



**THE DATASHEET OF  
AZ1117D-1.5TRE1**



## 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, which can provide the output voltage from 1.25V to 12V with only 2 external resistors.

The AZ1117 series is available in the industry standard SOT223, SOT89, TO220-3, TO252-2 (3), TO252-2 (4), TO252-2 (5) and TO263 power packages.

## Features

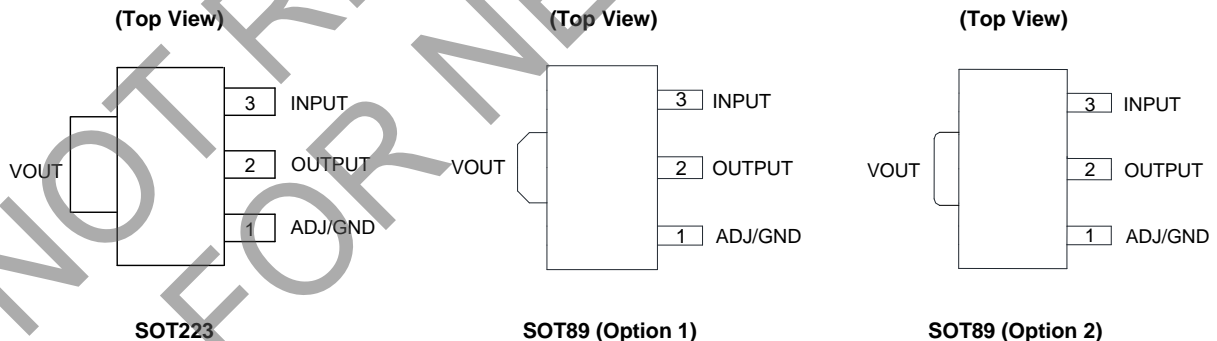
- Low Dropout Voltage: 1.15V at 1A Output Current
- Trimmed Current Limit
- On-chip Thermal Shutdown
- Three-terminal Adjustable or Fixed 1.2V, 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V
- Operation Junction Temperature: -40 to +125°C
- Lead-Free Packages: SOT223, SOT89, TO220-3, TO252-2 (3), TO252-2 (4), TO252-2 (5), TO263
- **Totally Lead-Free; RoHS Compliant (Notes 1 & 2)**

## Applications

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

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.  
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.

## Pin Assignments



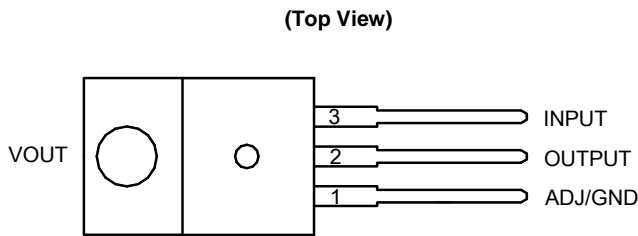
**Pin Assignments (Cont.)**



TO220-3 (Option 1)



TO220-3 (Option 2)



TO220-3 (Option 3)



TO263



TO252-2 (3) (Option 1)



TO252-2 (3) (Option 2)



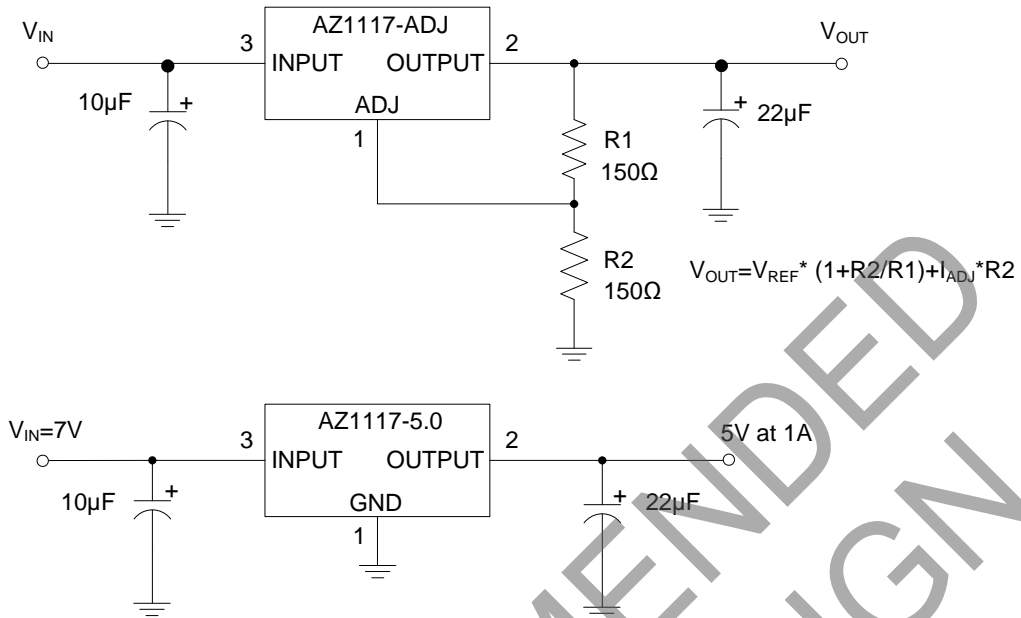
TO252-2 (4)



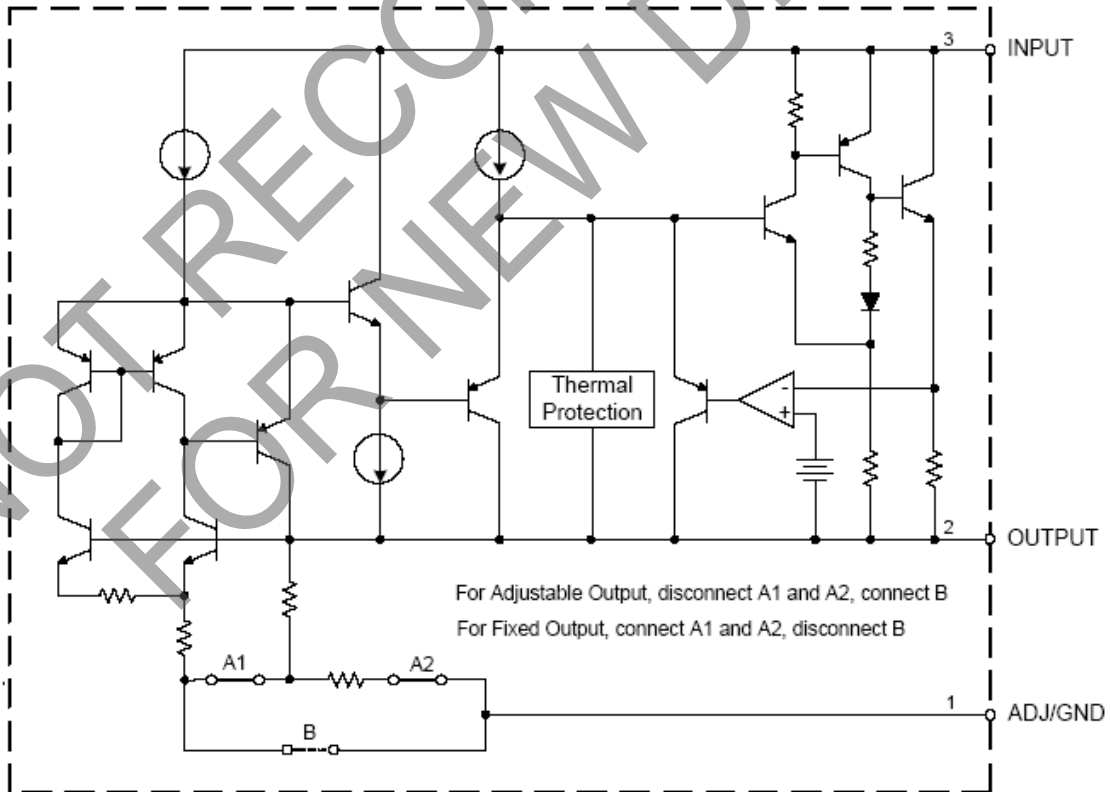
TO252-2 (5)

NOT RECOMMENDED FOR NEW DESIGN

**Typical Applications Circuit**



**Functional Block Diagram**



**Absolute Maximum Ratings** (Note 3)

| 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 4) | $\theta_{JA}$ | SOT223                                    | 120 | °C/W |
|  |               | SOT89                                     | 165 |      |
|  |               | TO220-3                                   | 60  |      |
|  |               | TO252-2 (3)<br>TO252-2 (4)<br>TO252-2 (5) | 100 |      |
|  |               | TO263                                     | 60  |      |
| ESD (Human Body Model)                   | ESD           | 2000                                      |     | V    |
| ESD (Machine Model)                      | ESD           | 250                                       |     | V    |

- Notes:
- 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.
  - 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: $V_{IN} \leq 10V$ , $T_J = +25^\circ C$ , unless otherwise specified.)

| Parameter                          | Symbol           | Conditions   | Min            | Typ            | Max            | Unit         |
|------------------------------------|------------------|--|----------------|----------------|----------------|--------------|
| Reference Voltage                  | $V_{REF}$        | $I_{OUT} = 10mA$ , $V_{IN}-V_{OUT} = 2V$<br>$10mA \leq I_{OUT} \leq 1A$ , $1.4V \leq V_{IN}-V_{OUT} \leq 8V$ ,<br>$P \leq$ Maximum Power Dissipation | 1.238<br>1.225 | 1.250<br>1.250 | 1.262<br>1.270 | V            |
| Line Regulation                    | $\Delta V_{OUT}$ | $I_{OUT}=10mA$ , $1.5V \leq V_{IN}-V_{OUT} \leq 10V$   | —              | 0.035          | 0.2            | %            |
| Load Regulation                    | $\Delta V_{OUT}$ | $V_{IN}-V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$  | —              | 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            | $\mu A$      |
| Adjust Pin Current Change          | $\Delta I_{ADJ}$ | $1.4V \leq V_{IN}-V_{OUT} \leq 10V$ , $10mA \leq I_{OUT} \leq 1A$  | —              | 0.2            | 5              | $\mu A$      |
| Minimum Load Current (ADJ)         | $I_{LOAD(MIN)}$  | $1.5V \leq V_{IN}-V_{OUT} \leq 10V$ (ADJ only)   | —              | 1.7            | 5              | mA           |
| Quiescent Current                  | $I_Q$            | $V_{IN} = V_{OUT} + 1.25V$   | —              | 5              | 10             | mA           |
| Ripple Rejection                   | PSRR             | $f = 120Hz$ , $C_{OUT} = 22\mu F$ Tantalum,<br>$V_{IN}-V_{OUT} = 3V$ , $I_{OUT} = 1A$  | 60             | 75             | —              | dB           |
| Temperature Stability              | —                | —  | —              | 0.5            | —              | %            |
| Long-term Stability                | —                | $T_A = +125^\circ C$ , 1000hrs   | —              | 0.3            | —              | %            |
| RMS Output Noise (% of $V_{OUT}$ ) | —                | $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$   | —              | 0.003          | —              | %            |
| Thermal Shutdown                   | —                | Junction Temperature   | —              | +150           | —              | $^\circ C$   |
| Thermal Shutdown Hysteresis        | —                | —  | —              | +25            | —              | $^\circ C$   |
| Thermal Resistance                 | $\theta_{JC}$    | SOT223   | —              | 25             | —              | $^\circ C/W$ |
|                                    |                  | SOT89  | —              | 30             | —              |              |
|                                    |                  | TO220-3  | —              | 10             | —              |              |
|                                    |                  | TO252-2 (3)/TO252-2 (4)/TO252-2 (5)  | —              | 17             | —              |              |
|                                    |                  | TO263  | —              | 10             | —              |              |

**Electrical Characteristics** (Cont.)

**AZ1117-1.2 Electrical Characteristics** (Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = +25^\circ C$ , unless otherwise specified.)

| Parameter                          | Symbol           | Conditions  | Min            | Typ        | Max            | Unit         |
|------------------------------------|------------------|---|----------------|------------|----------------|--------------|
| Output Voltage                     | $V_{OUT}$        | $I_{OUT} = 10mA$ , $V_{IN} = 3.2V$<br>$10mA \leq I_{OUT} \leq 1A$ , $3.0V \leq V_{IN} \leq 10V$ | 1.176<br>1.152 | 1.2<br>1.2 | 1.224<br>1.248 | V            |
| Line Regulation                    | $\Delta V_{OUT}$ | $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$  | —              | 1          | 6              | mV           |
| Load Regulation                    | $\Delta V_{OUT}$ | $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$   | —              | 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             | $f = 120Hz$ , $C_{OUT} = 22\mu F$ Tantalum,<br>$V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$         | 60             | 75         | —              | dB           |
| Temperature Stability              | —                | —   | —              | 0.5        | —              | %            |
| Long-term Stability                | —                | $T_A = +125^\circ C$ , 1000hrs  | —              | 0.3        | —              | %            |
| RMS Output Noise (% of $V_{OUT}$ ) | —                | $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$  | —              | 0.003      | —              | %            |
| Thermal Shutdown                   | —                | Junction Temperature  | —              | +150       | —              | $^\circ C$   |
| Thermal Shutdown Hysteresis        | —                | —   | —              | +25        | —              | $^\circ C$   |
| Thermal Resistance                 | $\theta_{JC}$    | SOT223  | —              | 25         | —              | $^\circ C/W$ |
|                                    |                  | SOT89   | —              | 30         | —              |              |
|                                    |                  | TO220-3   | —              | 10         | —              |              |
|                                    |                  | TO252-2 (3)/TO252-2 (4)/TO252-2 (5)   | —              | 17         | —              |              |
|                                    |                  | TO263   | —              | 10         | —              |              |

**Electrical Characteristics** (Cont.)

**AZ1117-1.5 Electrical Characteristics** (Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = +25^\circ C$ , unless otherwise specified.)

| Parameter                          | Symbol           | Conditions  | Min            | Typ        | Max            | Unit         |
|------------------------------------|------------------|---|----------------|------------|----------------|--------------|
| Output Voltage                     | $V_{OUT}$        | $I_{OUT} = 10mA$ , $V_{IN} = 3.5V$<br>$10mA \leq I_{OUT} \leq 1A$ , $3.0V \leq V_{IN} \leq 10V$ | 1.485<br>1.470 | 1.5<br>1.5 | 1.515<br>1.530 | V            |
| Line Regulation                    | $\Delta V_{OUT}$ | $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$  | —              | 1          | 6              | mV           |
| Load Regulation                    | $\Delta V_{OUT}$ | $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$   | —              | 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             | $f = 120Hz$ , $C_{OUT} = 22\mu F$ Tantalum,<br>$V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$         | 60             | 75         | —              | dB           |
| Temperature Stability              | —                | —   | —              | 0.5        | —              | %            |
| Long-term Stability                | —                | $T_A = +125^\circ C$ , 1000hrs  | —              | 0.3        | —              | %            |
| RMS Output Noise (% of $V_{OUT}$ ) | —                | $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$  | —              | 0.003      | —              | %            |
| Thermal Shutdown                   | —                | Junction Temperature  | —              | +150       | —              | $^\circ C$   |
| Thermal Shutdown Hysteresis        | —                | —   | —              | +25        | —              | $^\circ C$   |
| Thermal Resistance                 | $\theta_{JC}$    | SOT223  | —              | 25         | —              | $^\circ C/W$ |
|                                    |                  | SOT89   | —              | 30         | —              |              |
|                                    |                  | TO220-3   | —              | 10         | —              |              |
|                                    |                  | TO252-2 (3)/TO252-2 (4)/TO252-2 (5)   | —              | 17         | —              |              |
|                                    |                  | TO263   | —              | 10         | —              |              |

NOT RECOMMENDED FOR NEW DESIGN

**Electrical Characteristics** (Cont.)

**AZ1117-1.8 Electrical Characteristics** (Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = +25^\circ C$ , unless otherwise specified.)

| Parameter                          | Symbol           | Conditions  | Min            | Typ        | Max            | Unit         |
|------------------------------------|------------------|---|----------------|------------|----------------|--------------|
| Output Voltage                     | $V_{OUT}$        | $I_{OUT} = 10mA$ , $V_{IN} = 3.8V$<br>$10mA \leq I_{OUT} \leq 1A$ , $3.2V \leq V_{IN} \leq 10V$ | 1.782<br>1.746 | 1.8<br>1.8 | 1.818<br>1.854 | V            |
| Line Regulation                    | $\Delta V_{OUT}$ | $I_{OUT}=10mA$ , $1.5V \leq V_{IN}-V_{OUT} \leq 10V$  | —              | 1          | 6              | mV           |
| Load Regulation                    | $\Delta V_{OUT}$ | $V_{IN}-V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$   | —              | 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             | $f = 120Hz$ , $C_{OUT} = 22\mu F$ Tantalum,<br>$V_{IN}-V_{OUT} = 3V$ , $I_{OUT} = 1A$           | 60             | 75         | —              | dB           |
| Temperature Stability              | —                | —   | —              | 0.5        | —              | %            |
| Long-term Stability                | —                | $T_A = +125^\circ C$ , 1000hrs  | —              | 0.3        | —              | %            |
| RMS Output Noise (% of $V_{OUT}$ ) | —                | $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$  | —              | 0.003      | —              | %            |
| Thermal Shutdown                   | —                | Junction Temperature  | —              | +150       | —              | $^\circ C$   |
| Thermal Shutdown Hysteresis        | —                | —   | —              | +25        | —              | $^\circ C$   |
| Thermal Resistance                 | $\theta_{JC}$    | SOT223  | —              | 25         | —              | $^\circ C/W$ |
|                                    |                  | SOT89   | —              | 30         | —              |              |
|                                    |                  | TO220-3   | —              | 10         | —              |              |
|                                    |                  | TO252-2 (3)/TO252-2 (4)/TO252-2 (5)   | —              | 17         | —              |              |
|                                    |                  | TO263   | —              | 10         | —              |              |

**Electrical Characteristics** (Cont.)

**AZ1117-2.5 Electrical Characteristics** (Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = +25^\circ C$ , unless otherwise specified.)

| Parameter                          | Symbol           | Conditions  | Min            | Typ        | Max            | Unit         |
|------------------------------------|------------------|---|----------------|------------|----------------|--------------|
| Output Voltage                     | $V_{OUT}$        | $I_{OUT} = 10mA$ , $V_{IN} = 4.5V$<br>$10mA \leq I_{OUT} \leq 1A$ , $3.9V \leq V_{IN} \leq 10V$ | 2.475<br>2.450 | 2.5<br>2.5 | 2.525<br>2.550 | V            |
| Line Regulation                    | $\Delta V_{OUT}$ | $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$  | —              | 1          | 6              | mV           |
| Load Regulation                    | $\Delta V_{OUT}$ | $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$   | —              | 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             | $f = 120Hz$ , $C_{OUT} = 22\mu F$ Tantalum,<br>$V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$         | 60             | 75         | —              | dB           |
| Temperature Stability              | —                | —   | —              | 0.5        | —              | %            |
| Long-term Stability                | —                | $T_A = +125^\circ C$ , 1000hrs  | —              | 0.3        | —              | %            |
| RMS Output Noise (% of $V_{OUT}$ ) | —                | $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$  | —              | 0.003      | —              | %            |
| Thermal Shutdown                   | —                | Junction Temperature  | —              | +150       | —              | $^\circ C$   |
| Thermal Shutdown Hysteresis        | —                | —   | —              | +25        | —              | $^\circ C$   |
| Thermal Resistance                 | $\theta_{JC}$    | SOT223  | —              | 25         | —              | $^\circ C/W$ |
|                                    |                  | SOT89   | —              | 30         | —              |              |
|                                    |                  | TO220-3   | —              | 10         | —              |              |
|                                    |                  | TO252-2 (3)/TO252-2 (4)/TO252-2 (5)   | —              | 17         | —              |              |
|                                    |                  | TO263   | —              | 10         | —              |              |

**Electrical Characteristics** (Cont.)

**AZ1117-2.85 Electrical Characteristics** (Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = +25^\circ C$ , unless otherwise specified.)

| Parameter                          | Symbol           | Conditions  | Min            | Typ          | Max            | Unit         |
|------------------------------------|------------------|---|----------------|--------------|----------------|--------------|
| Output Voltage                     | $V_{OUT}$        | $I_{OUT} = 10mA$ , $V_{IN} = 4.85V$<br>$10mA \leq I_{OUT} \leq 1A$ , $4.25V \leq V_{IN} \leq 10V$ | 2.822<br>2.793 | 2.85<br>2.85 | 2.878<br>2.907 | V            |
| Line Regulation                    | $\Delta V_{OUT}$ | $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$  | —              | 1            | 6              | mV           |
| Load Regulation                    | $\Delta V_{OUT}$ | $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$   | —              | 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             | $f = 120Hz$ , $C_{OUT} = 22\mu F$ Tantalum,<br>$V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$           | 60             | 75           | —              | dB           |
| Temperature Stability              | —                | —   | —              | 0.5          | —              | %            |
| Long-term Stability                | —                | $T_A = +125^\circ C$ , 1000hrs  | —              | 0.3          | —              | %            |
| RMS Output Noise (% of $V_{OUT}$ ) | —                | $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$  | —              | 0.003        | —              | %            |
| Thermal Shutdown                   | —                | Junction Temperature  | —              | +150         | —              | $^\circ C$   |
| Thermal Shutdown Hysteresis        | —                | —   | —              | +25          | —              | $^\circ C$   |
| Thermal Resistance                 | $\theta_{JC}$    | SOT223  | —              | 25           | —              | $^\circ C/W$ |
|                                    |                  | SOT89   | —              | 30           | —              |              |
|                                    |                  | TO220-3   | —              | 10           | —              |              |
|                                    |                  | TO252-2 (3)/TO252-2 (4)/TO252-2 (5)   | —              | 17           | —              |              |
|                                    |                  | TO263   | —              | 10           | —              |              |

NOT RECOMMENDED FOR NEW DESIGN

**Electrical Characteristics** (Cont.)

**AZ1117-3.3 Electrical Characteristics** (Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = +25^\circ C$ , unless otherwise specified.)

| Parameter                          | Symbol           | Conditions   | Min            | Typ        | Max            | Unit         |
|------------------------------------|------------------|--|----------------|------------|----------------|--------------|
| Output Voltage                     | $V_{OUT}$        | $I_{OUT} = 10mA$ , $V_{IN} = 5.0V$<br>$10mA \leq I_{OUT} \leq 1A$ , $4.75V \leq V_{IN} \leq 10V$ | 3.267<br>3.235 | 3.3<br>3.3 | 3.333<br>3.365 | V            |
| Line Regulation                    | $\Delta V_{OUT}$ | $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$   | —              | 1          | 6              | mV           |
| Load Regulation                    | $\Delta V_{OUT}$ | $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$  | —              | 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             | $f = 120Hz$ , $C_{OUT} = 22\mu F$ Tantalum,<br>$V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$          | 60             | 75         | —              | dB           |
| Temperature Stability              | —                | —  | —              | 0.5        | —              | %            |
| Long-term Stability                | —                | $T_A = +125^\circ C$ , 1000hrs   | —              | 0.3        | —              | %            |
| RMS Output Noise (% of $V_{OUT}$ ) | —                | $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$   | —              | 0.003      | —              | %            |
| Thermal Shutdown                   | —                | Junction Temperature   | —              | +150       | —              | $^\circ C$   |
| Thermal Shutdown Hysteresis        | —                | —  | —              | +25        | —              | $^\circ C$   |
| Thermal Resistance                 | $\theta_{JC}$    | SOT223   | —              | 25         | —              | $^\circ C/W$ |
|                                    |                  | SOT89  | —              | 30         | —              |              |
|                                    |                  | TO220-3  | —              | 10         | —              |              |
|                                    |                  | TO252-2 (3)/TO252-2 (4)/TO252-2 (5)  | —              | 17         | —              |              |
|                                    |                  | TO263  | —              | 10         | —              |              |

NOT RECOMMENDED FOR NEW DESIGN

**Electrical Characteristics** (Cont.)

**AZ1117-5.0 Electrical Characteristics** (Operating Conditions:  $V_{IN} \leq 10V$ ,  $T_J = +25^\circ C$ , unless otherwise specified.)

| Parameter                          | Symbol           | Conditions  | Min            | Typ        | Max            | Unit         |
|------------------------------------|------------------|---|----------------|------------|----------------|--------------|
| Output Voltage                     | $V_{OUT}$        | $I_{OUT} = 10mA$ , $V_{IN} = 7.0V$<br>$10mA \leq I_{OUT} \leq 1A$ , $6.5V \leq V_{IN} \leq 12V$ | 4.950<br>4.900 | 5.0<br>5.0 | 5.050<br>5.100 | V            |
| Line Regulation                    | $\Delta V_{OUT}$ | $I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$  | —              | 1          | 10             | mV           |
| Load Regulation                    | $\Delta V_{OUT}$ | $V_{IN} - V_{OUT} = 2V$ , $10mA \leq I_{OUT} \leq 1A$   | —              | 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             | $f = 120Hz$ , $C_{OUT} = 22\mu F$ Tantalum,<br>$V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$         | 60             | 75         | —              | dB           |
| Temperature Stability              | —                | —   | —              | 0.5        | —              | %            |
| Long-term Stability                | —                | $T_A = +125^\circ C$ , 1000hrs  | —              | 0.3        | —              | %            |
| RMS Output Noise (% of $V_{OUT}$ ) | —                | $T_A = +25^\circ C$ , $10Hz \leq f \leq 10kHz$  | —              | 0.003      | —              | %            |
| Thermal Shutdown                   | —                | Junction Temperature  | —              | +150       | —              | $^\circ C$   |
| Thermal Shutdown Hysteresis        | —                | —   | —              | +25        | —              | $^\circ C$   |
| Thermal Resistance                 | $\theta_{JC}$    | SOT223  | —              | 25         | —              | $^\circ C/W$ |
|                                    |                  | SOT89   | —              | 30         | —              |              |
|                                    |                  | TO220-3   | —              | 10         | —              |              |
|                                    |                  | TO252-2 (3)/TO252-2 (4)/TO252-2 (5)   | —              | 17         | —              |              |
|                                    |                  | TO263   | —              | 10         | —              |              |

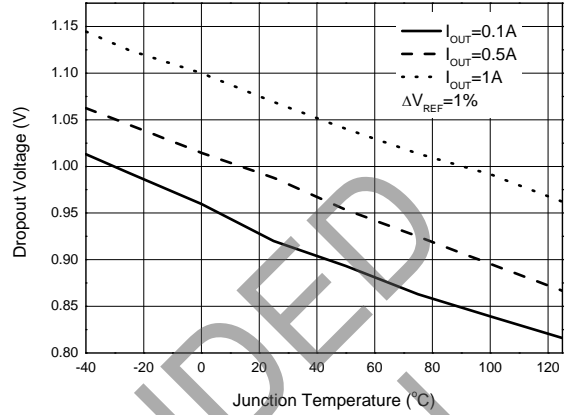
NOT RECOMMENDED FOR NEW DESIGN

**Performance Characteristics**

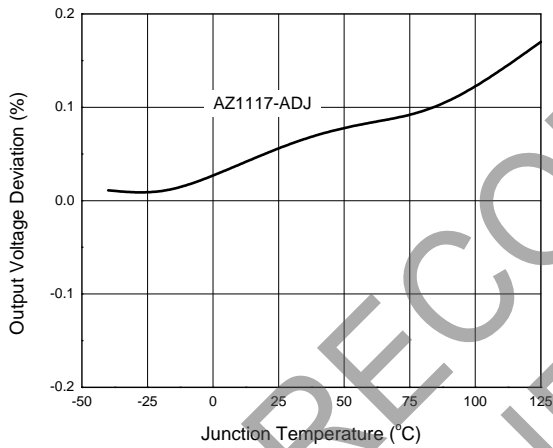
**Dropout Voltage vs. Output Current**



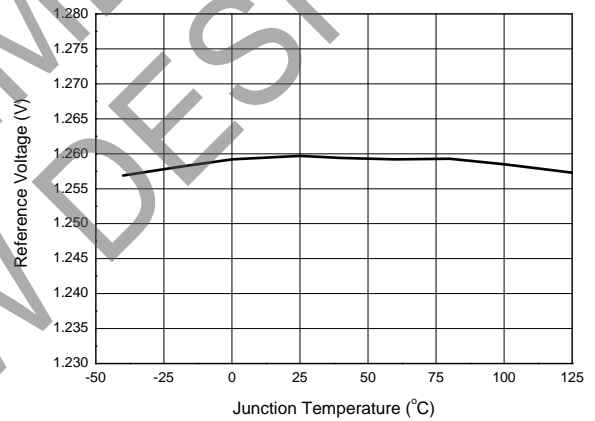
**Dropout Voltage vs. Junction Temperature**



**Load Regulation vs. Junction Temperature**



**Reference Voltage vs. Junction Temperature**



**Output Voltage vs. Junction Temperature**



**Minimum Load Current vs. Junction Temperature**

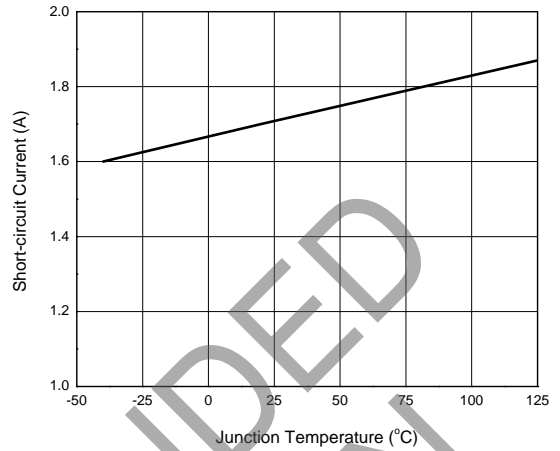


**Performance Characteristics (Cont.)**

**Adjust Pin Current vs. Junction Temperature**



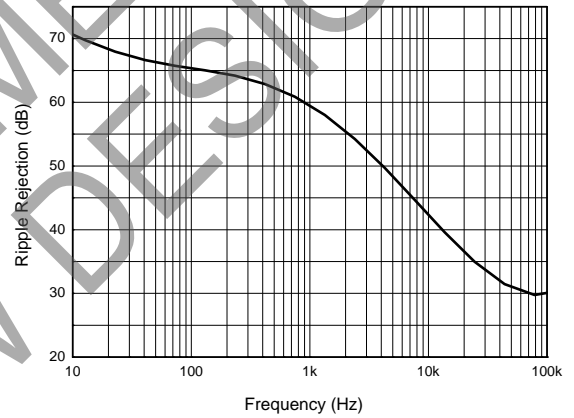
**Short-circuit Current vs. Junction Temperature**



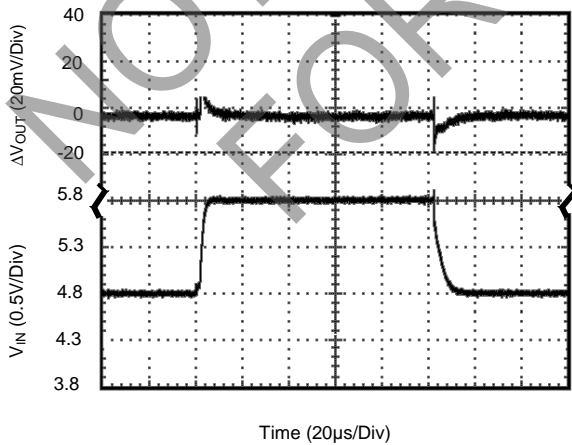
**Maximum Power Dissipation**



**Ripple Rejection vs. Frequency**

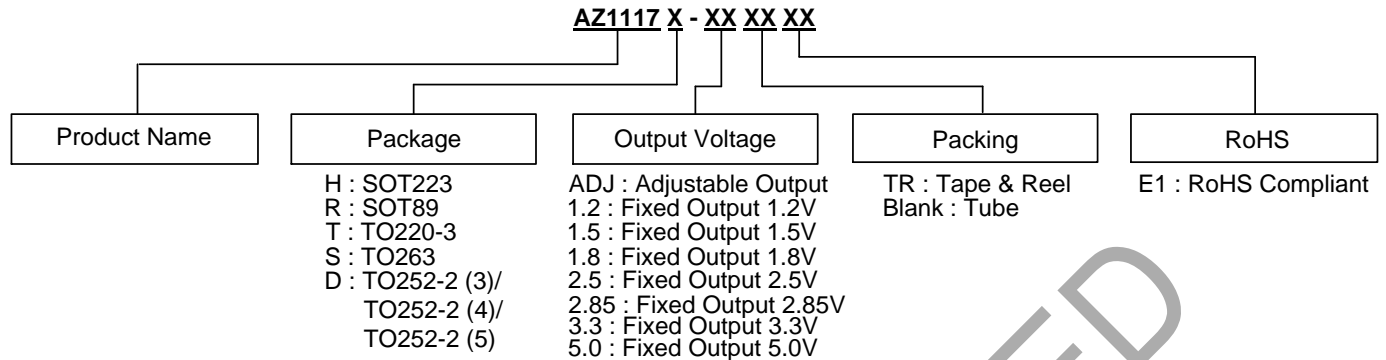


**Line Transient Response**  
(Conditions:  $V_{IN} = 4.8$  to  $5.8V$ ,  $V_{OUT} = 3.33V$ ,  $I_{OUT} = 0.1A$ ,  $C_{IN} = 1\mu F$ ,  $C_{OUT} = 10\mu F$ )



**Load Transient Response**  
(Conditions:  $V_{IN} = 4.8V$ ,  $V_{OUT} = 3.33V$ ,  $I_{OUT} = 0.1$  to  $0.5A$ ,  $C_{IN} = C_{OUT} = 10\mu F$ )



**Ordering Information**


| Package | Temperature Range | Part Number      | Marking ID     | Packing          |
|---------|-------------------|------------------|----------------|------------------|
| SOT223  | -40 to +125°C     | AZ1117H-ADJTRE1  | EH11A          | 4000/Tape & Reel |
|         | -40 to +125°C     | AZ1117H-1.2TRE1  | EH18A          | 4000/Tape & Reel |
|         | -40 to +125°C     | AZ1117H-1.5TRE1  | EH12A          | 4000/Tape & Reel |
|         | -40 to +125°C     | AZ1117H-1.8TRE1  | EH13A          | 4000/Tape & Reel |
|         | -40 to +125°C     | AZ1117H-2.5TRE1  | EH14A          | 4000/Tape & Reel |
|         | -40 to +125°C     | AZ1117H-2.85TRE1 | EH15A          | 4000/Tape & Reel |
|         | -40 to +125°C     | AZ1117H-3.3TRE1  | EH16A          | 4000/Tape & Reel |
|         | -40 to +125°C     | AZ1117H-5.0TRE1  | EH17A          | 4000/Tape & Reel |
| SOT89   | -40 to +125°C     | AZ1117R-ADJTRE1  | E17A           | 1000/Tape & Reel |
|         | -40 to +125°C     | AZ1117R-1.2TRE1  | E17G           | 1000/Tape & Reel |
|         | -40 to +125°C     | AZ1117R-1.5TRE1  | E17B           | 1000/Tape & Reel |
|         | -40 to +125°C     | AZ1117R-1.8TRE1  | E17C           | 1000/Tape & Reel |
|         | -40 to +125°C     | AZ1117R-2.5TRE1  | E17D           | 1000/Tape & Reel |
|         | -40 to +125°C     | AZ1117R-2.85TRE1 | E17H           | 1000/Tape & Reel |
|         | -40 to +125°C     | AZ1117R-3.3TRE1  | E17E           | 1000/Tape & Reel |
|         | -40 to +125°C     | AZ1117R-5.0TRE1  | E17F           | 1000/Tape & Reel |
| TO220-3 | -40 to +125°C     | AZ1117T-ADJE1    | AZ1117T-ADJE1  | 50/Tube          |
|         | -40 to +125°C     | AZ1117T-1.2E1    | AZ1117T-1.2E1  | 50/Tube          |
|         | -40 to +125°C     | AZ1117T-1.5E1    | AZ1117T-1.5E1  | 50/Tube          |
|         | -40 to +125°C     | AZ1117T-1.8E1    | AZ1117T-1.8E1  | 50/Tube          |
|         | -40 to +125°C     | AZ1117T-2.5E1    | AZ1117T-2.5E1  | 50/Tube          |
|         | -40 to +125°C     | AZ1117T-2.85E1   | AZ1117T-2.85E1 | 50/Tube          |
|         | -40 to +125°C     | AZ1117T-3.3E1    | AZ1117T-3.3E1  | 50/Tube          |
|         | -40 to +125°C     | AZ1117T-5.0E1    | AZ1117T-5.0E1  | 50/Tube          |

**Ordering Information** (Cont.)

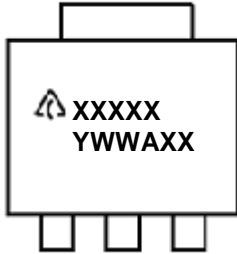
| Package             | Temperature Range | Part Number      | Marking ID     | Packing          |
|---------------------|-------------------|------------------|----------------|------------------|
| TO252-2 (3)/(4)/(5) | -40 to +125°C     | AZ1117D-ADJTRE1  | AZ1117D-ADJE1  | 2500/Tape & Reel |
|                     | -40 to +125°C     | AZ1117D-1.2TRE1  | AZ1117D-1.2E1  | 2500/Tape & Reel |
|                     | -40 to +125°C     | AZ1117D-1.5TRE1  | AZ1117D-1.5E1  | 2500/Tape & Reel |
|                     | -40 to +125°C     | AZ1117D-1.8TRE1  | AZ1117D-1.8E1  | 2500/Tape & Reel |
|                     | -40 to +125°C     | AZ1117D-2.5TRE1  | AZ1117D-2.5E1  | 2500/Tape & Reel |
|                     | -40 to +125°C     | AZ1117D-2.85TRE1 | AZ1117D-2.85E1 | 2500/Tape & Reel |
|                     | -40 to +125°C     | AZ1117D-3.3TRE1  | AZ1117D-3.3E1  | 2500/Tape & Reel |
|                     | -40 to +125°C     | AZ1117D-5.0TRE1  | AZ1117D-5.0E1  | 2500/Tape & Reel |
| TO263               | -40 to +125°C     | AZ1117S-ADJTRE1  | AZ1117S-ADJE1  | 800/Tape & Reel  |
|                     | -40 to +125°C     | AZ1117S-1.2TRE1  | AZ1117S-1.2E1  | 800/Tape & Reel  |
|                     | -40 to +125°C     | AZ1117S-1.5TRE1  | AZ1117S-1.5E1  | 800/Tape & Reel  |
|                     | -40 to +125°C     | AZ1117S-1.8TRE1  | AZ1117S-1.8E1  | 800/Tape & Reel  |
|                     | -40 to +125°C     | AZ1117S-2.5TRE1  | AZ1117S-2.5E1  | 800/Tape & Reel  |
|                     | -40 to +125°C     | AZ1117S-2.85TRE1 | AZ1117S-2.85E1 | 800/Tape & Reel  |
|                     | -40 to +125°C     | AZ1117S-3.3TRE1  | AZ1117S-3.3E1  | 800/Tape & Reel  |
|                     | -40 to +125°C     | AZ1117S-5.0TRE1  | AZ1117S-5.0E1  | 800/Tape & Reel  |

NOT RECOMMENDED FOR NEW DESIGN

**Marking Information**

(1) SOT223 Series

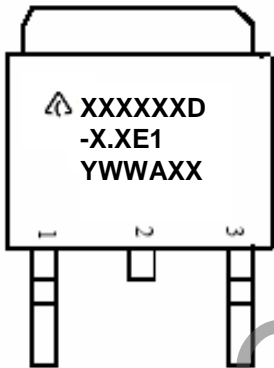
(Top View)



First Line: Logo and Marking ID  
(See Ordering Information)  
Second Line: Date Code  
Y: Year  
WW: Work Week of Molding  
A: Assembly House Code  
XX: 7th and 8th Digits of Batch Number

(2) TO252-2 Series

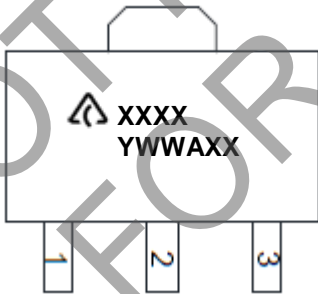
(Top View)



First and Second Lines: Logo and Marking ID  
(See Ordering Information)  
Third Line: Date Code  
Y: Year  
WW: Work Week of Molding  
A: Assembly House Code  
XX: 7th and 8th Digits of Batch Number

(3) SOT89

(Top View)

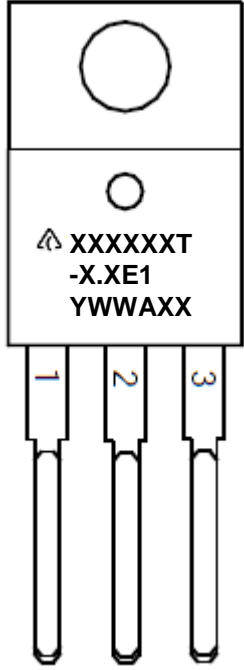


First Line: Logo and Marking ID  
(See Ordering Information)  
Second Line: Date Code  
Y: Year  
WW: Work Week of Molding  
A: Assembly House Code  
XX: 7th and 8th Digits of Batch Number

**Marking Information** (Cont.)

(4) TO220-3

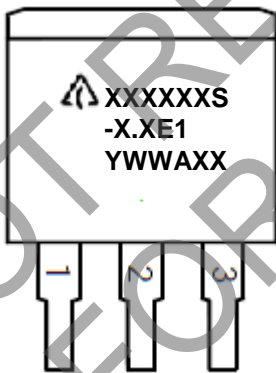
(Top View)



First and Second Lines: Logo and Marking ID  
(See Ordering Information)  
Third Line: Date Code  
Y: Year  
WW: Work Week of Molding  
A: Assembly House Code  
XX: 7th and 8th Digits of Batch Number

(5) TO263

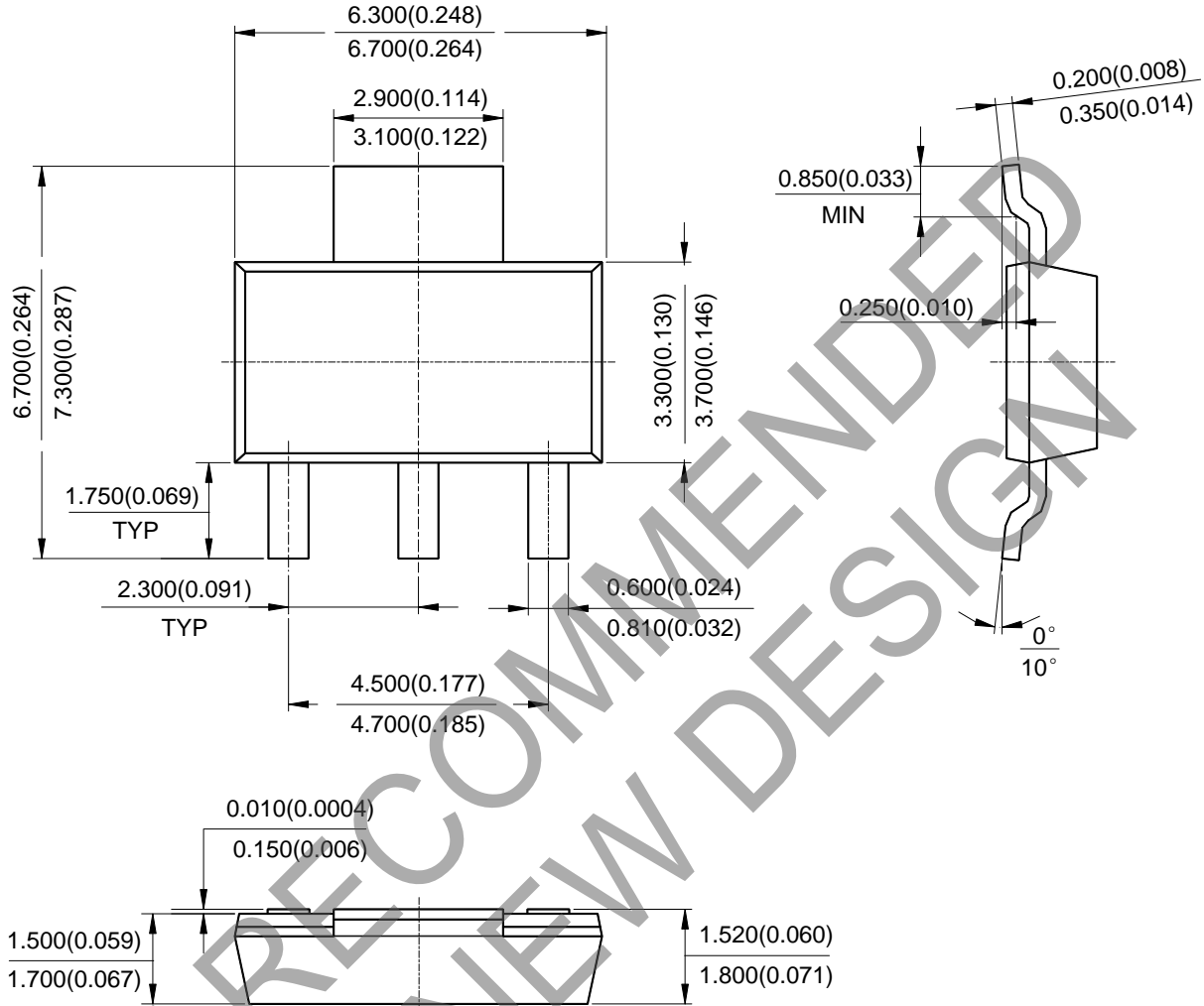
(Top View)



First and Second Lines: Logo and Marking ID  
(See Ordering Information)  
Third Line: Date Code  
Y: Year  
WW: Work Week of Molding  
A: Assembly House Code  
XX: 7th and 8th Digits of Batch Number

**Package Outline Dimensions** (All dimensions in mm (inch).)

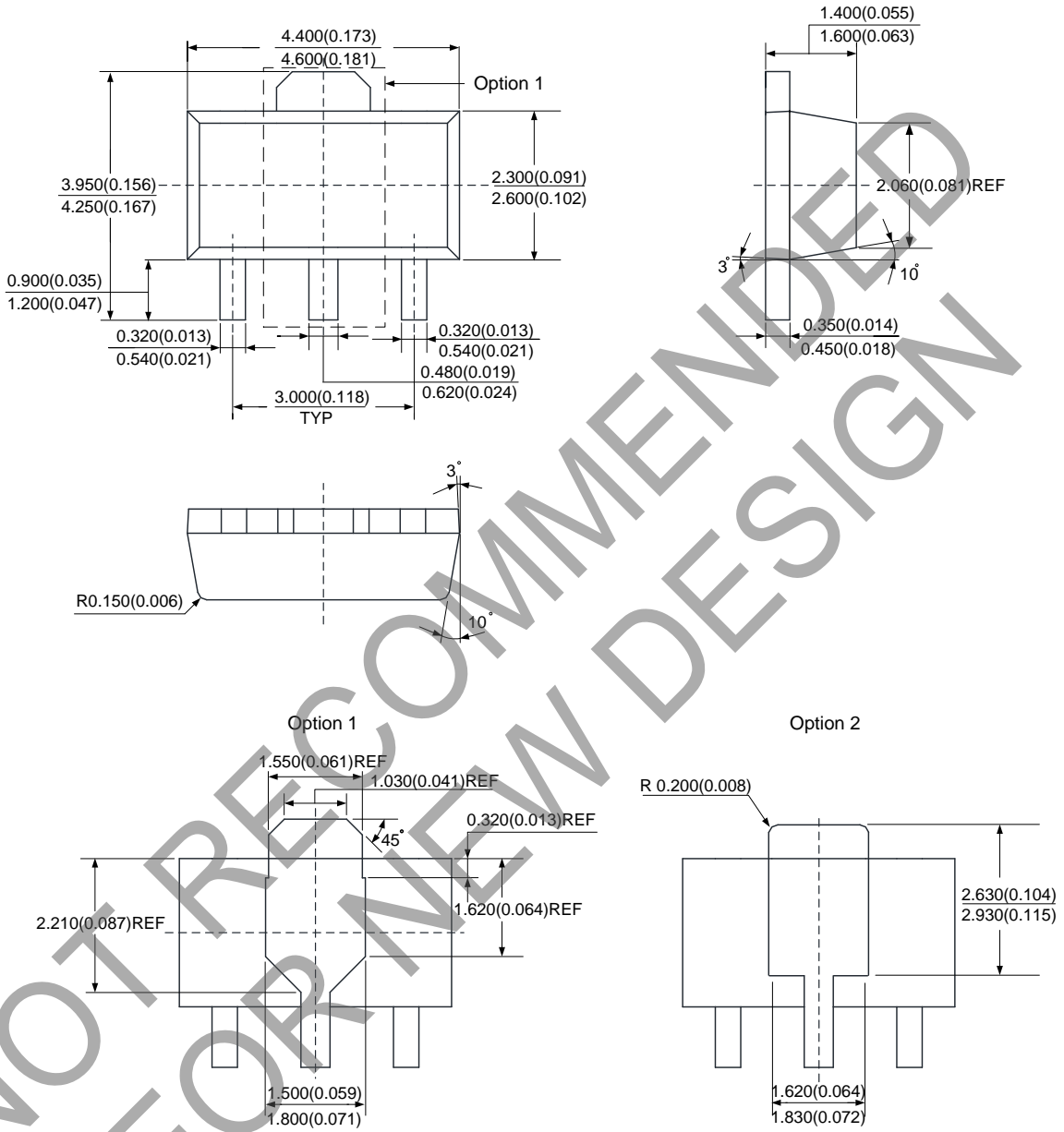
(1) Package Type: SOT223



NOT RECOMMENDED FOR NEW DESIGN

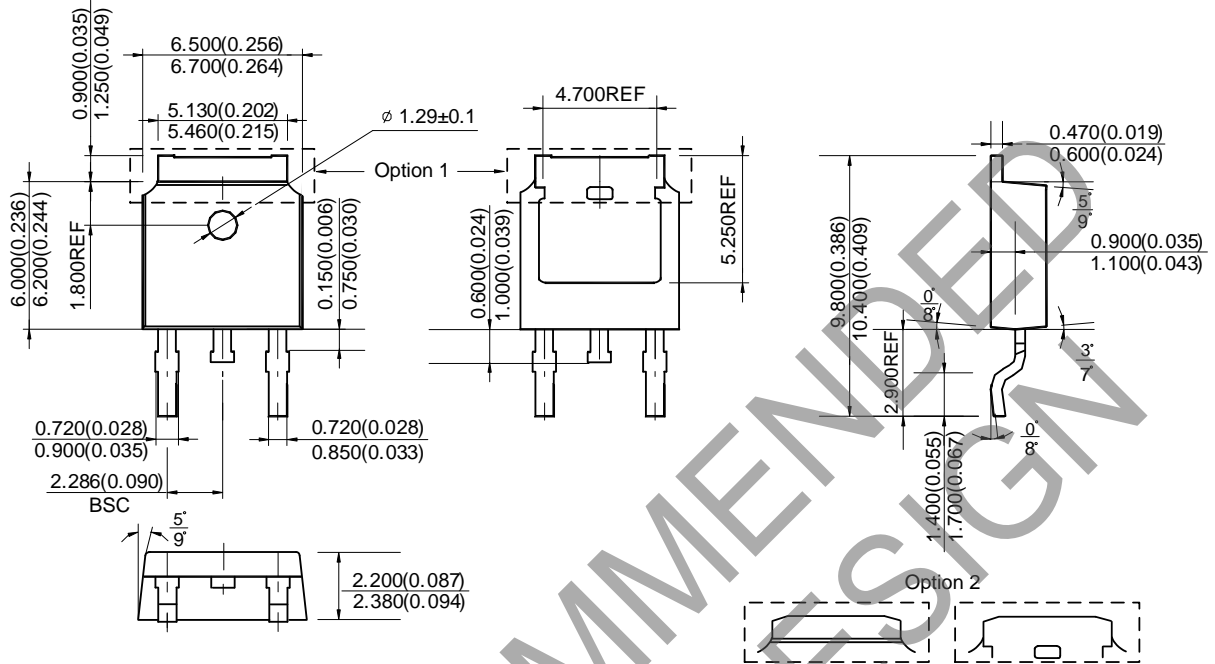
**Package Outline Dimensions** (Cont. All dimensions in mm(inch).)

(2) Package Type: SOT89



**Package Outline Dimensions** (Cont. All dimensions in mm(inch).)

(3) Package Type: TO252-2 (3)



NOT RECOMMENDED FOR NEW DESIGN

**Package Outline Dimensions** (Cont. All dimensions in mm(inch).)

(4) Package Type: TO252-2 (4)



NOT RECOMMENDED FOR NEW DESIGN

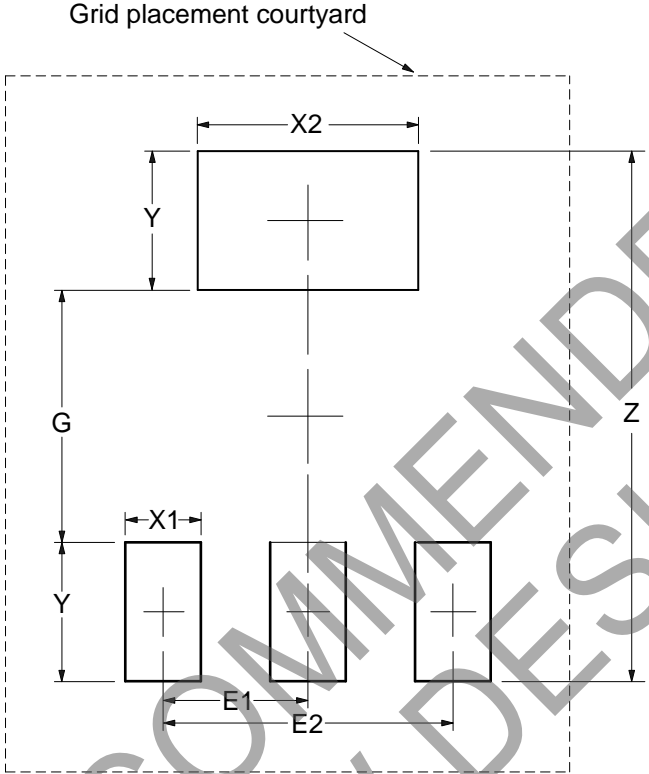






**Suggested Pad Layout**

(1) Package Type: SOT223

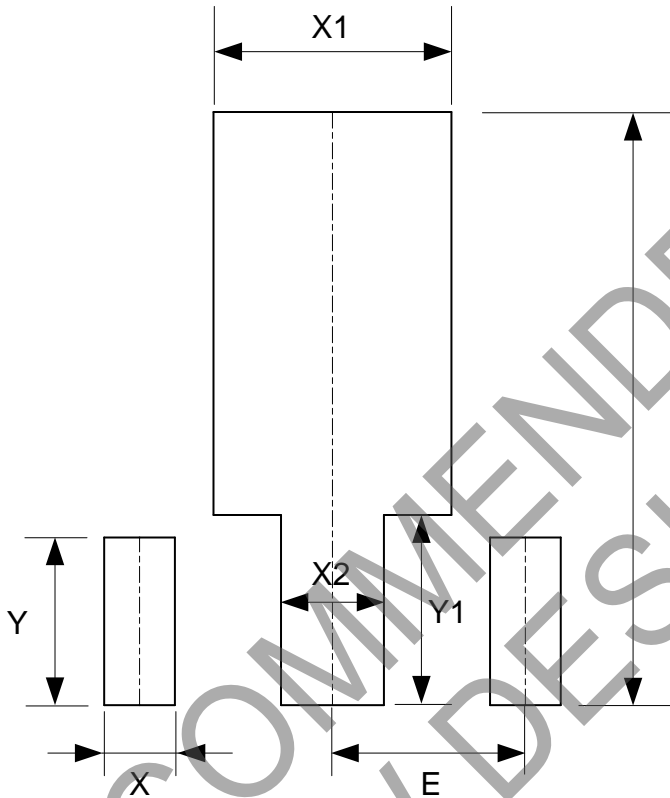


| Dimensions | Z<br>(mm)/(inch) | G<br>(mm)/(inch) | X1<br>(mm)/(inch) | X2<br>(mm)/(inch) | Y<br>(mm)/(inch) | E1<br>(mm)/(inch) | E2<br>(mm)/(inch) |
|------------|------------------|------------------|-------------------|-------------------|------------------|-------------------|-------------------|
| Value      | 8.400/0.331      | 4.000/0.157      | 1.200/0.047       | 3.500/0.138       | 2.200/0.087      | 2.300/0.091       | 4.600/0.181       |

NOT RECOMMENDED FOR NEW DESIGN

**Suggested Pad Layout** (Cont.)

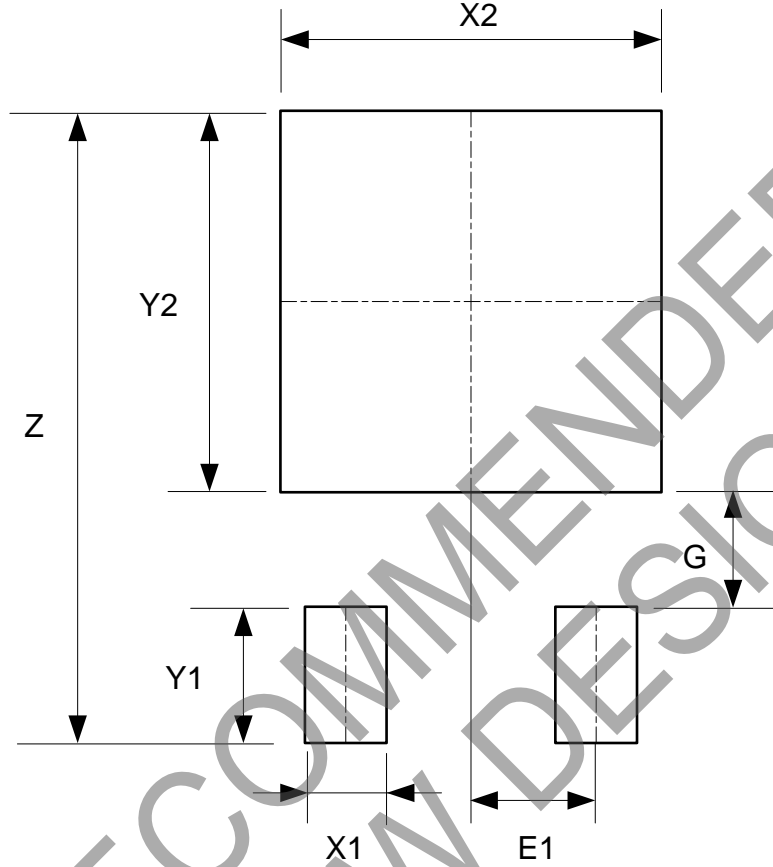
(2) Package Type: SOT89



| Dimensions | Z<br>(mm)/(inch) | X<br>(mm)/(inch) | X1<br>(mm)/(inch) | X2<br>(mm)/(inch) | Y<br>(mm)/(inch) | Y1<br>(mm)/(inch) | E<br>(mm)/(inch) |
|------------|------------------|------------------|-------------------|-------------------|------------------|-------------------|------------------|
| Value      | 4.600/0.181      | 0.550/0.022      | 1.850/0.073       | 0.800/0.031       | 1.300/0.051      | 1.475/0.058       | 1.500/0.059      |

**Suggested Pad Layout** (Cont.)

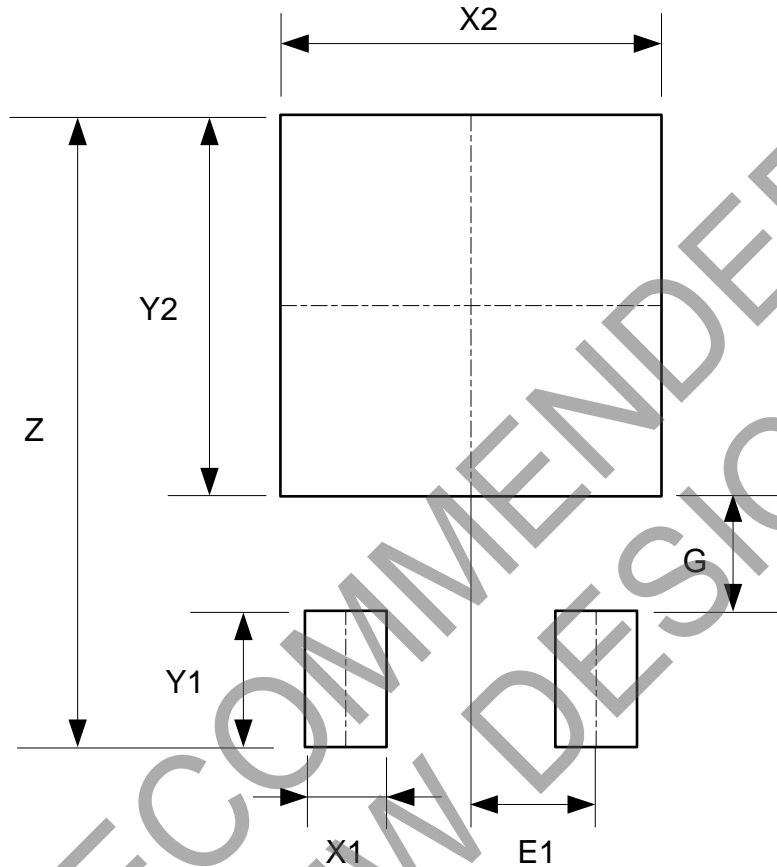
(3) Package Type: TO252-2 (3)



| Dimensions | Z<br>(mm)/(inch) | X1<br>(mm)/(inch) | X2=Y2<br>(mm)/(inch) | Y1<br>(mm)/(inch) | G<br>(mm)/(inch) | E1<br>(mm)/(inch) |
|------------|------------------|-------------------|----------------------|-------------------|------------------|-------------------|
| Value      | 11.600/0.457     | 1.500/0.059       | 7.000/0.276          | 2.500/0.098       | 2.100/0.083      | 2.300/0.091       |

**Suggested Pad Layout (Cont.)**

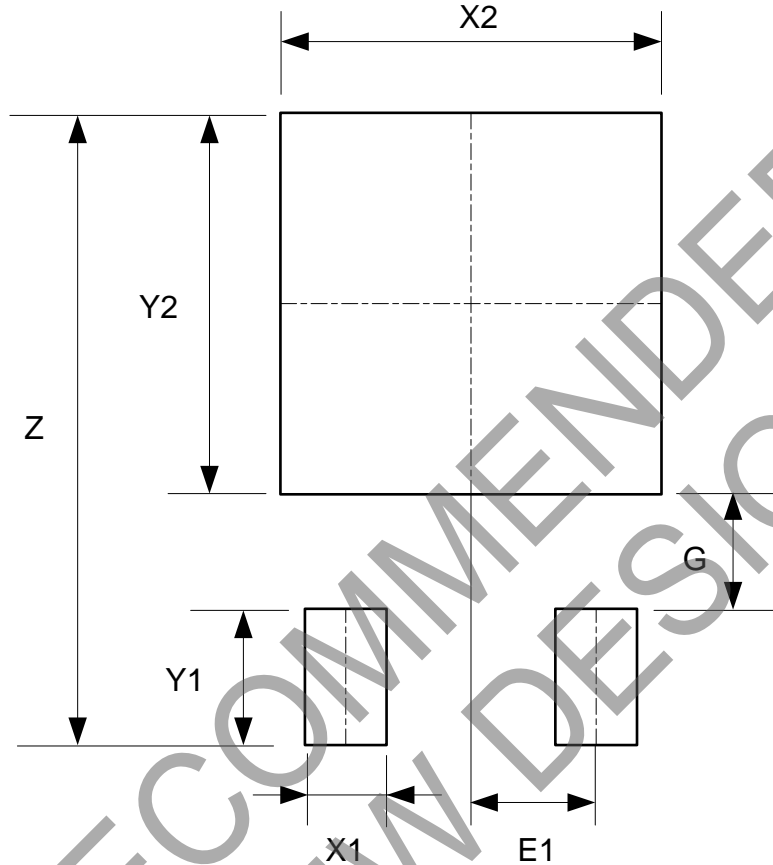
(4) Package Type: TO252-2 (4)



| Dimensions | Z<br>(mm)/(inch) | X1<br>(mm)/(inch) | X2=Y2<br>(mm)/(inch) | Y1<br>(mm)/(inch) | G<br>(mm)/(inch) | E1<br>(mm)/(inch) |
|------------|------------------|-------------------|----------------------|-------------------|------------------|-------------------|
| Value      | 11.600/0.457     | 1.500/0.059       | 7.000/0.276          | 2.500/0.098       | 2.100/0.083      | 2.300/0.091       |

**Suggested Pad Layout (Cont.)**

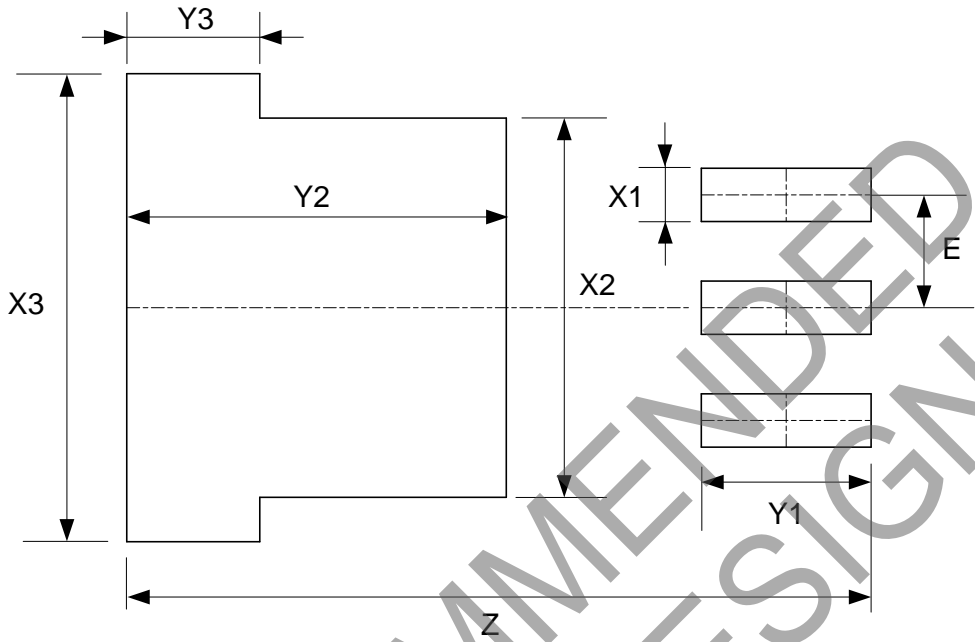
(5) Package Type: TO252-2 (5)



| Dimensions | Z<br>(mm)/(inch) | X1<br>(mm)/(inch) | X2=Y2<br>(mm)/(inch) | Y1<br>(mm)/(inch) | G<br>(mm)/(inch) | E1<br>(mm)/(inch) |
|------------|------------------|-------------------|----------------------|-------------------|------------------|-------------------|
| Value      | 11.600/0.457     | 1.500/0.059       | 7.000/0.276          | 2.500/0.098       | 2.100/0.083      | 2.300/0.091       |

**Suggested Pad Layout (Cont.)**

(6) Package Type: TO263



|            |                   |                   |                   |                   |
|------------|-------------------|-------------------|-------------------|-------------------|
| Dimensions | Z<br>(mm)/(inch)  | X1<br>(mm)/(inch) | X2<br>(mm)/(inch) | X3<br>(mm)/(inch) |
| Value      | 16.760/0.660      | 1.200/0.047       | 8.540/0.336       | 10.540/0.415      |
| Dimensions | Y1<br>(mm)/(inch) | Y2<br>(mm)/(inch) | Y3<br>(mm)/(inch) | E<br>(mm)/(inch)  |
| Value      | 3.830/0.151       | 8.560/0.337       | 3.000/0.118       | 2.540/0.100       |

#### IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

#### LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.



Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2019, Diodes Incorporated

[www.diodes.com](http://www.diodes.com)

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View AZ1117D-1.5TRE1 on WIN SOURCE](#)
-  [Diodes Incorporated Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management