865

**Taiwan Office**
**BCD Semiconductor (Taiwan) Company Limited**
4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan
Tel: +886-2-2656 2808
Fax: +886-2-2656 2806

**USA Office**
**BCD Semiconductor Corp.**
30920 Huntwood Ave. Hayward, CA 94544, USA
Tel : +1-510-324-2988
Fax: +1-510-324-2788