

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

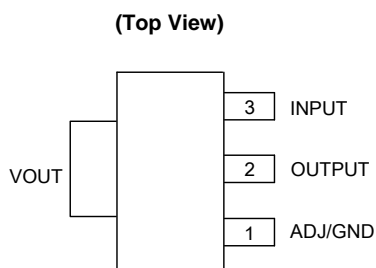
- Low Dropout Voltage: 1.15V at 1A Output Current
- Trimmed Current Limit
- On-chip Thermal Shutdown
- Three-terminal Adjustable or Fixed 1.2V, 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V
- Operation Junction Temperature: -40 to +125°C
- Lead-Free Packages: SOT223, SOT89, TO220-3, TO252-2 (3), TO252-2 (4), TO252-2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

Applications

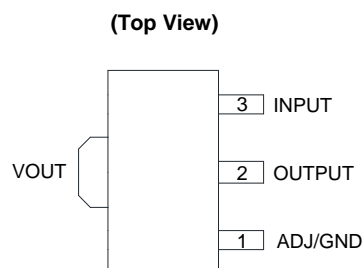
- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-video Player
- NIC/Switch
- Telecom Equipment
- ADSL Modem
- Printer and other Peripheral Equipment

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

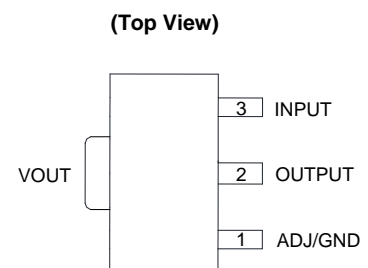
Pin Assignments



(SOT223/ H Package)



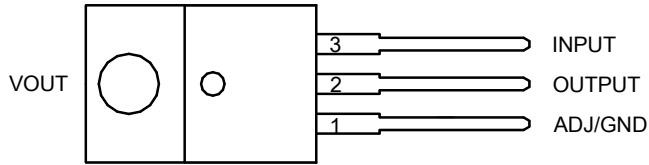
(SOT89 Option 1/ R Package)



(SOT89 Option 2/ R Package)

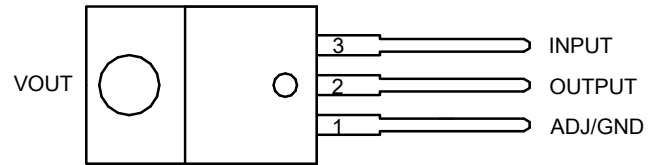
Pin Assignments (Cont.)

(Top View)



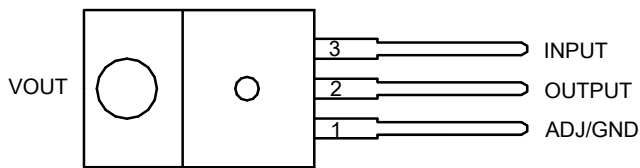
(TO220-3 Option 1/ T Package)

(Top View)



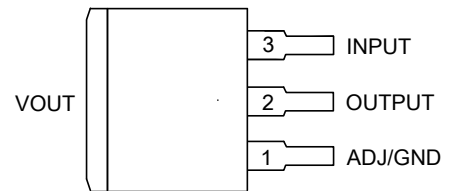
(TO220-3 Option 2/ T Package)

(Top View)



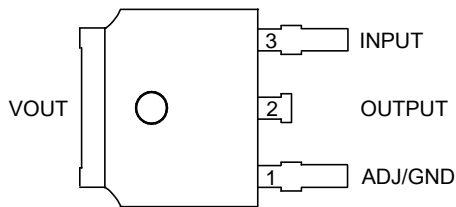
(TO220-3 Option 3/ T Package)

(Top View)



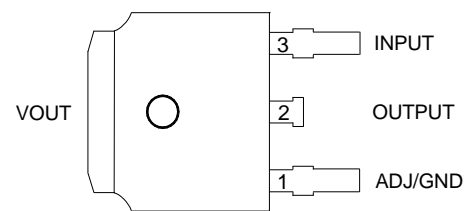
(TO263/ S Package)

(Top View)



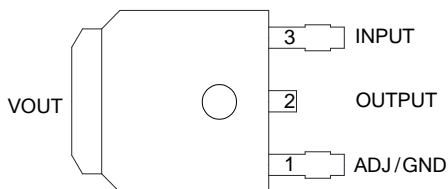
(TO252-2 (3) Option 1/ D Package)

(Top View)



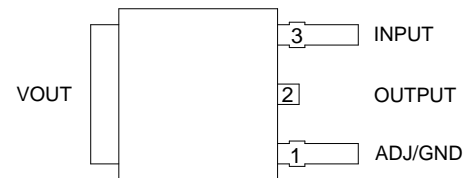
(TO252-2 (3) Option 2/ D Package)

(Top View)



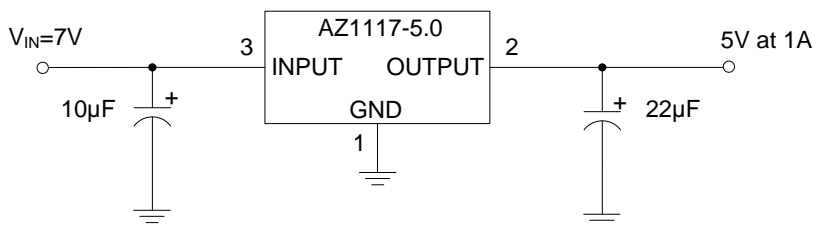
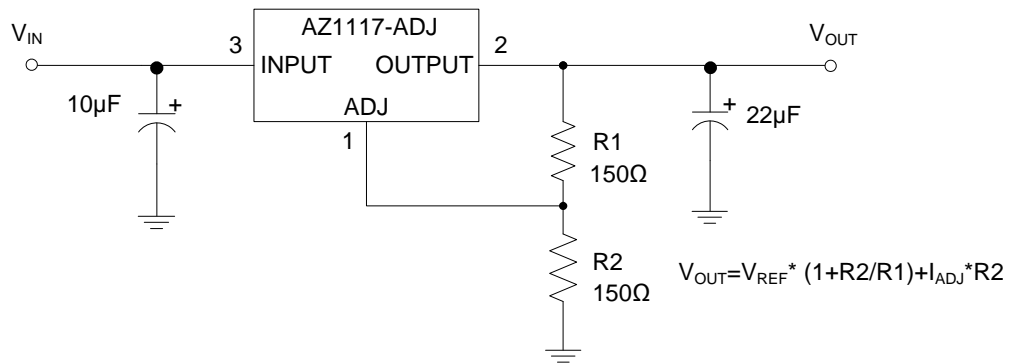
(TO252-2 (4)/ D Package)

(Top View)

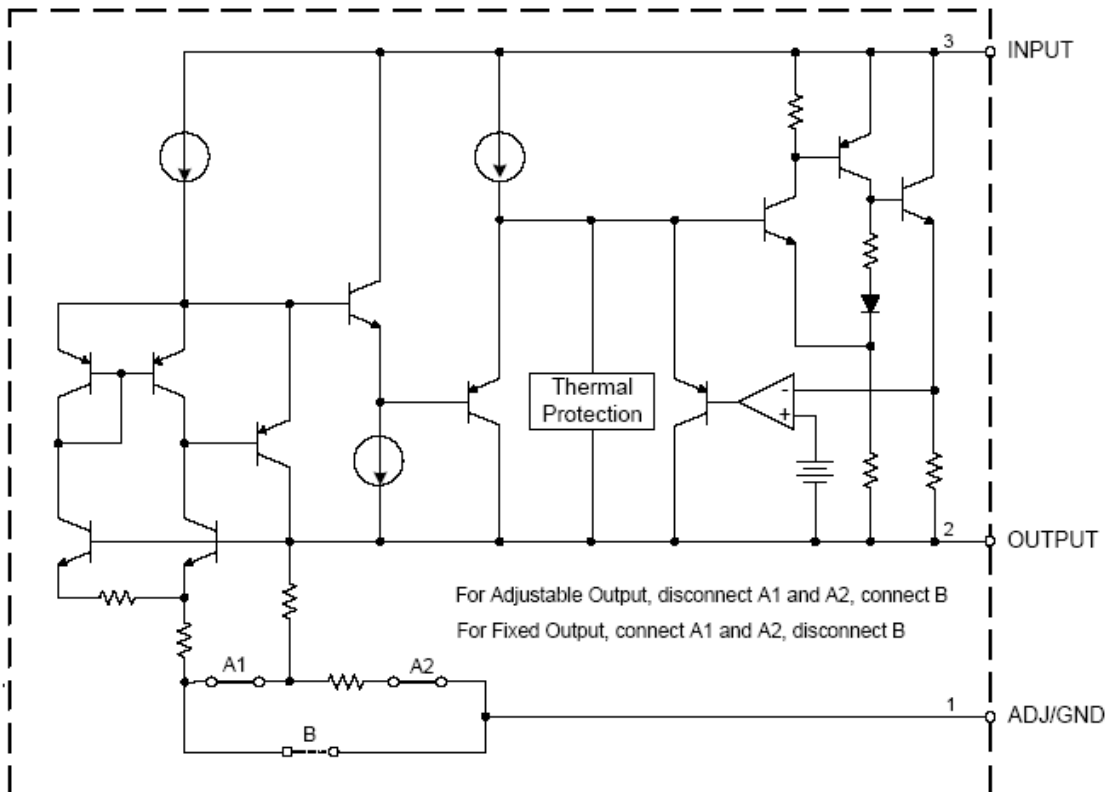


(TO252-2 (5)/ D Package)

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) | θ_{JA} | SOT223 | 120 | °C/W |
| | | SOT89 | 165 | |
| | | TO220-3 | 60 | |
| | | TO252-2 (3) TO252-2 (4) 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, θ_{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} | $I_{OUT} = 10mA$, $V_{IN}-V_{OUT} = 2V$ $10mA \leq I_{OUT} \leq 1A$, $1.4V \leq V_{IN}-V_{OUT} \leq 8V$, $P \leq$ Maximum Power Dissipation | 1.238 1.225 | 1.250 1.250 | 1.262 1.270 | V |
| Line Regulation | ΔV_{OUT} | $I_{OUT}=10mA$, $1.5V \leq V_{IN}-V_{OUT} \leq 10V$ | – | 0.035 | 0.2 | % |
| Load Regulation | ΔV_{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 | μA |
| Adjust Pin Current Change | ΔI_{ADJ} | $1.4V \leq V_{IN}-V_{OUT} \leq 10V$, $10mA \leq I_{OUT} \leq 1A$ | – | 0.2 | 5 | μA |
| 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, $V_{IN}-V_{OUT} = 3V$, $I_{OUT} = 1A$ | 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 | θ_{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} | $I_{OUT} = 10mA$, $V_{IN} = 3.2V$ $10mA \leq I_{OUT} \leq 1A$, $3.0V \leq V_{IN} \leq 10V$ | 1.176 1.152 | 1.2 1.2 | 1.224 1.248 | V |
| Line Regulation | ΔV_{OUT} | $I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 10V$ | – | 1 | 6 | mV |
| Load Regulation | ΔV_{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, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$ | 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 | θ_{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} | $I_{OUT} = 10mA$, $V_{IN} = 3.5V$ $10mA \leq I_{OUT} \leq 1A$, $3.0V \leq V_{IN} \leq 10V$ | 1.485 1.470 | 1.5 1.5 | 1.515 1.530 | V |
| Line Regulation | ΔV_{OUT} | $I_{OUT}=10mA$, $1.5V \leq V_{IN}-V_{OUT} \leq 10V$ | – | 1 | 6 | mV |
| Load Regulation | ΔV_{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, $V_{IN}-V_{OUT} = 3V$, $I_{OUT} = 1A$ | 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 | θ_{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.)

AZ1117-1.8 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} | $I_{OUT} = 10mA$, $V_{IN} = 3.8V$ $10mA \leq I_{OUT} \leq 1A$, $3.2V \leq V_{IN} \leq 10V$ | 1.782 1.746 | 1.8 1.8 | 1.818 1.854 | V |
| Line Regulation | ΔV_{OUT} | $I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 10V$ | – | 1 | 6 | mV |
| Load Regulation | ΔV_{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, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$ | 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 | θ_{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} | $I_{OUT} = 10mA$, $V_{IN} = 4.5V$ $10mA \leq I_{OUT} \leq 1A$, $3.9V \leq V_{IN} \leq 10V$ | 2.475 2.450 | 2.5 2.5 | 2.525 2.550 | V |
| Line Regulation | ΔV_{OUT} | $I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 10V$ | – | 1 | 6 | mV |
| Load Regulation | ΔV_{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, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$ | 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 | θ_{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} | $I_{OUT} = 10mA$, $V_{IN} = 4.85V$ $10mA \leq I_{OUT} \leq 1A$, $4.25V \leq V_{IN} \leq 10V$ | 2.822 2.793 | 2.85 2.85 | 2.878 2.907 | V |
| Line Regulation | ΔV_{OUT} | $I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 10V$ | – | 1 | 6 | mV |
| Load Regulation | ΔV_{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, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$ | 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 | θ_{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.)

AZ1117-3.3 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} | $I_{OUT} = 10mA$, $V_{IN} = 5.0V$ $10mA \leq I_{OUT} \leq 1A$, $4.75V \leq V_{IN} \leq 10V$ | 3.267 3.235 | 3.3 3.3 | 3.333 3.365 | V |
| Line Regulation | ΔV_{OUT} | $I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 10V$ | – | 1 | 6 | mV |
| Load Regulation | ΔV_{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, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$ | 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 | θ_{JC} | SOT223 | – | 25 | – | $^\circ C/W$ |
| | | SOT89 | – | 30 | – | |
| | | TO220-3 | – | 10 | – | |
| | | TO252-2 (3)/TO252-2 (4)/TO252-2 (5) | – | 17 | – | |
| | | TO263 | – | 10 | – | |

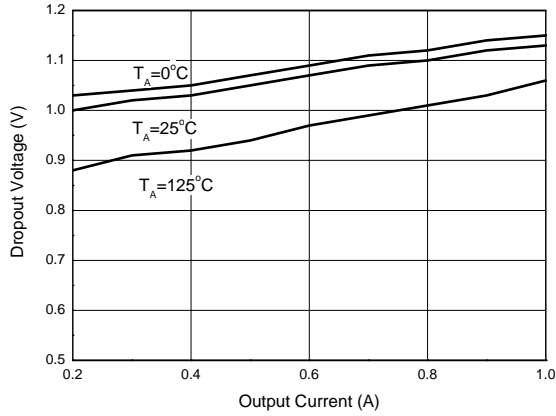
Electrical Characteristics (Cont.)

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

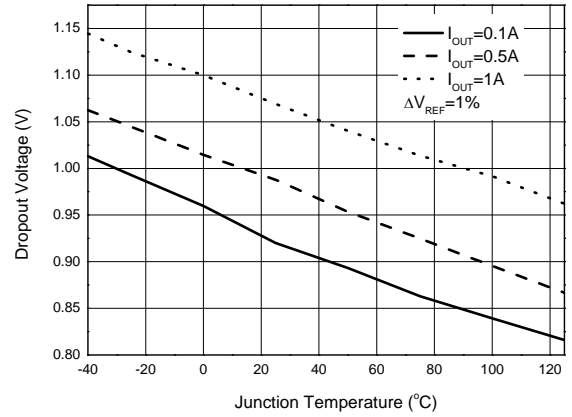
| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|------------------------------------|------------------|---|----------------|------------|----------------|--------------|
| Output Voltage | V_{OUT} | $I_{OUT} = 10mA$, $V_{IN} = 7.0V$ $10mA \leq I_{OUT} \leq 1A$, $6.5V \leq V_{IN} \leq 12V$ | 4.950 4.900 | 5.0 5.0 | 5.050 5.100 | V |
| Line Regulation | ΔV_{OUT} | $I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 10V$ | – | 1 | 10 | mV |
| Load Regulation | ΔV_{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, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$ | 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 | θ_{JC} | SOT223 | – | 25 | – | $^\circ C/W$ |
| | | SOT89 | – | 30 | – | |
| | | TO220-3 | – | 10 | – | |
| | | TO252-2 (3)/TO252-2 (4)/TO252-2 (5) | – | 17 | – | |
| | | TO263 | – | 10 | – | |

Performance Characteristics

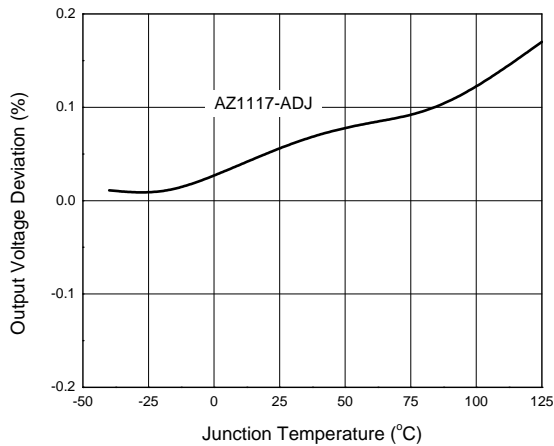
Dropout Voltage vs. Output Current



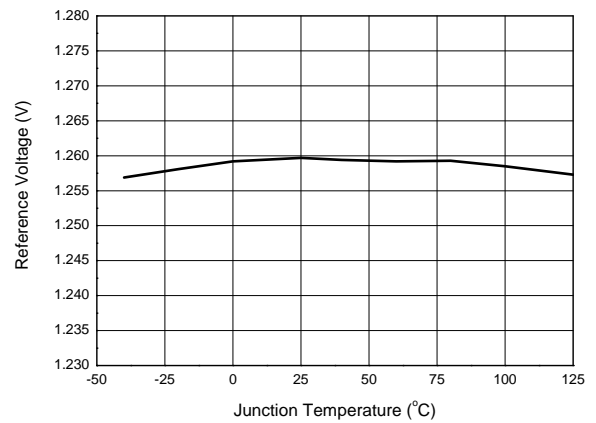
Dropout Voltage vs. Junction Temperature



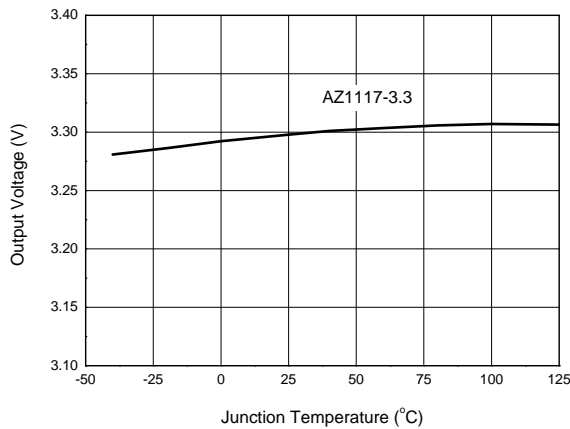
Load Regulation vs. Junction Temperature



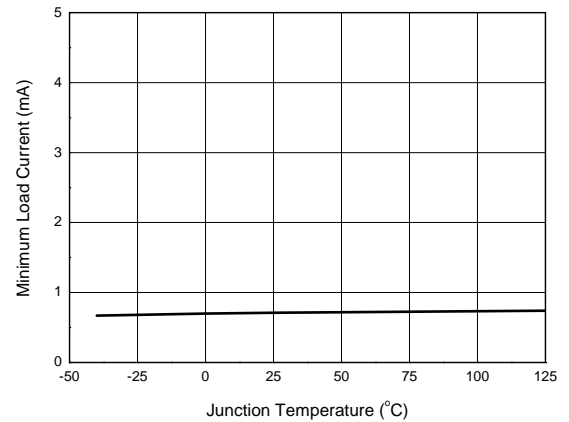
Reference Voltage vs. Junction Temperature



Output Voltage vs. Junction Temperature

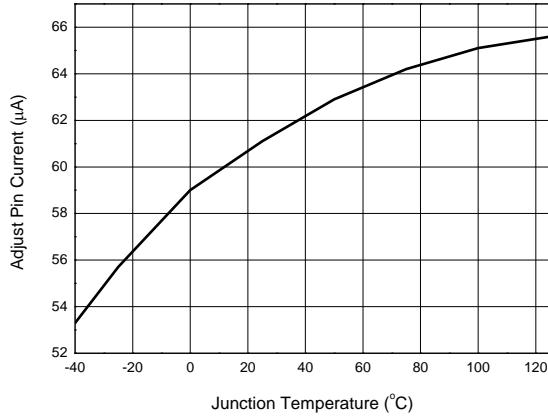


Minimum Load Current vs. Junction Temperature

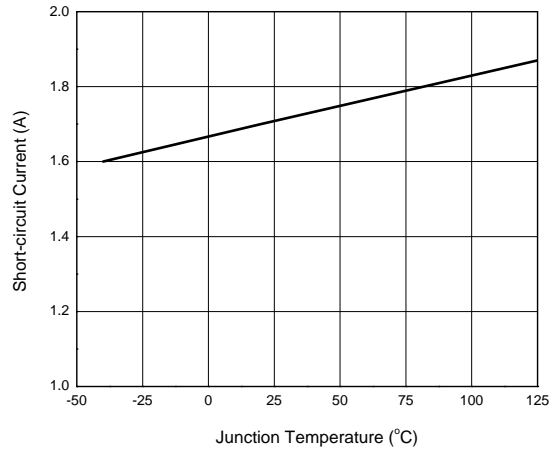


Performance Characteristics (Cont.)

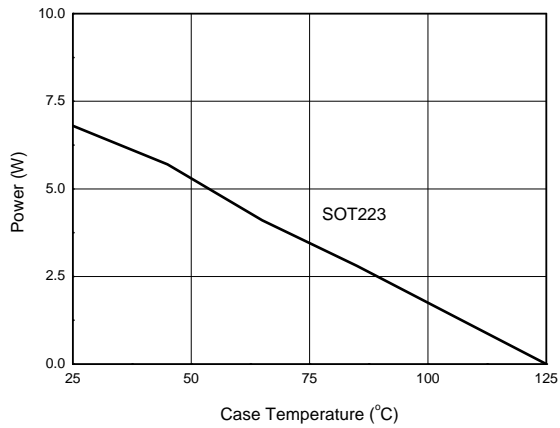
Adjust Pin Current vs. Junction Temperature



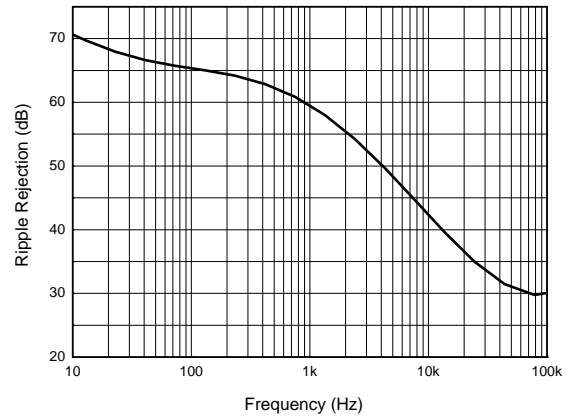
Short-circuit Current vs. Junction Temperature



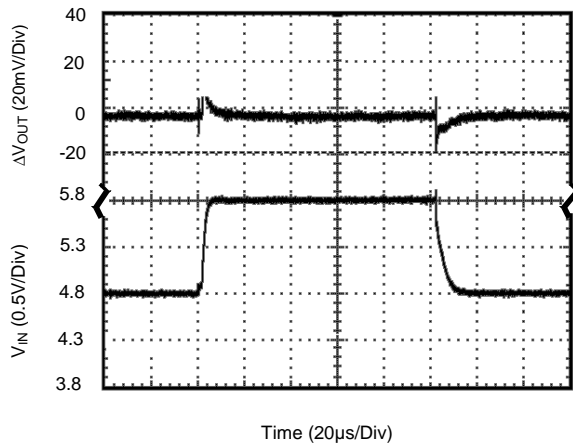
Maximum Power Dissipation



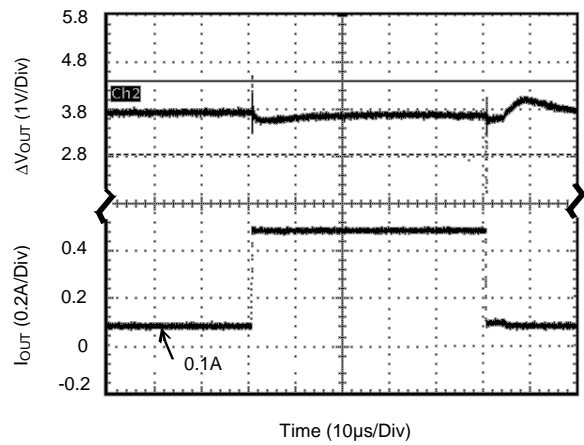
Ripple Rejection vs. Frequency



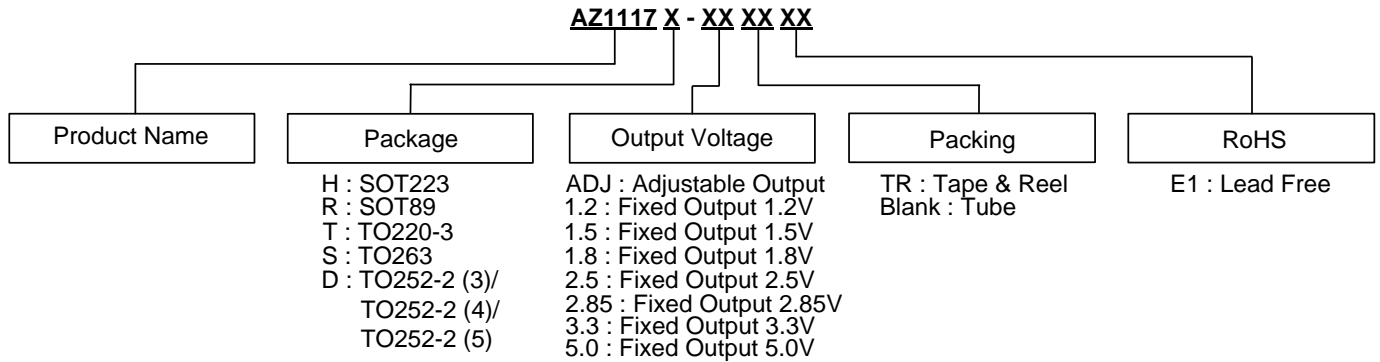
Line Transient Response
(Conditions: $V_{IN} = 4.8$ to $5.8V$, $V_{OUT} = 3.33V$, $I_{OUT} = 0.1A$, $C_{IN} = 1\mu F$, $C_{OUT} = 10\mu F$)



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 (Note 5) | -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 (Note 6) | -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.)

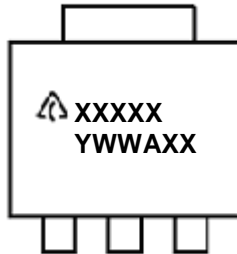
| Package | Temperature Range | Part Number | Marking ID | Packing |
|---------------------------------|-------------------|------------------|----------------|------------------|
| TO252-2 (3)/(4)/(5) (Note 5) | -40 to +125°C | AZ1117D-ADJTRE1 | AZ1117D-ADJE1 | 2500/Tape & Reel |
| | -40 to +125°C | 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 |

Notes: 5. Not recommended for new design, please use AZ1117I.
6. Not recommended for new design, please use AZ1117C.

Marking Information

(1) SOT223 Series

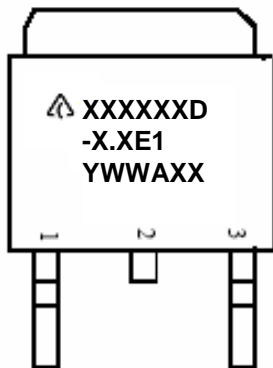
(Top View)



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

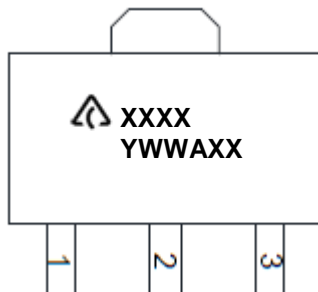
(Top View)



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)

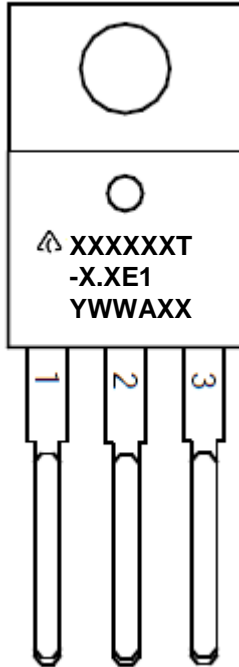


First Line: Logo and Marking ID (See Ordering Information)
 Second Line: Date Code
 Y: Year
 WW: Work Week of Molding
 A: Assembly House Code
 XX: 7th and 8th Digits of Batch Number

Marking Information (Cont.)

(4) TO220-3

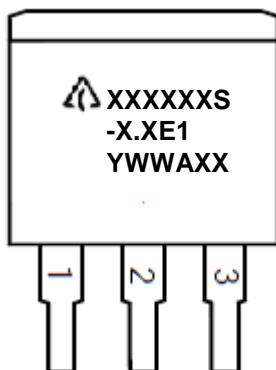
(Top View)



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

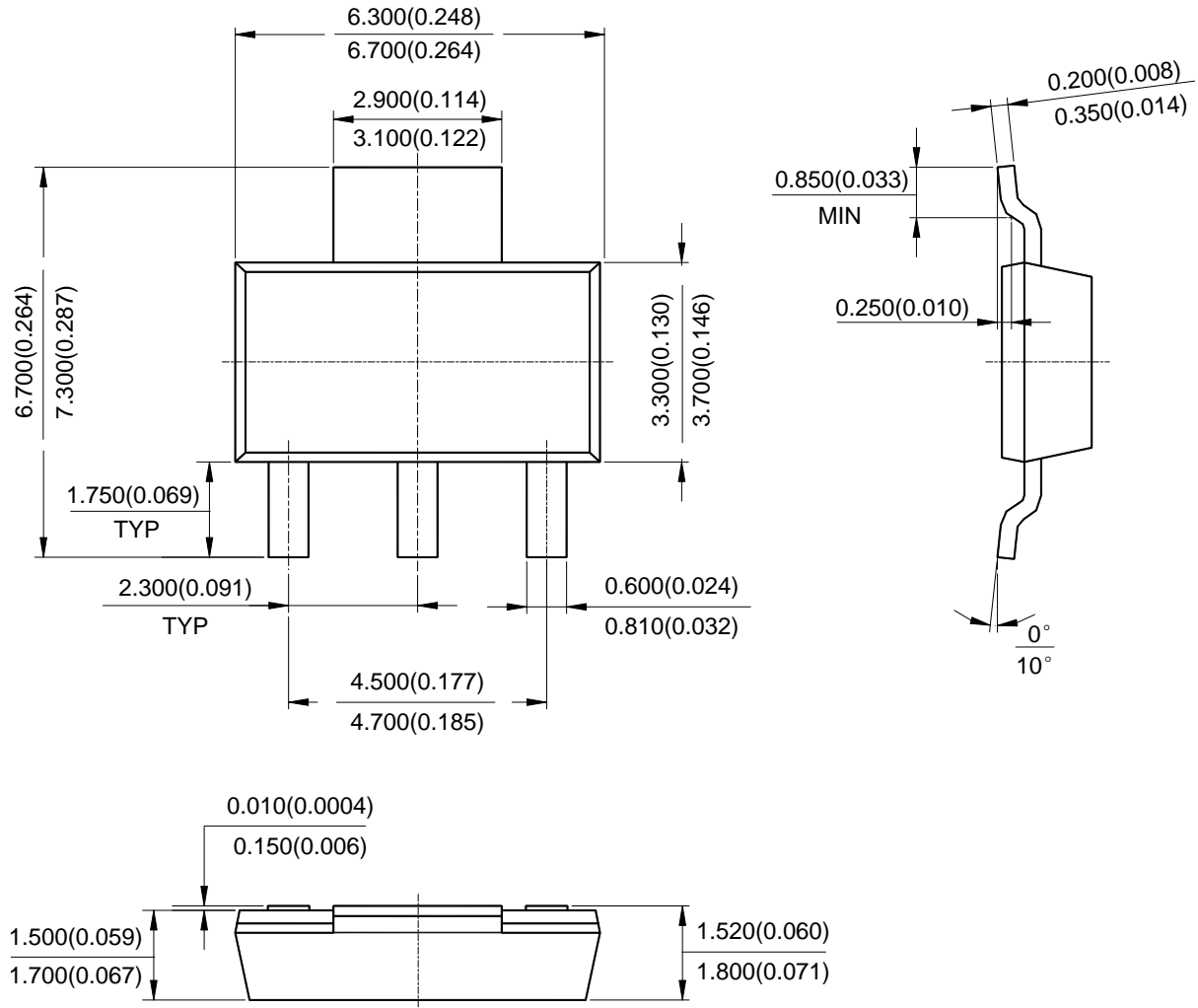
(Top View)



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

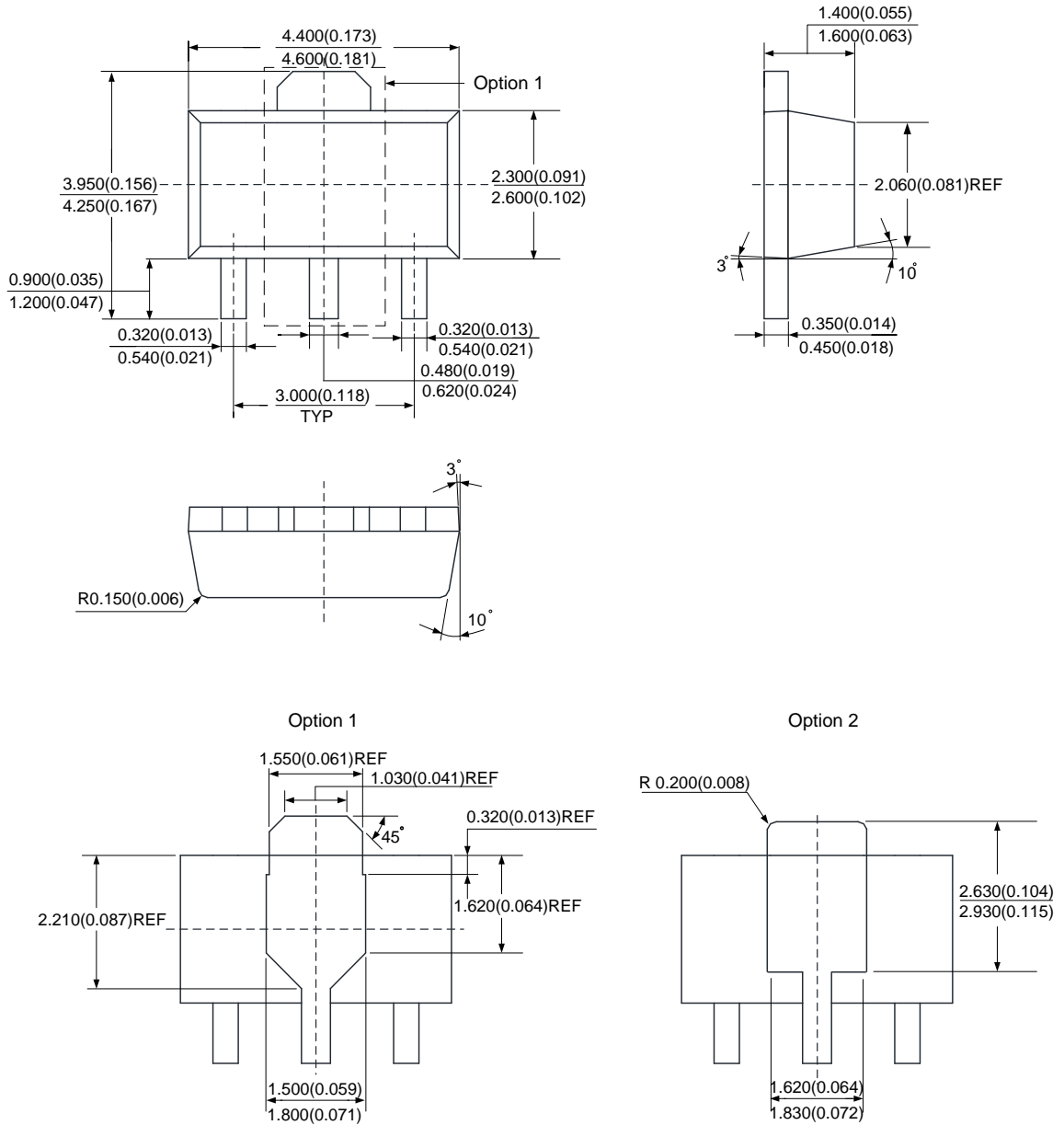
Package Outline Dimensions (All dimensions in mm (inch).)

(1) Package Type: SOT223



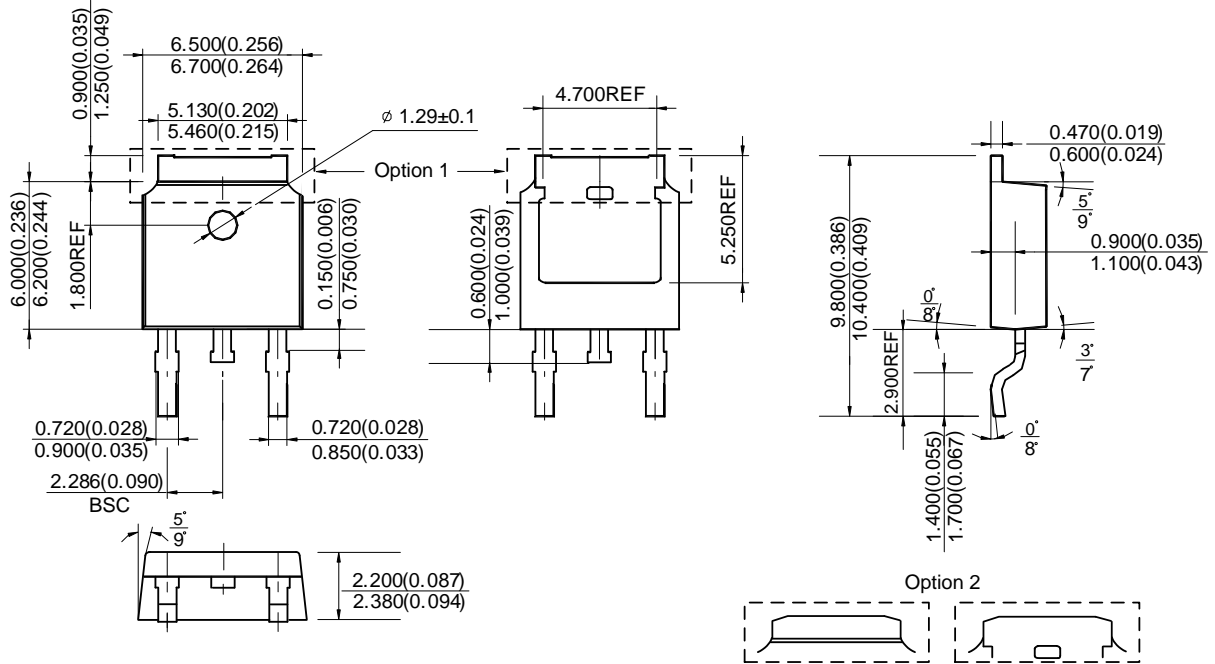
Package Outline Dimensions (Cont. All dimensions in mm(inch).)

(2) Package Type: SOT89



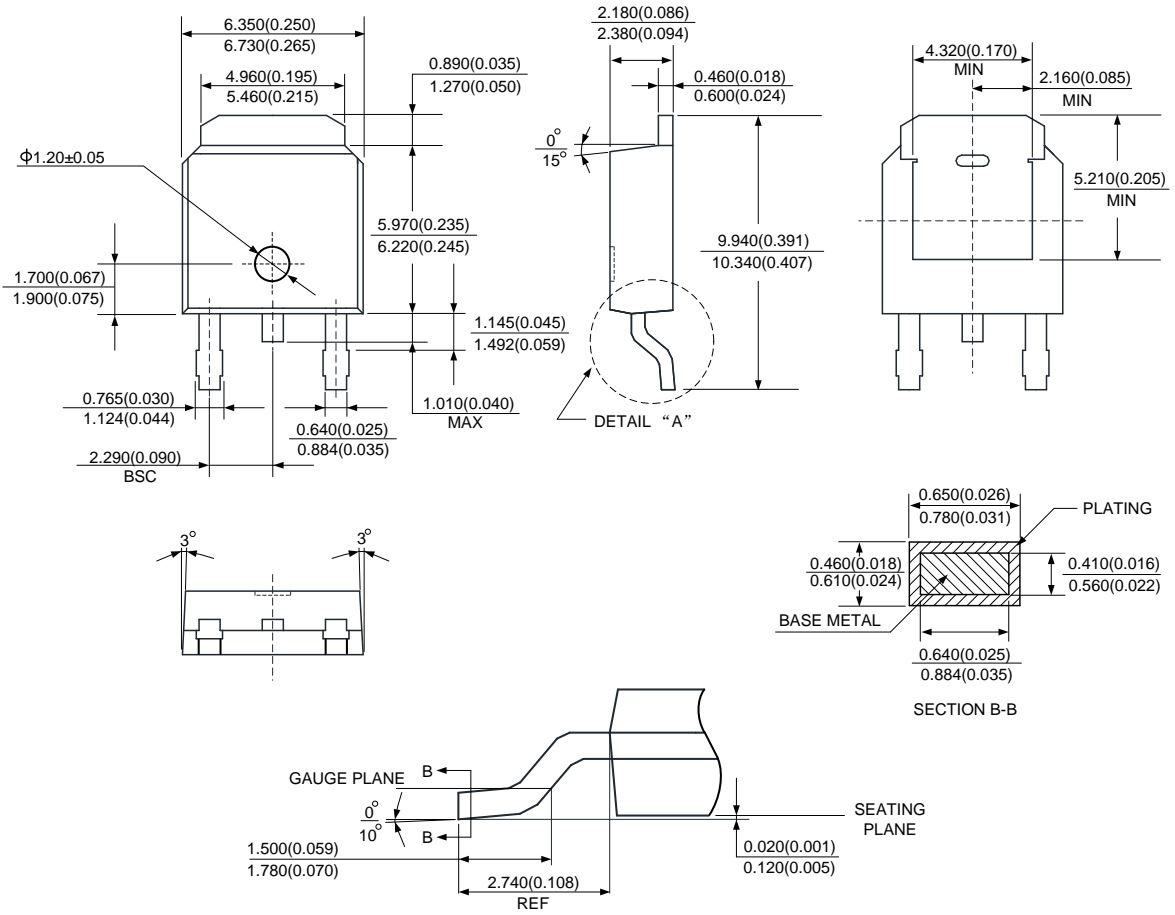
Package Outline Dimensions (Cont. All dimensions in mm(inch).)

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



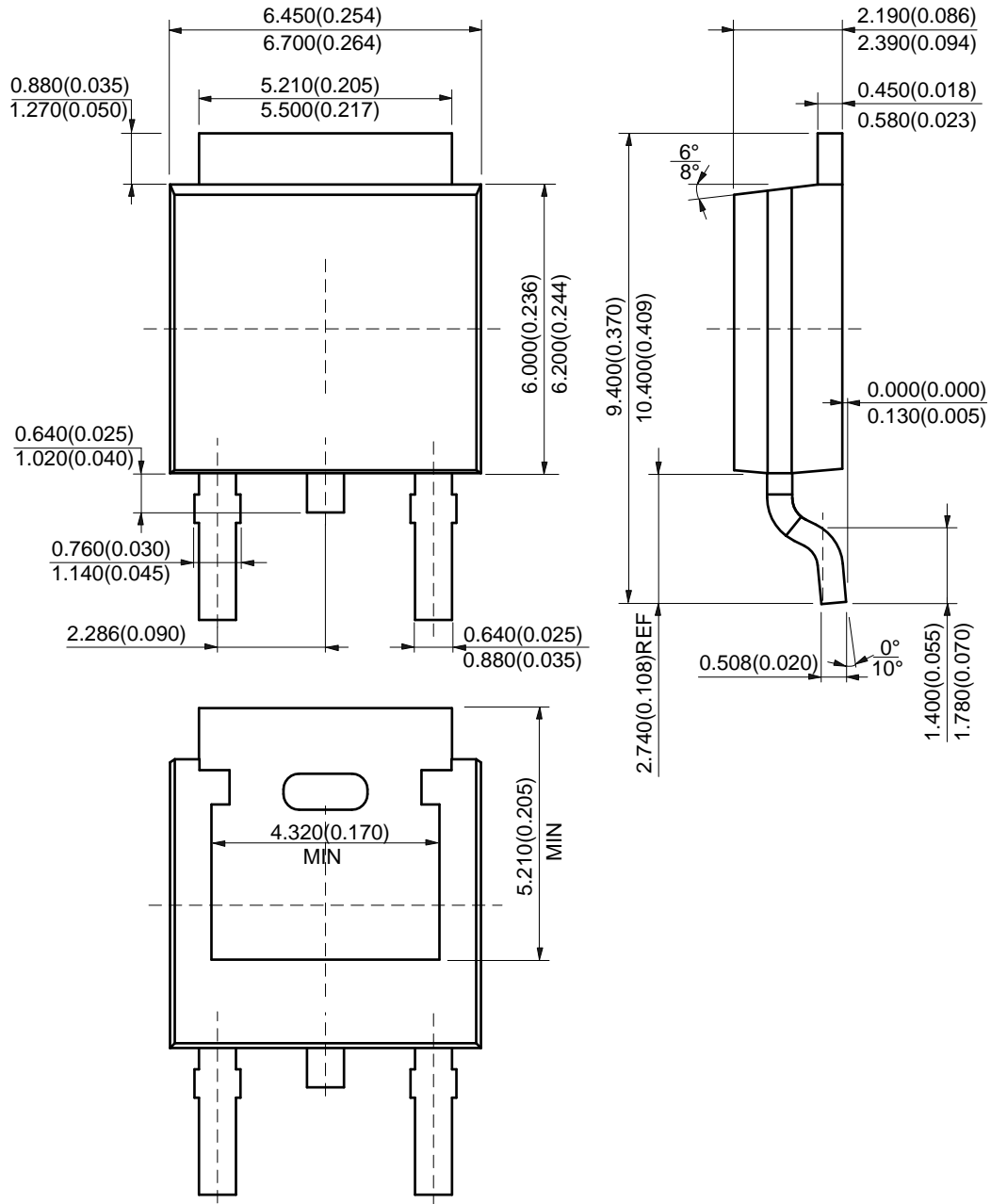
Package Outline Dimensions (Cont. All dimensions in mm(inch).)

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



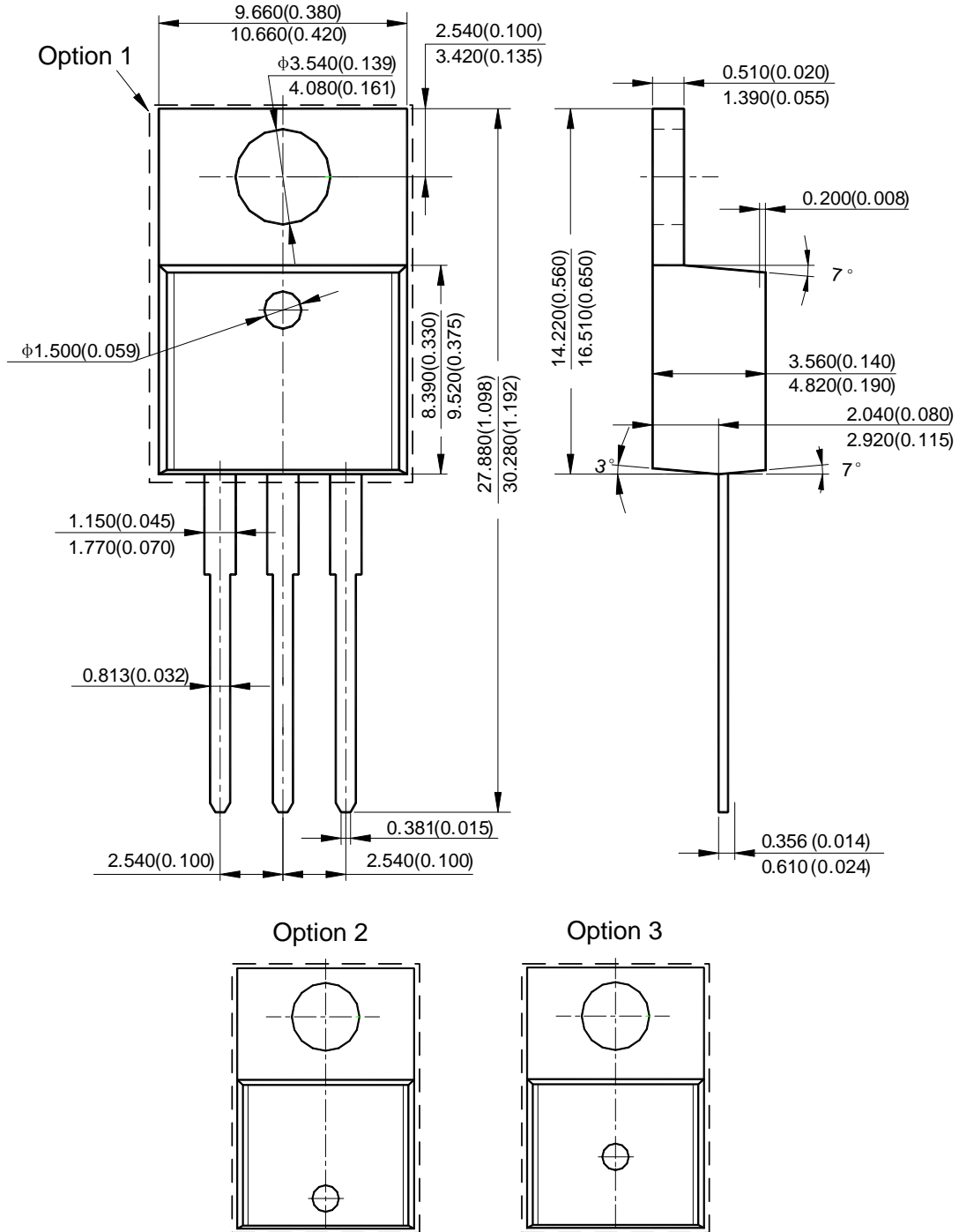
Package Outline Dimensions (Cont. All dimensions in mm(inch).)

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



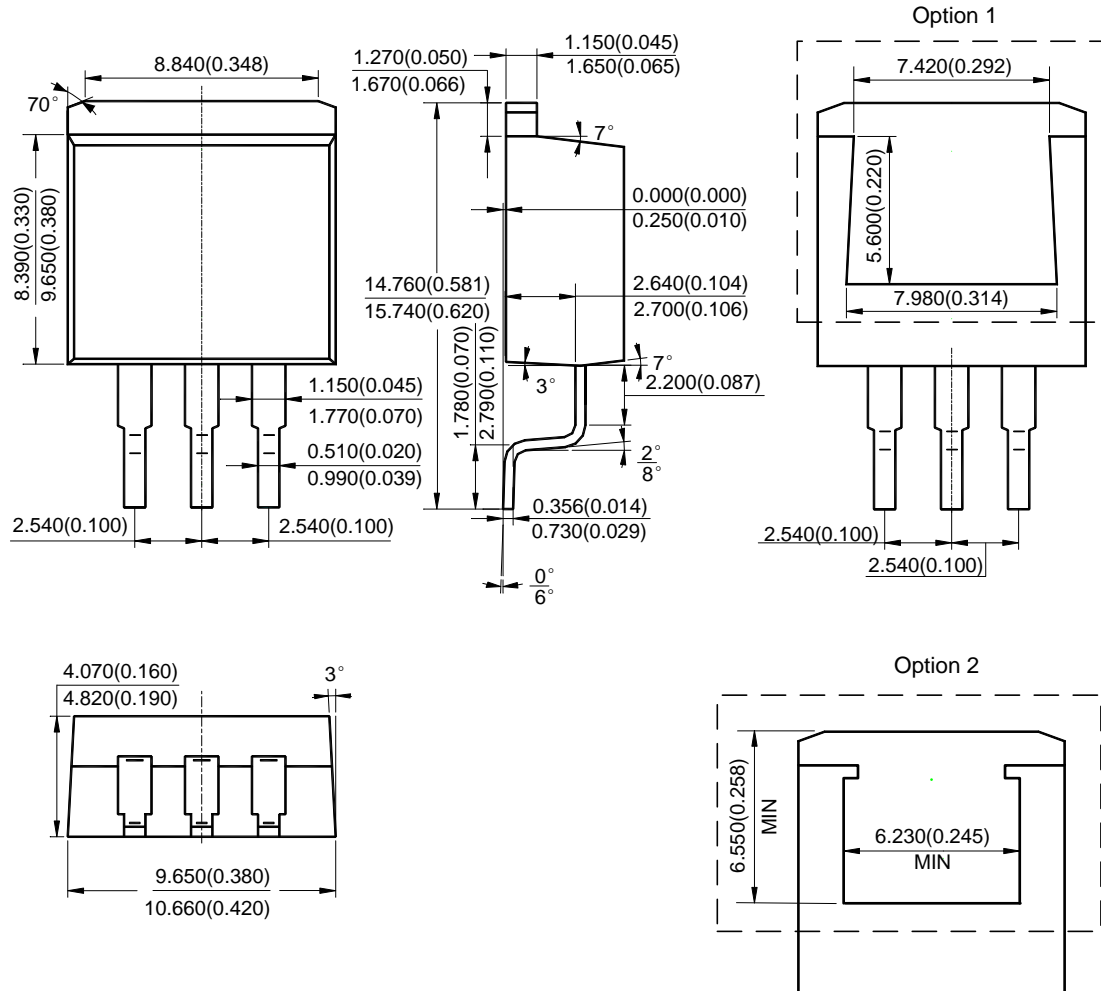
Package Outline Dimensions (Cont. All dimensions in mm(inch).)

(6) Package Type: TO220-3



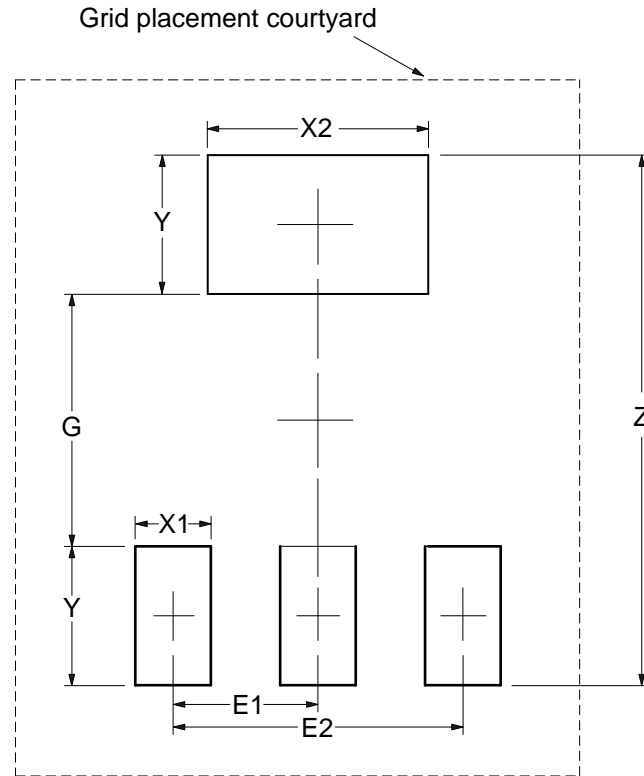
Package Outline Dimensions (Cont. All dimensions in mm(inch).)

(7) Package Type: TO263



Suggested Pad Layout

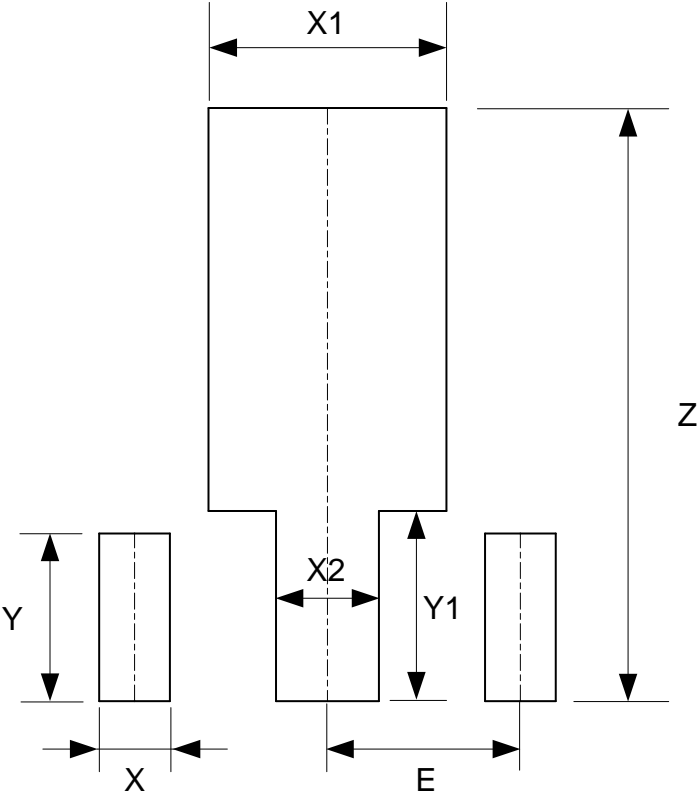
(1) Package Type: SOT223



| Dimensions | Z (mm)/(inch) | G (mm)/(inch) | X1 (mm)/(inch) | X2 (mm)/(inch) | Y (mm)/(inch) | E1 (mm)/(inch) | E2 (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 |

Suggested Pad Layout (Cont.)

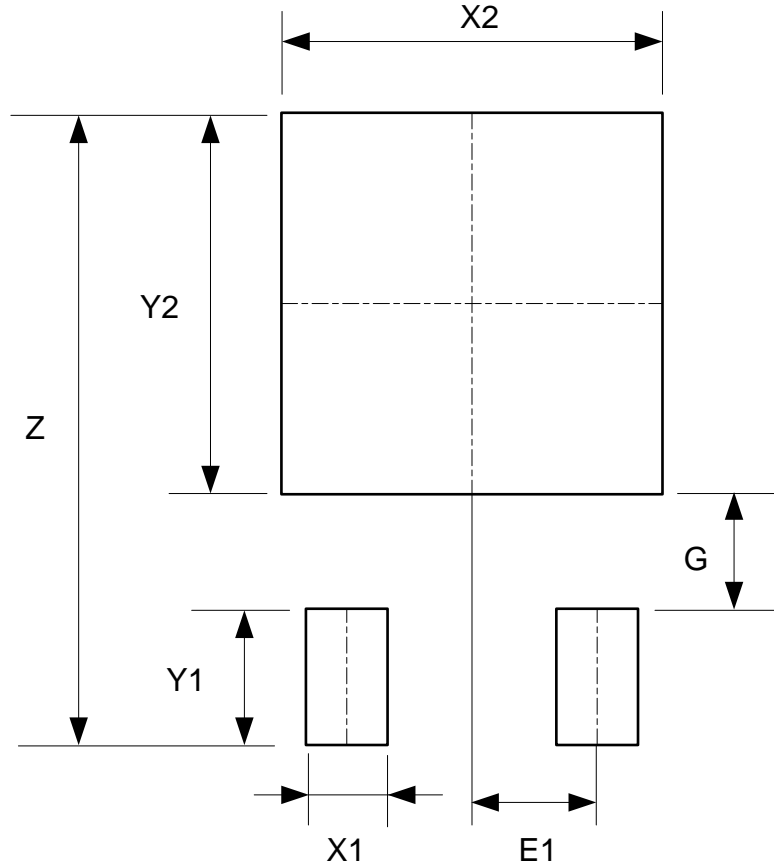
(2) Package Type: SOT89



| Dimensions | Z (mm)/(inch) | X (mm)/(inch) | X1 (mm)/(inch) | X2 (mm)/(inch) | Y (mm)/(inch) | Y1 (mm)/(inch) | E (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.)

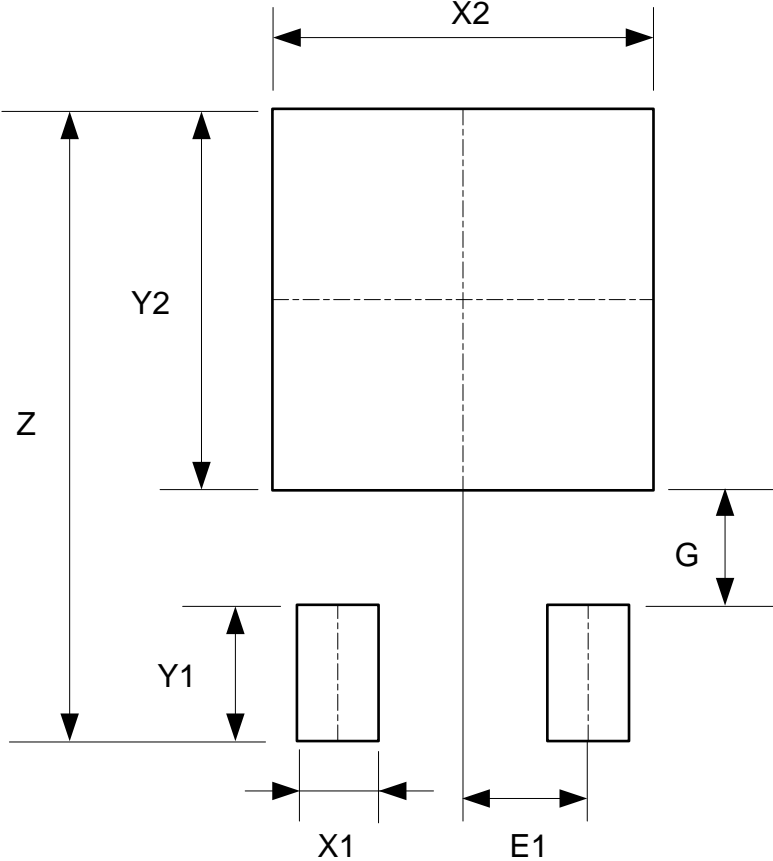
(3) Package Type: TO252-2 (3)



| Dimensions | Z (mm)/(inch) | X1 (mm)/(inch) | X2=Y2 (mm)/(inch) | Y1 (mm)/(inch) | G (mm)/(inch) | E1 (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.)

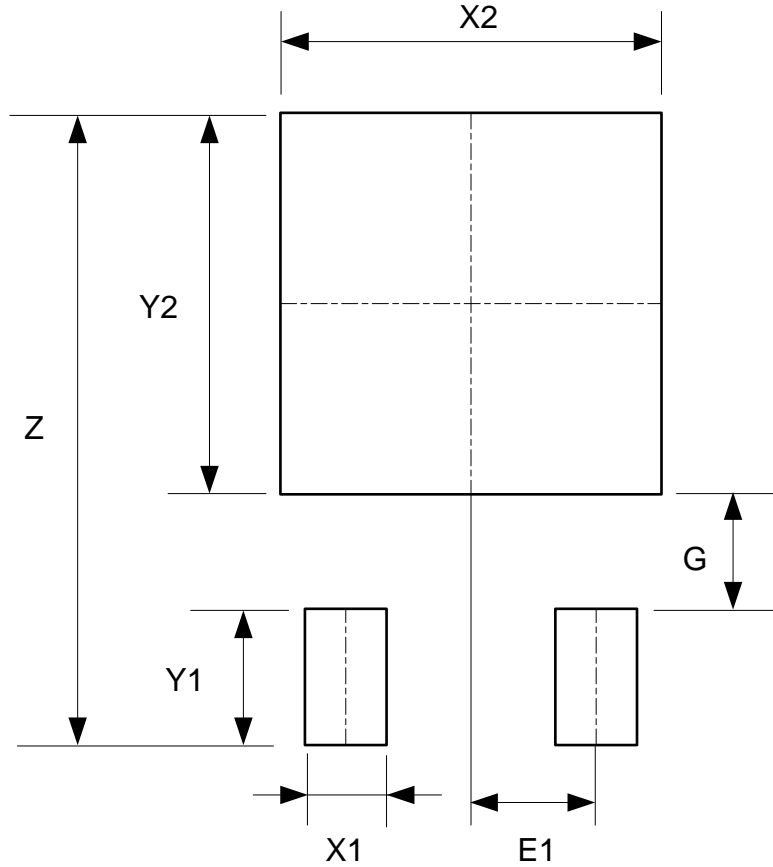
(4) Package Type: TO252-2 (4)



| Dimensions | Z (mm)/(inch) | X1 (mm)/(inch) | X2=Y2 (mm)/(inch) | Y1 (mm)/(inch) | G (mm)/(inch) | E1 (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.)

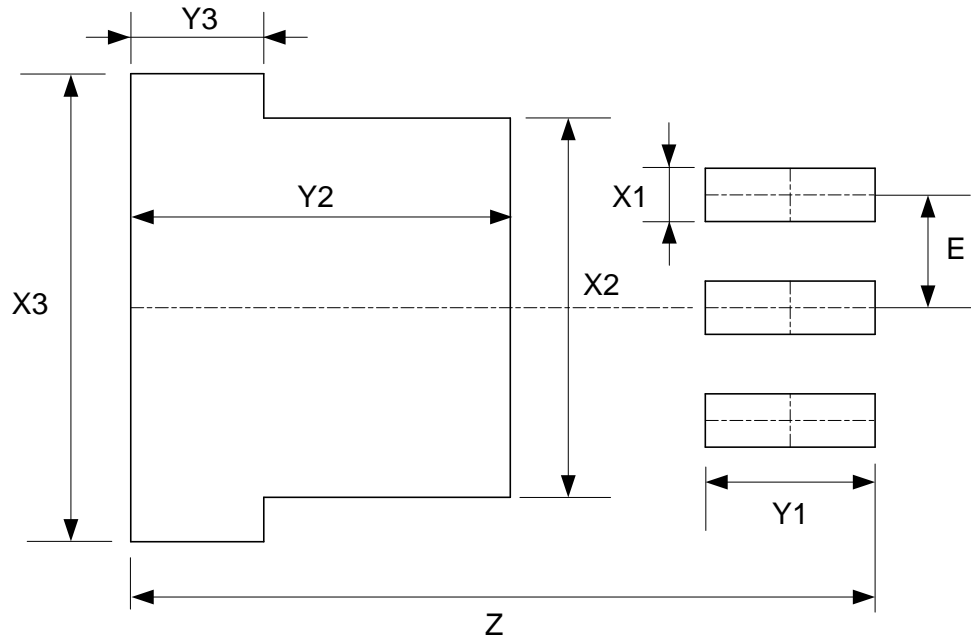
(5) Package Type: TO252-2 (5)



| Dimensions | Z (mm)/(inch) | X1 (mm)/(inch) | X2=Y2 (mm)/(inch) | Y1 (mm)/(inch) | G (mm)/(inch) | E1 (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 (mm)/(inch) | X1 (mm)/(inch) | X2 (mm)/(inch) | X3 (mm)/(inch) |
| Value | 16.760/0.660 | 1.200/0.047 | 8.540/0.336 | 10.540/0.415 |
| Dimensions | Y1 (mm)/(inch) | Y2 (mm)/(inch) | Y3 (mm)/(inch) | E (mm)/(inch) |
| Value | 3.830/0.151 | 8.560/0.337 | 3.000/0.118 | 2.540/0.100 |

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