

**3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR****AZ317****General Description**

The AZ317 is an adjustable three-terminal positive voltage regulator with a very low dropout of 1.2V at 1A output current. Using 2 external resistors, the AZ317 can provide an adjustable output voltage down to 1.25V.

The AZ317 includes a circuit of trimmed bandgap reference to assure output voltage accuracy to be within 1%. It also provides current limiting and thermal shutdown. The current limit is trimmed to ensure specified output current and controlled short-circuit current. The On-chip thermal limiting provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The AZ317 is available in the standard SOT-223, TO-220, TO-252 and TO-263 power packages.

Features

- Typical 1% Output Voltage Tolerance
- Typical 0.01%/V Line Regulation
- Typical 0.2% Load Regulation
- Very Low Dropout Voltage: 1.2V at 1A Output Current
- Trimmed Current Limit
- On-chip Thermal Protection
- Operation Junction Temperature: 0 to 125°C

Applications

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD Player
- Network Interface Card/Switch
- Telecom Equipment
- Printer and other Peripheral Equipment

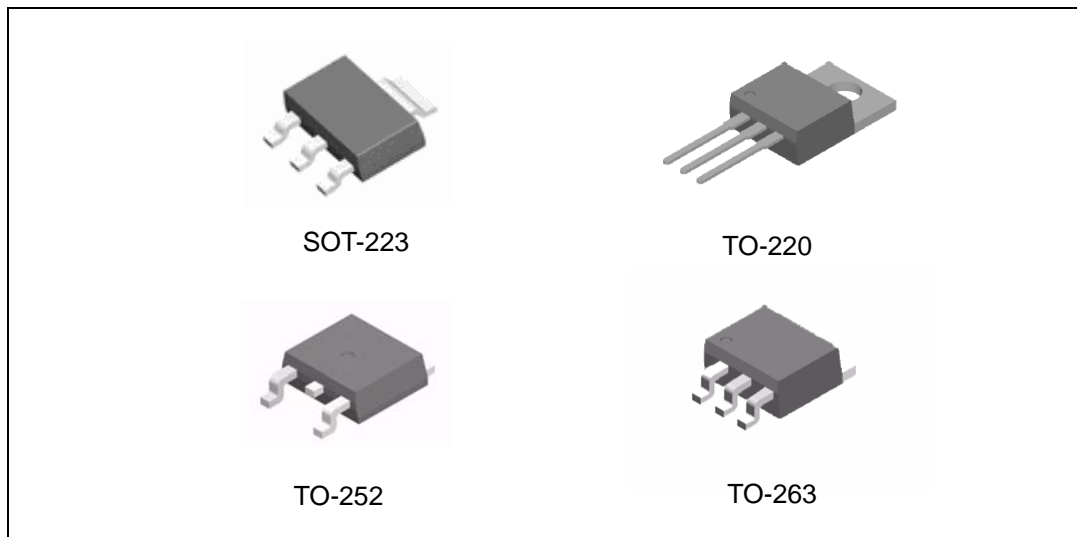


Figure 1. Package Types of AZ317



3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Pin Configuration

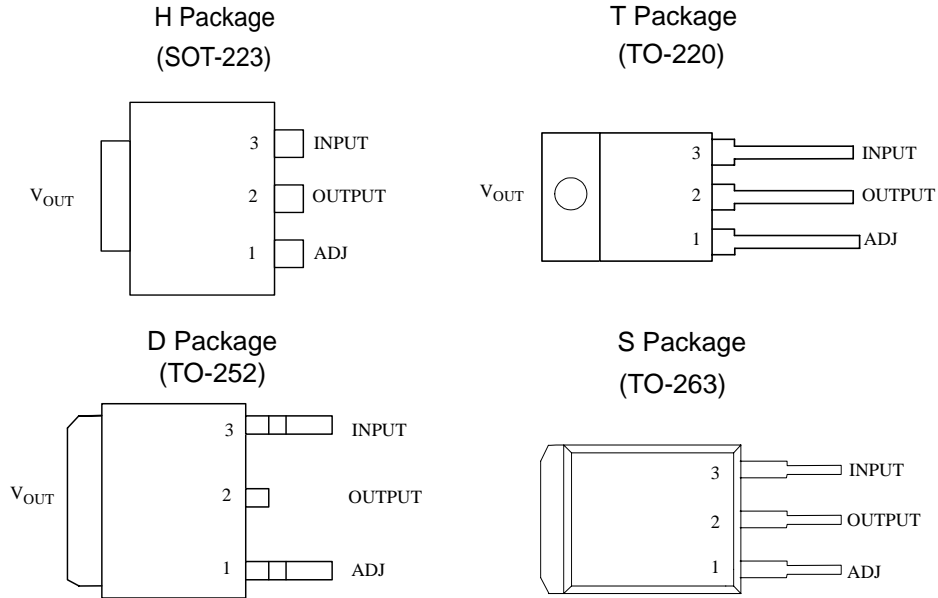


Figure 2. Pin Configuration of AZ317 (Top View)

Functional Block Diagram

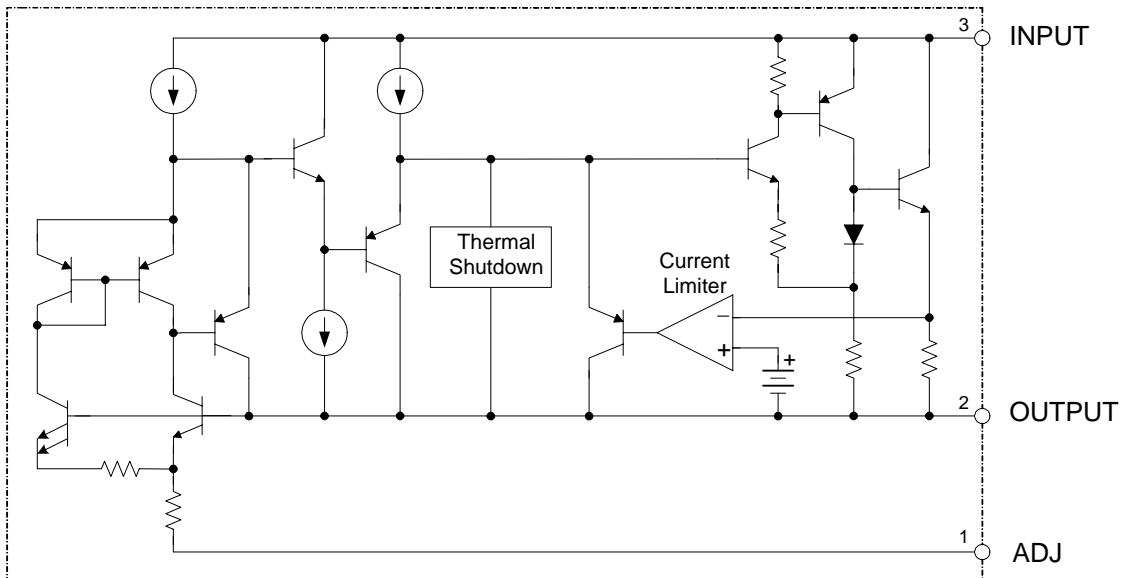


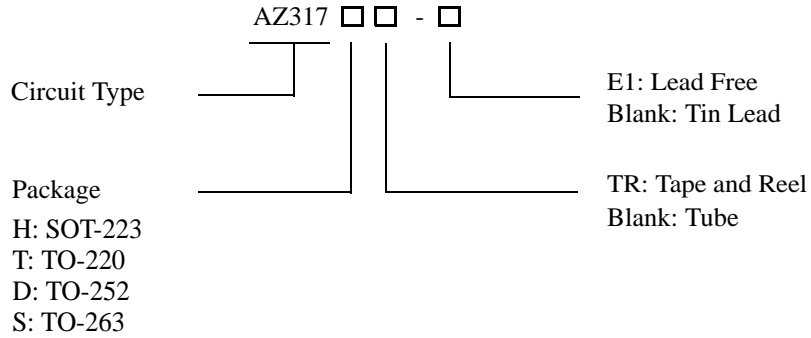
Figure 3. Functional Block Diagram of AZ317



3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Ordering Information



| Package | Temperature Range | Part Number | | Marking ID | | Packing Type |
|---------|-------------------|-------------|-------------|------------|-----------|--------------|
| | | Tin Lead | Lead Free | Tin Lead | Lead Free | |
| SOT-223 | 0 to 125°C | AZ317HTR | AZ317HTR-E1 | 317H | EH31A | Tape & Reel |
| TO-220 | 0 to 125°C | AZ317T | AZ317T-E1 | AZ317T | AZ317T-E1 | Tube |
| TO-252 | 0 to 125°C | AZ317D | AZ317D-E1 | AZ317D | AZ317D-E1 | Tube |
| | | AZ317DTR | AZ317DTR-E1 | AZ317D | AZ317D-E1 | Tape & Reel |
| TO-263 | 0 to 125°C | AZ317S | AZ317S-E1 | AZ317S | AZ317S-E1 | Tube |
| | | AZ317STR | AZ317STR-E1 | AZ317S | AZ317S-E1 | Tape & Reel |

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

**3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR****AZ317****Absolute Maximum Ratings (Note 1)**

| Parameter | Symbol | Min | Max | Unit |
|-------------------------------------|------------|-----|------|------|
| Input Voltage | V_{IN} | | 20 | V |
| Maximum Junction Temperature | T_J | | 150 | °C |
| Storage Temperature | T_S | -65 | 150 | °C |
| Lead Temperature (Soldering, 10sec) | T_{LEAD} | | 300 | °C |
| ESD (Human Body Model) | ESD | | 4000 | V |

Note1: 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.

Recommended Operating Conditions

| Parameter | Symbol | Min | Max | Unit |
|--------------------------------------|----------|-------------|-----|------|
| Input Voltage | V_{IN} | $V_{OUT}+2$ | 15 | V |
| Operating Junction Temperature Range | T_J | 0 | 125 | °C |

**3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR****AZ317****Electrical Characteristics**(Typicals and limits apply for $T_J = 25^\circ\text{C}$, $P \leq$ Maximum Power Dissipation unless otherwise specified.)(Note 2)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|-------------|---|------|----------------------|------|---------------------------|
| Reference Voltage | V_{REF} | $10\text{mA} \leq I_{OUT} \leq 1\text{A}$, $3\text{V} \leq (V_{IN} - V_{OUT}) \leq 10\text{V}$ | 1.20 | 1.25 | 1.30 | V |
| Line Regulation | S_V | $I_{OUT} \leq 20\text{mA}$, $3\text{V} \leq V_{IN} - V_{OUT} \leq 10\text{V}$ | | 0.01 | 0.04 | %/V |
| Load Regulation | S_i | $V_{IN} - V_{OUT} = 2\text{V}$, $10\text{mA} \leq I_{OUT} \leq 1\text{A}$ | | 0.2 | 0.4 | % |
| Thermal Regulation | | 20ms Pulse | | 0.04 | 0.07 | %/W |
| Dropout Voltage | ΔV | $I_{OUT} = 1\text{A}$ | | 1.2 | 1.3 | V |
| Current Limit | I_{LIMIT} | $(V_{IN} - V_{OUT}) = 2\text{V}$ | 1.2 | 1.5 | 1.8 | A |
| Adjust Pin Current | | | | 50 | 100 | μA |
| Adjust Pin Current Change | | $1.4\text{V} \leq (V_{IN} - V_{OUT}) \leq 10\text{V}$, $10\text{mA} \leq I_{OUT} \leq 1\text{A}$ | | 0.2 | 5 | μA |
| Minimum Load Current | | $3\text{V} \leq (V_{IN} - V_{OUT}) \leq 15\text{V}$ | | 3.5 | 10 | mA |
| Ripple Rejection | | $f = 120\text{Hz}$, $C_{OUT} = 1\mu\text{F}$ Tantalum, $(V_{IN} - V_{OUT}) = 3\text{V}$, $I_{OUT} = 1\text{A}$ | 60 | 75 | | dB |
| Temperature Stability | | | | 1 | | % |
| Long -Term Stability | | $T_A = 125^\circ\text{C}$, 1000hrs | | 0.3 | | % |
| RMS Output Noise (% of V_{OUT}) | | $T_A = 25^\circ\text{C}$, $10\text{Hz} \leq f \leq 10\text{kHz}$ | | 0.003 | | % |
| Thermal Resistance, Junction to Case | | SOT-223 TO-252 TO-220 TO-263 | | 15 10 4.5 4 | | $^\circ\text{C}/\text{W}$ |
| Thermal Shutdown | | Junction Temperature | | 150 | | $^\circ\text{C}$ |
| Thermal Shutdown Hysteresis | | | | 25 | | $^\circ\text{C}$ |

Note 2: Maximum Power Dissipation is Package Type and Case Temperature dependent. Please see Figure 12.



3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Typical Performance Characteristics

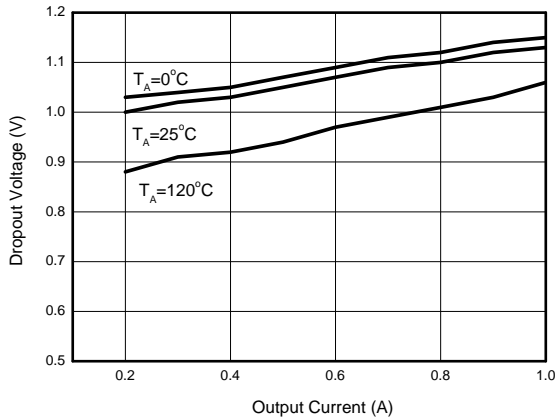


Figure 5. Dropout Voltage vs. Output Current

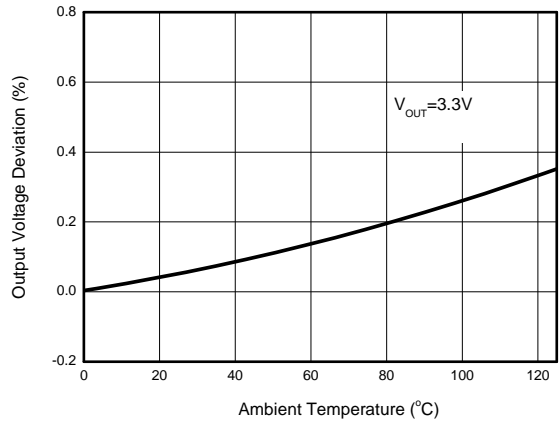


Figure 6. Load Regulation vs. Temperature

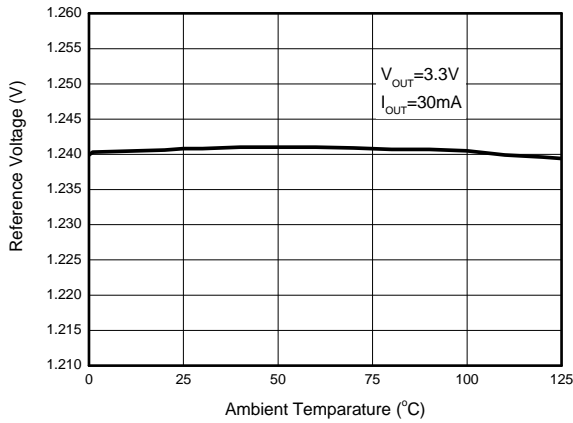


Figure 7. Reference Voltage vs. Temperature

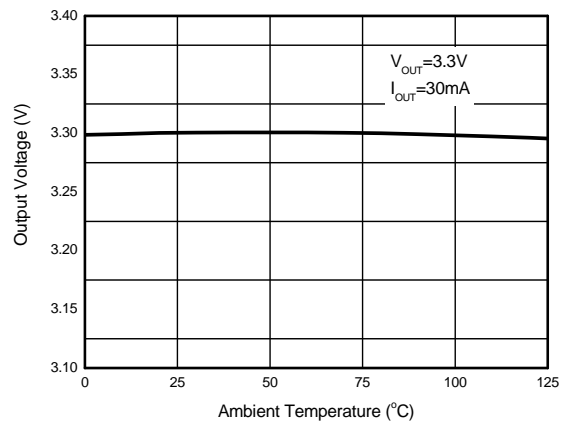


Figure 8. Output Voltage vs. Temperature



3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Typical Performance Characteristics (Continued)

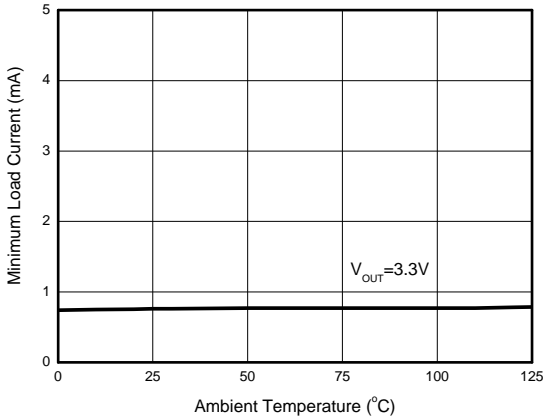


Figure 9. Minimum Load Current vs. Temperature

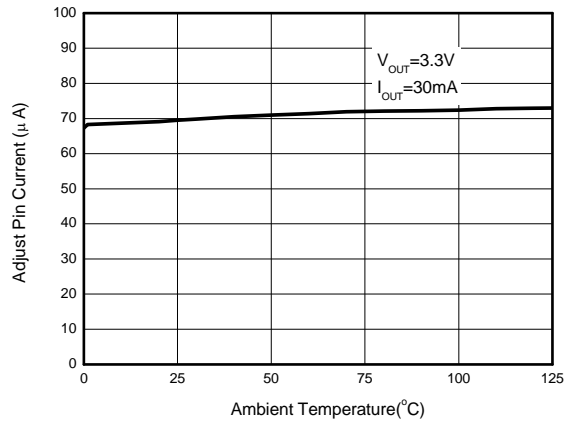


Figure 10. Adjust Pin Current vs. Temperature

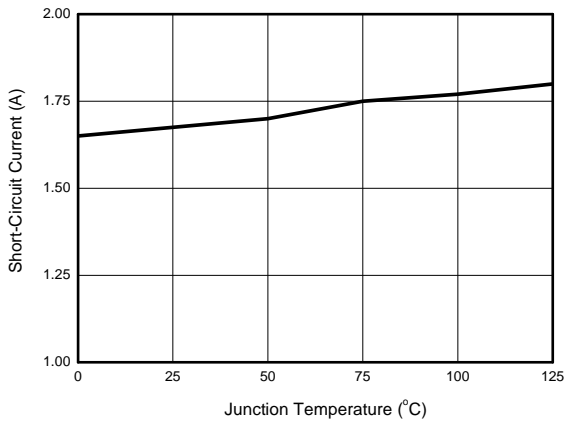


Figure 11. Short-Circuit Current vs. Temperature

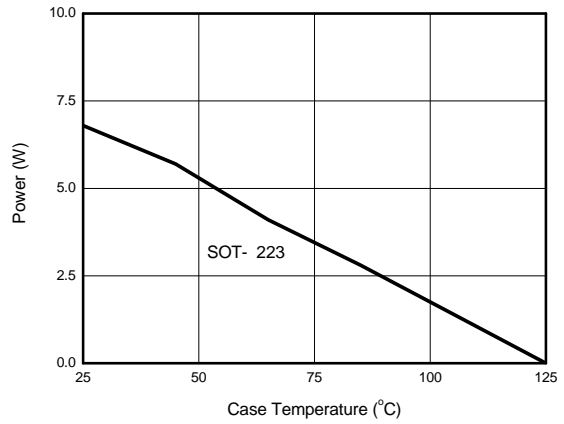


Figure 12. Maximum Power Dissipation



3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Typical Performance Characteristics (Continued)

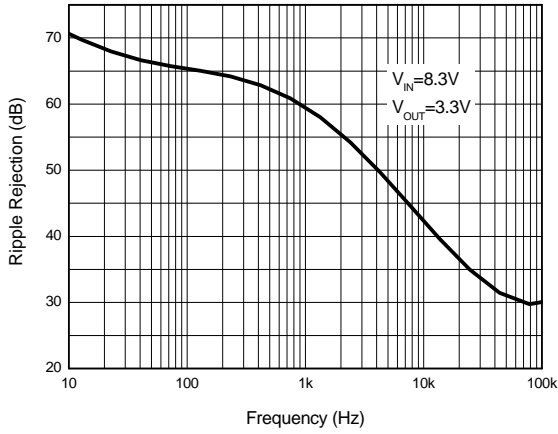


Figure 13. Ripple Rejection vs. Frequency

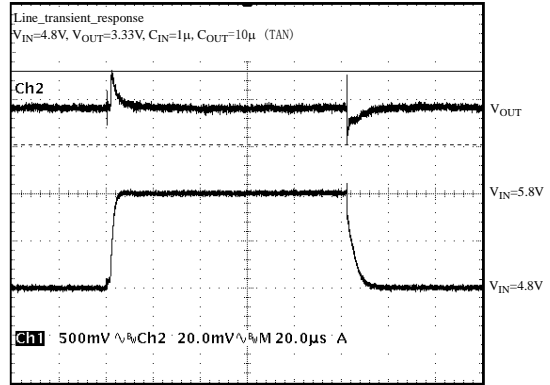


Figure 14. Line Transient Response

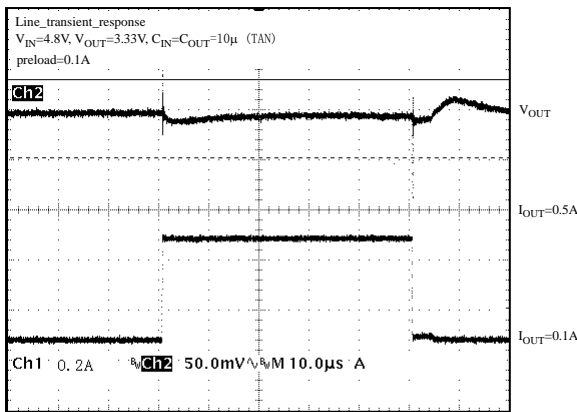
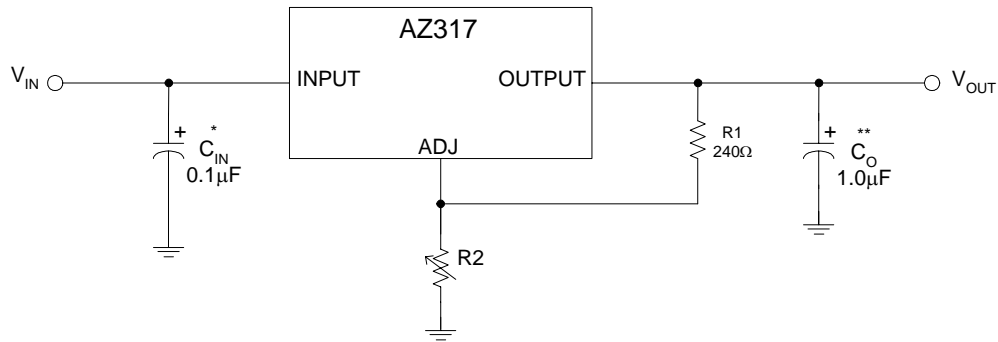


Figure 15. Load Transient Response

**3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR****AZ317****Typical Application**

* = C_{IN} is required if the regulator is located near power supply filter.

**= C_O is needed for stability and it improves transient response.

$$V_{OUT} = V_{REF} \times (1 + R2/R1) + I_{ADJ} \times R2$$

Since I_{ADJ} is controlled to less than $100\mu A$, the error associated with this term is negligible in most applications.

Figure 4. Typical Application of AZ317



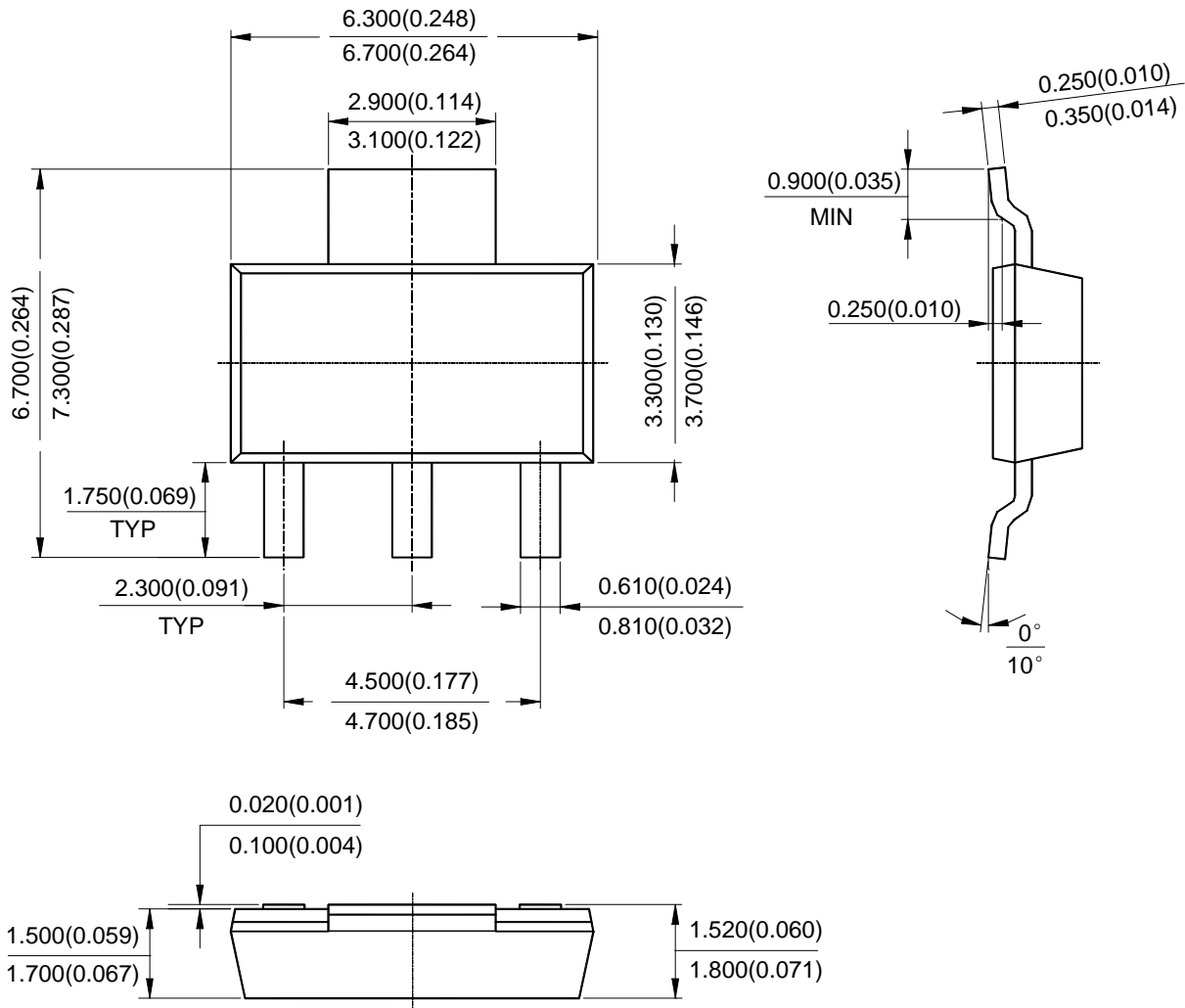
3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Mechanical Dimensions

SOT-223

Unit: mm(inch)





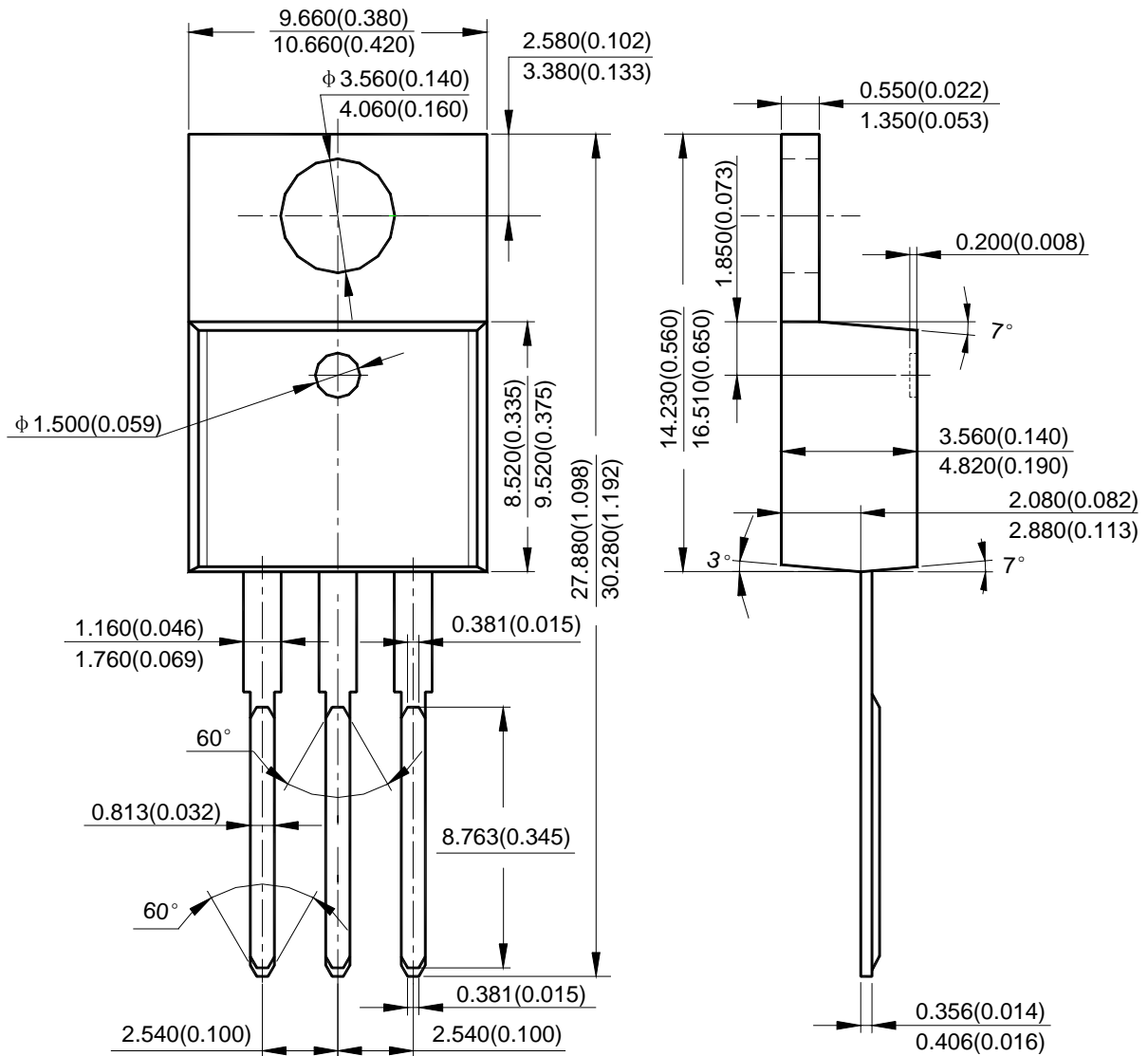
3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Mechanical Dimensions (Continued)

TO-220

Unit: mm(inch)





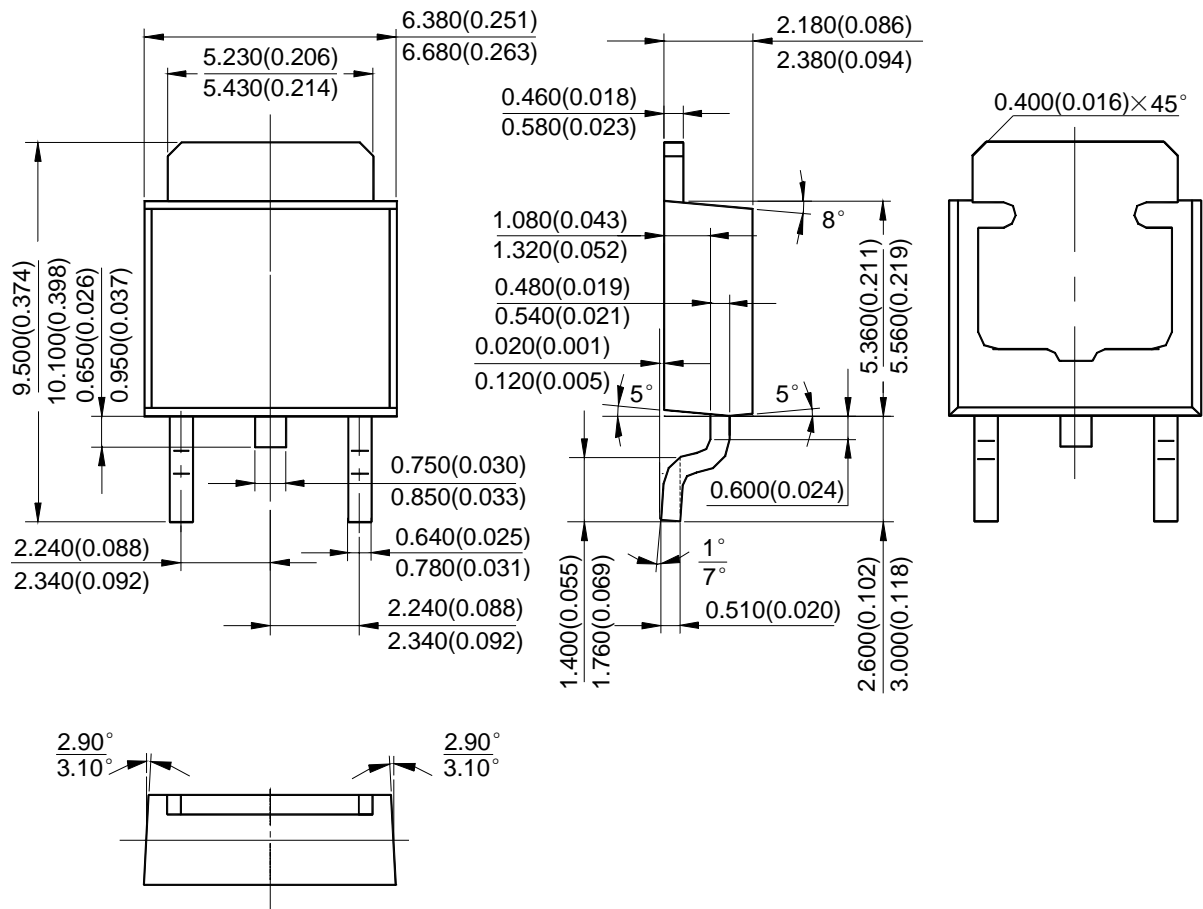
3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Mechanical Dimensions (Continued)

TO-252

Unit: mm(inch)





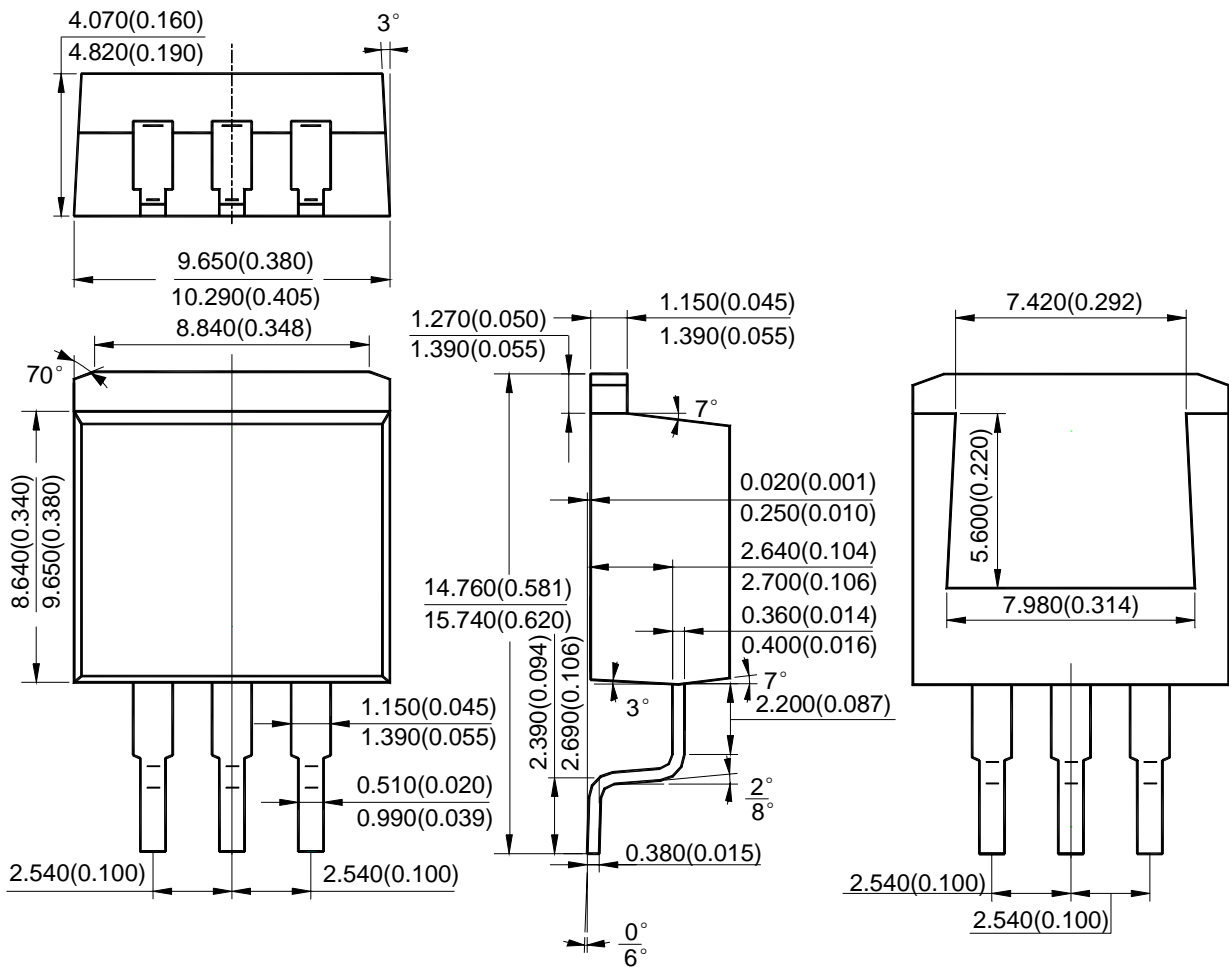
3-TERMINAL 1A ADJUSTABLE VOLTAGE REGULATOR

AZ317

Mechanical Dimensions (Continued)

TO-263

Unit: mm(inch)





BCD Semiconductor Manufacturing Limited

<http://www.bcdsemi.com>

BCD Semiconductor Corporation

3170 De La Cruz Blvd, Suite # 105 Santa Clara, CA 95054-2411, U.S.A

Tel: +1-408-988 6388, Fax: +1-408-988 6386

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.

800 Yi Shan Road, Shanghai 200233, PRC

Tel: +86-21-6485-1491, Fax: +86-21-5450-0008

Advanced Analog Circuits (Shanghai) Corporation

8F, B Zone, 900 Yi Shan Road, Shanghai 200233, PRC

Tel: +86-21-6495 9539, Fax: +86-21-6485 9673

BCD Semiconductor (Taiwan) Company Limited

Room 2210, 22nd Fl, 333, Keelung Road, Sec. 1, TaiPei (110), Taiwan

Tel: +886-2-2758 6828, Fax: +886-2-2758 6892

IMPORTANT NOTICE

BCD Semiconductor Manufacturing Limited reserves the right to make changes without further notice to any products or specifications herein. BCD Semiconductor Manufacturing Limited does not assume any responsibility for use of any its products for any particular purpose, nor does BCD Semiconductor Manufacturing Limited assume any liability arising out of the application or use of any its products or circuits. BCD Semiconductor Manufacturing Limited does not convey any license under its patent rights or other rights nor the rights of others.