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-220-3, TO-252-2 (1), TO-252-2 (3) and TO-263-3 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

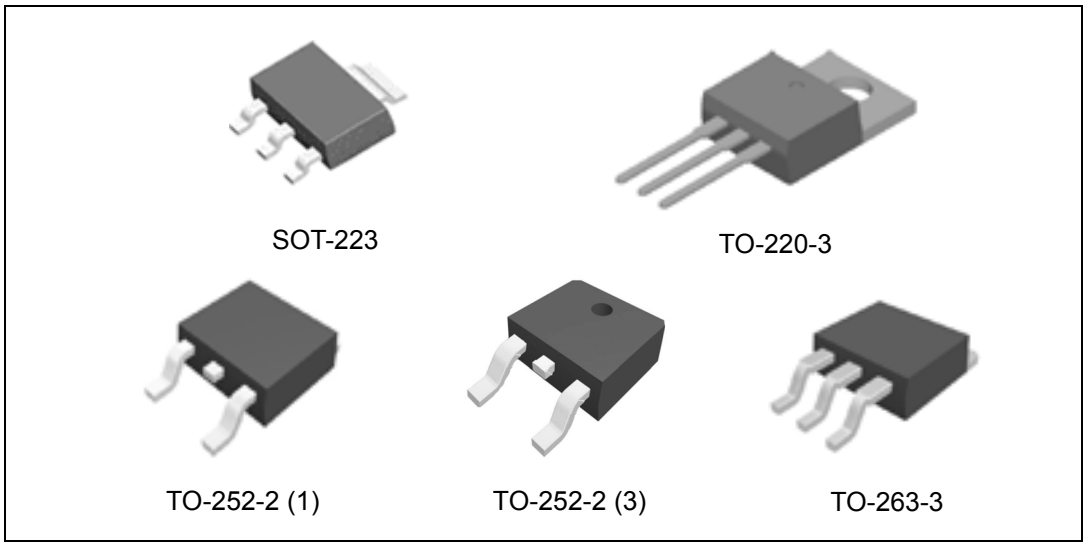


Figure 1. Package Types of AZ317

Pin Configuration

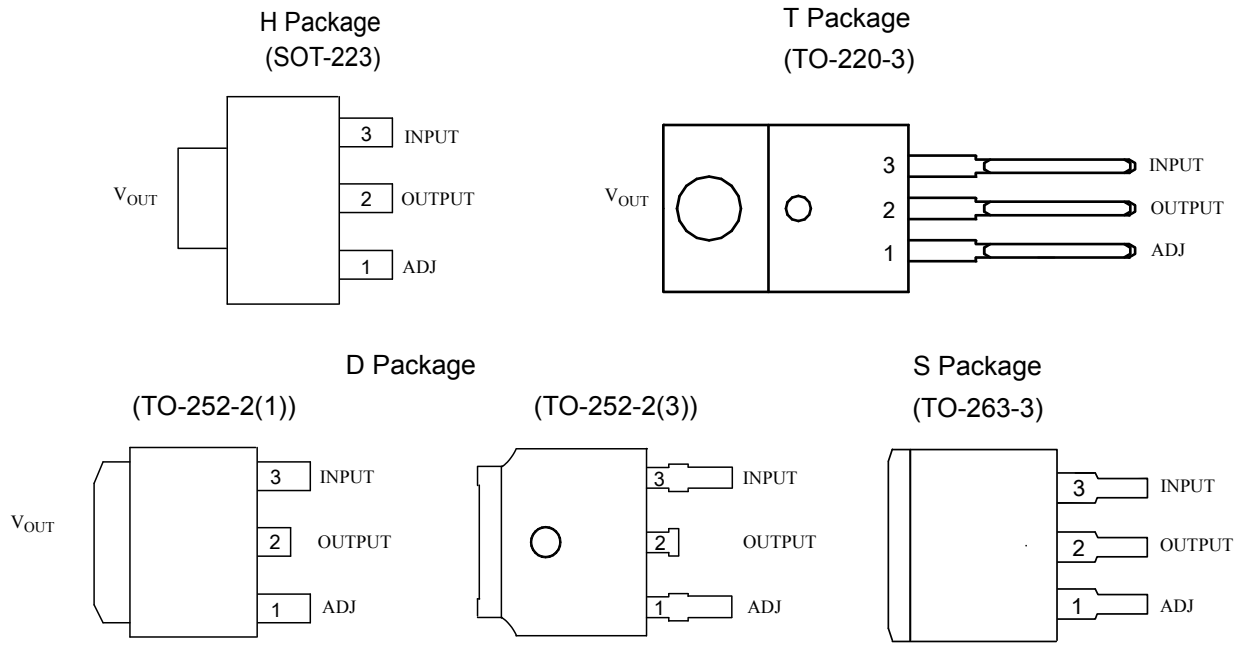


Figure 2. Pin Configuration of AZ317 (Top View)

Functional Block Diagram

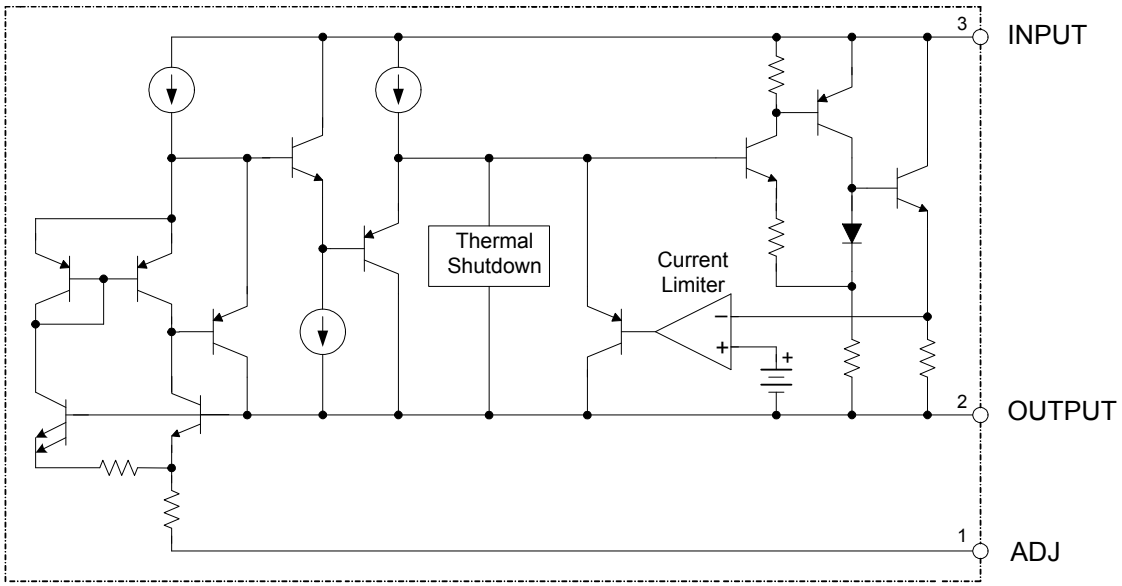
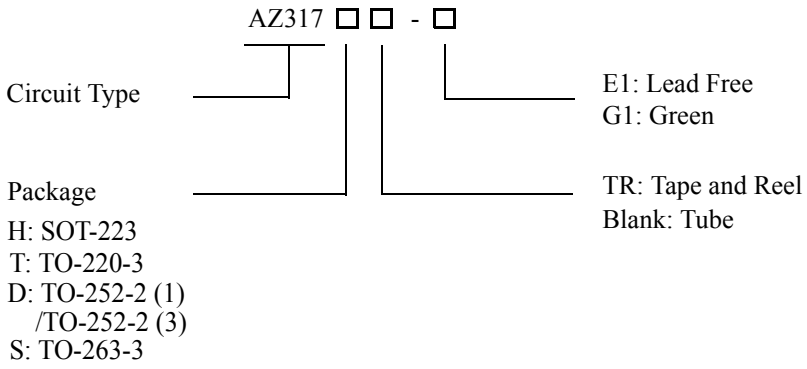


Figure 3. Functional Block Diagram of AZ317

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Lead Free	Green	Lead Free	Green	
SOT-223	0 to 125°C	AZ317HTR-E1	AZ317HTR-G1	EH31A	GH31A	Tape & Reel
TO-220-3	0 to 125°C	AZ317T-E1	AZ317T-G1	AZ317T-E1	AZ317T-G1	Tube
TO-252-2 (1)/ TO-252-2 (3)	0 to 125°C	AZ317DTR-E1	AZ317DTR-G1	AZ317D-E1	AZ317D-G1	Tape & Reel
TO-263-3	0 to 125°C	AZ317S-E1	AZ317S-G1	AZ317S-E1	AZ317S-G1	Tube
		AZ317STR-E1	AZ317STR-G1	AZ317S-E1	AZ317S-G1	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green packages.

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

Electrical Characteristics

(Typicals and limits apply for T_J =25°C, P≤ Maximum Power Dissipation unless otherwise specified.)(Note 2)

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

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

Typical Performance Characteristics

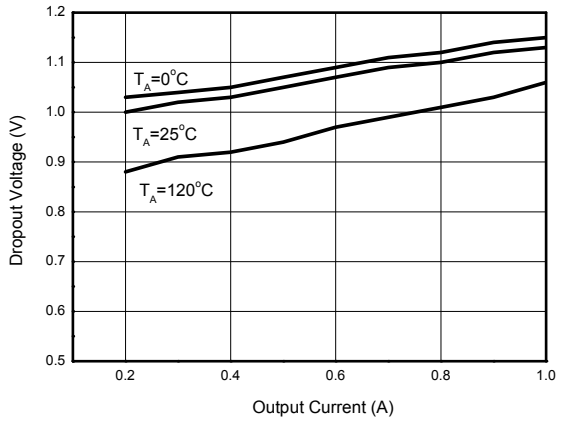


Figure 5. Dropout Voltage vs. Output Current

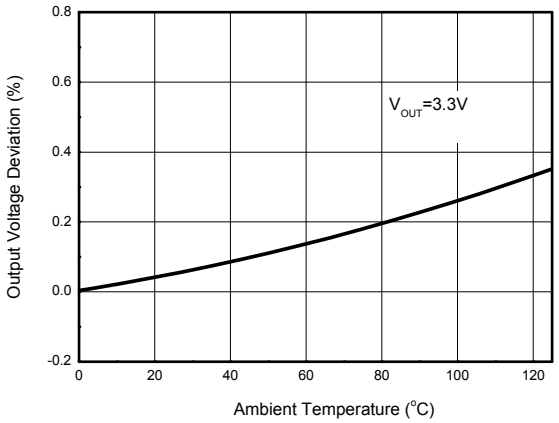


Figure 6. Load Regulation vs. Temperature

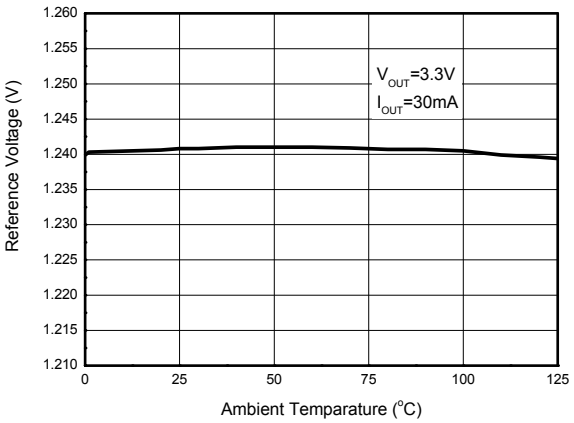


Figure 7. Reference Voltage vs. Temperature

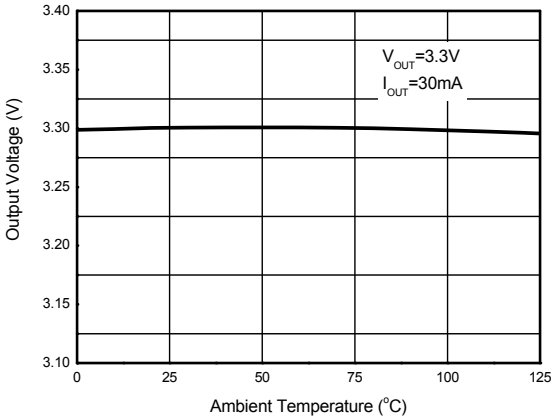


Figure 8. Output Voltage vs. Temperature

Typical Performance Characteristics (Continued)

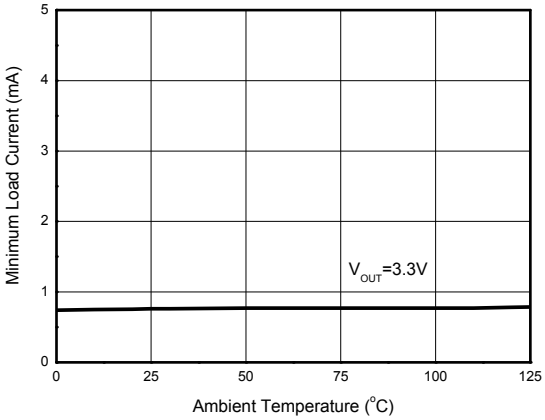


Figure 9. Minimum Load Current vs. Temperature

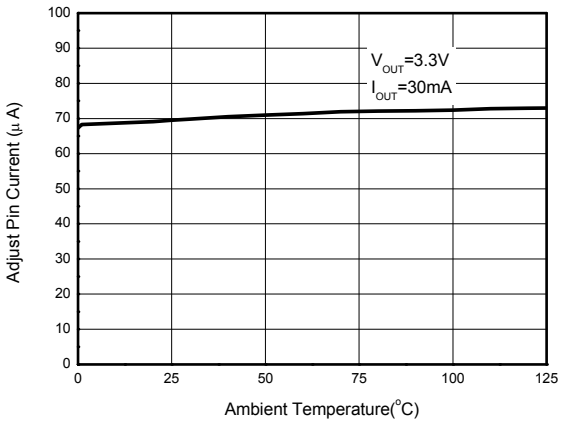


Figure 10. Adjust Pin Current vs. Temperature

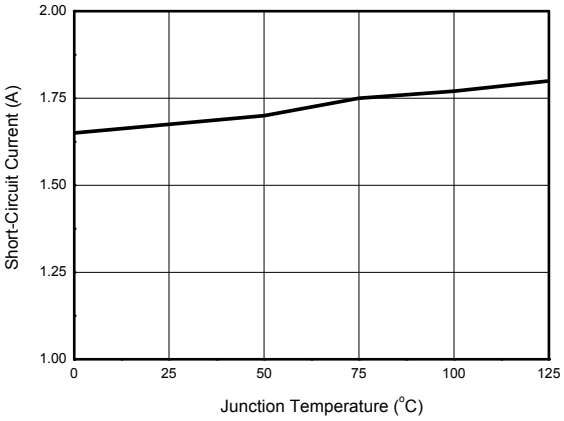


Figure 11. Short-Circuit Current vs. Temperature

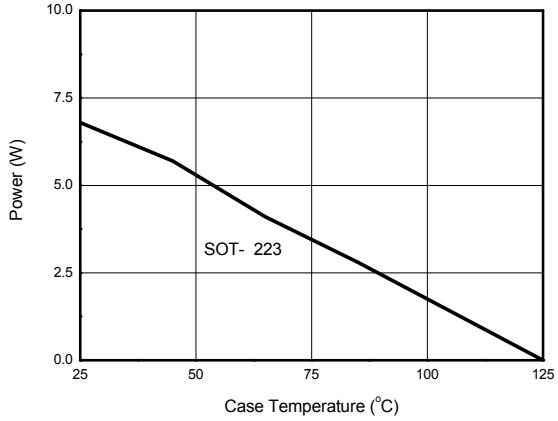


Figure 12. Maximum Power Dissipation

Typical Performance Characteristics (Continued)

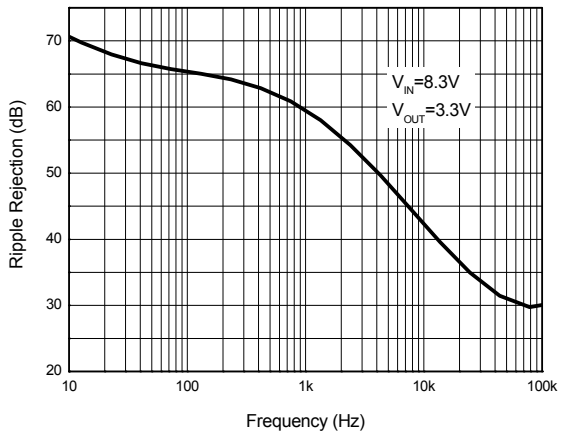


Figure 13. Ripple Rejection vs. Frequency

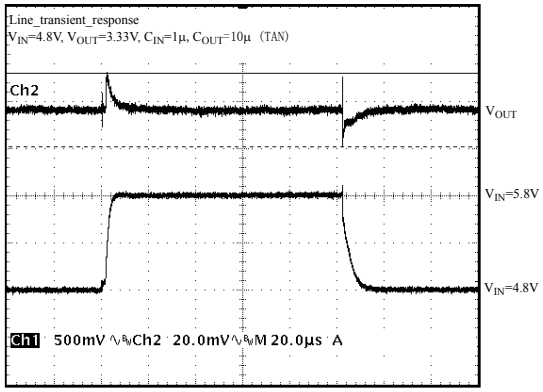


Figure 14. Line Transient Response

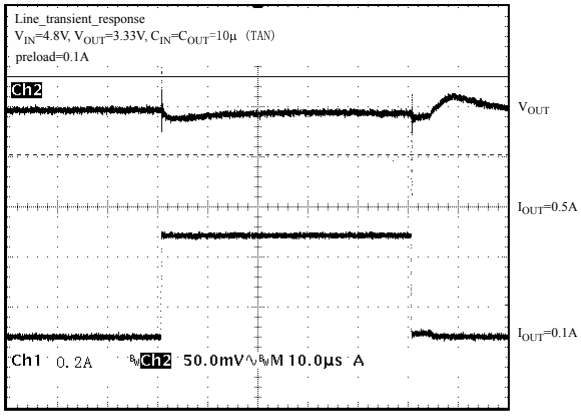
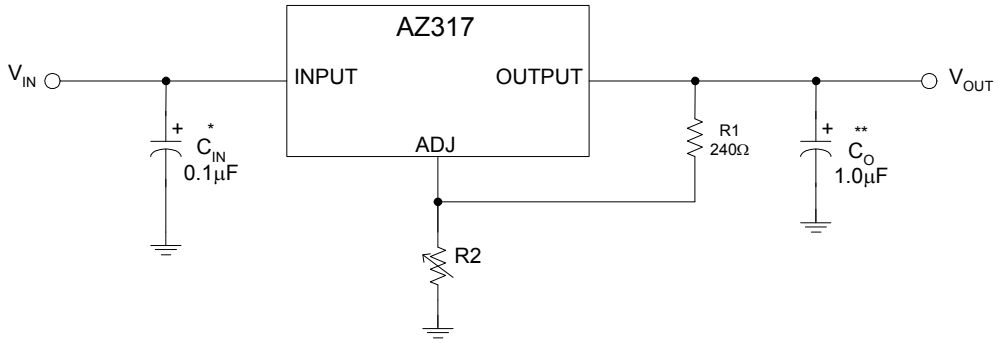


Figure 15. Load Transient Response

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.

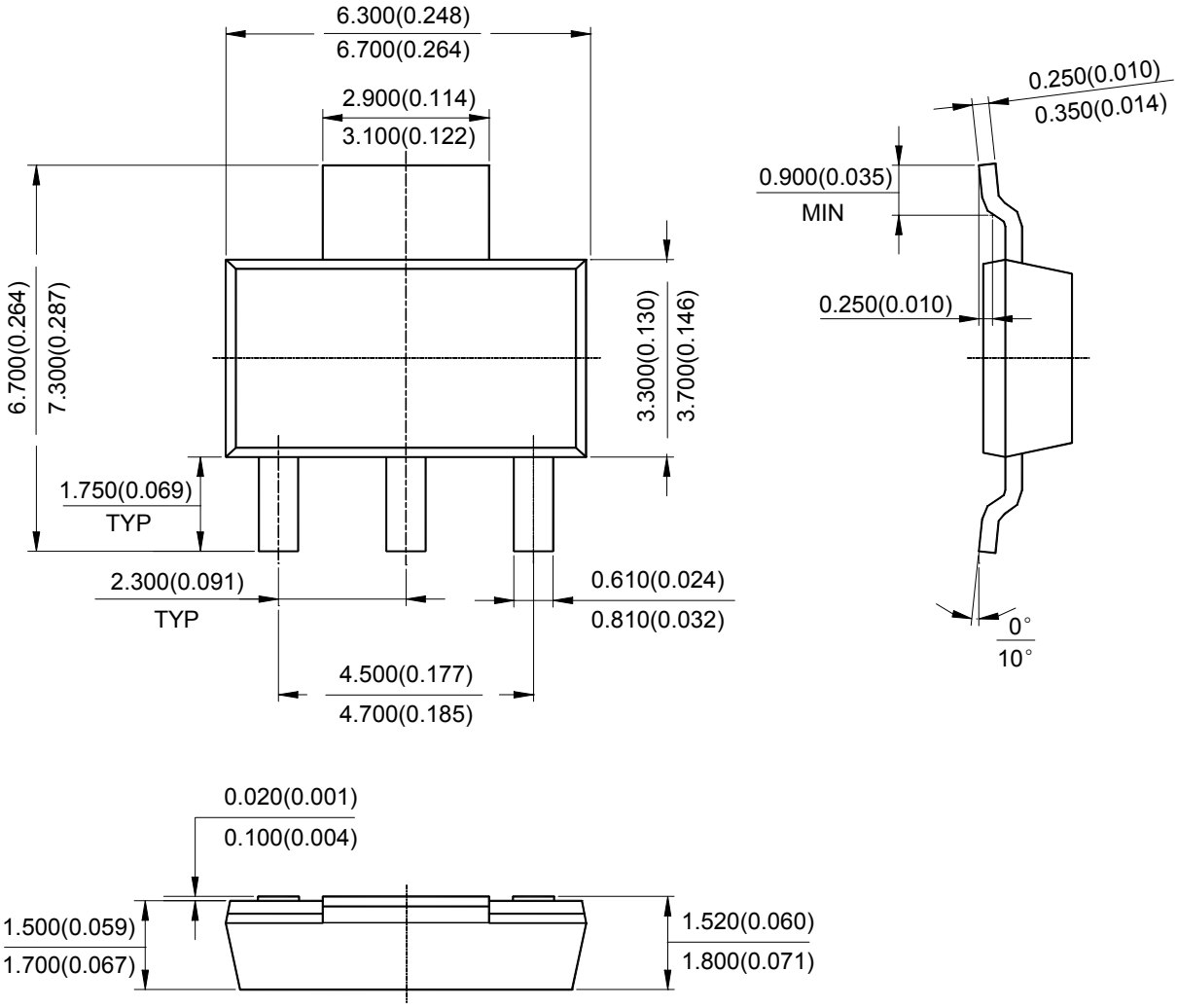
$$V_{OUT} = V_{REF} \times (1+R2/R1) + I_{ADJ} \times R2$$

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

Figure 4. Typical Application of AZ317

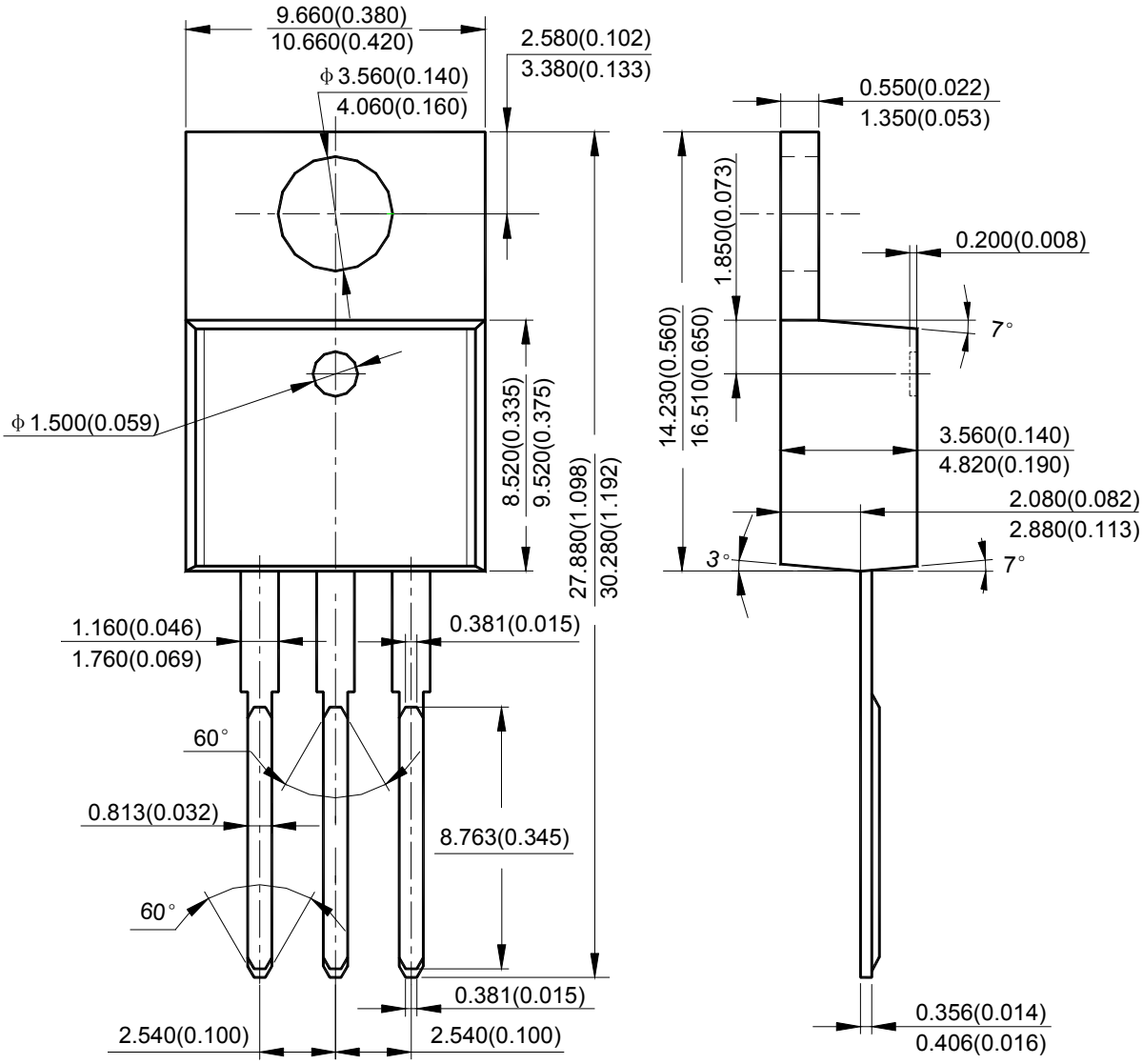
Mechanical Dimensions

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



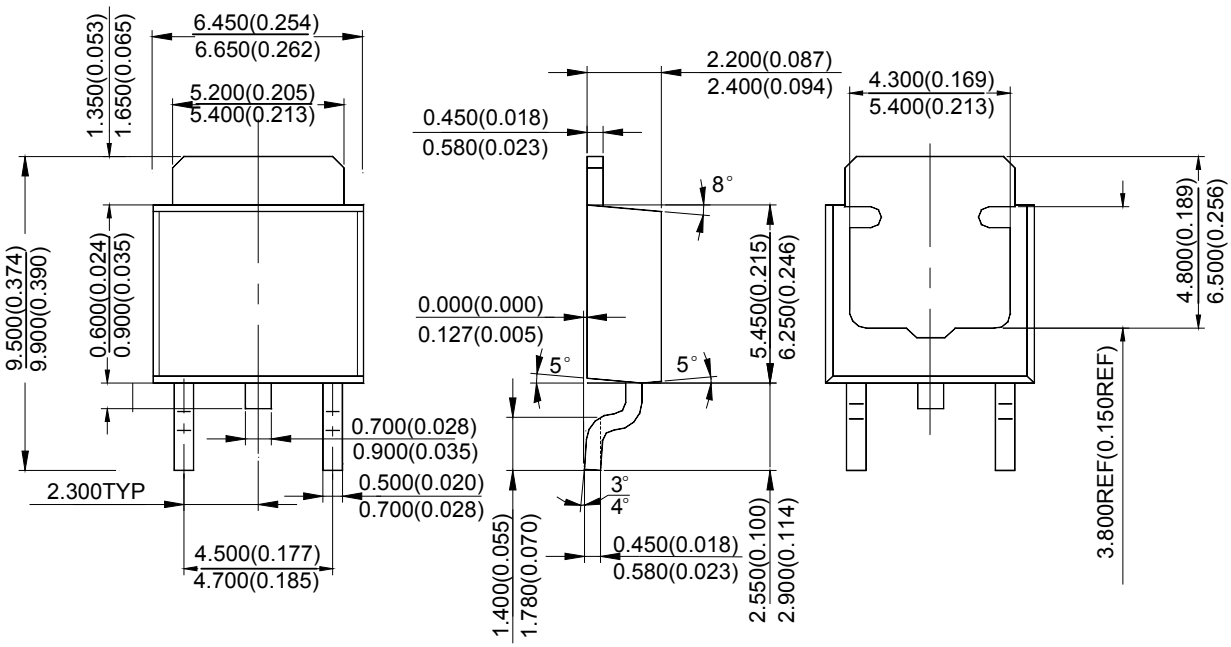
Mechanical Dimensions (Continued)

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



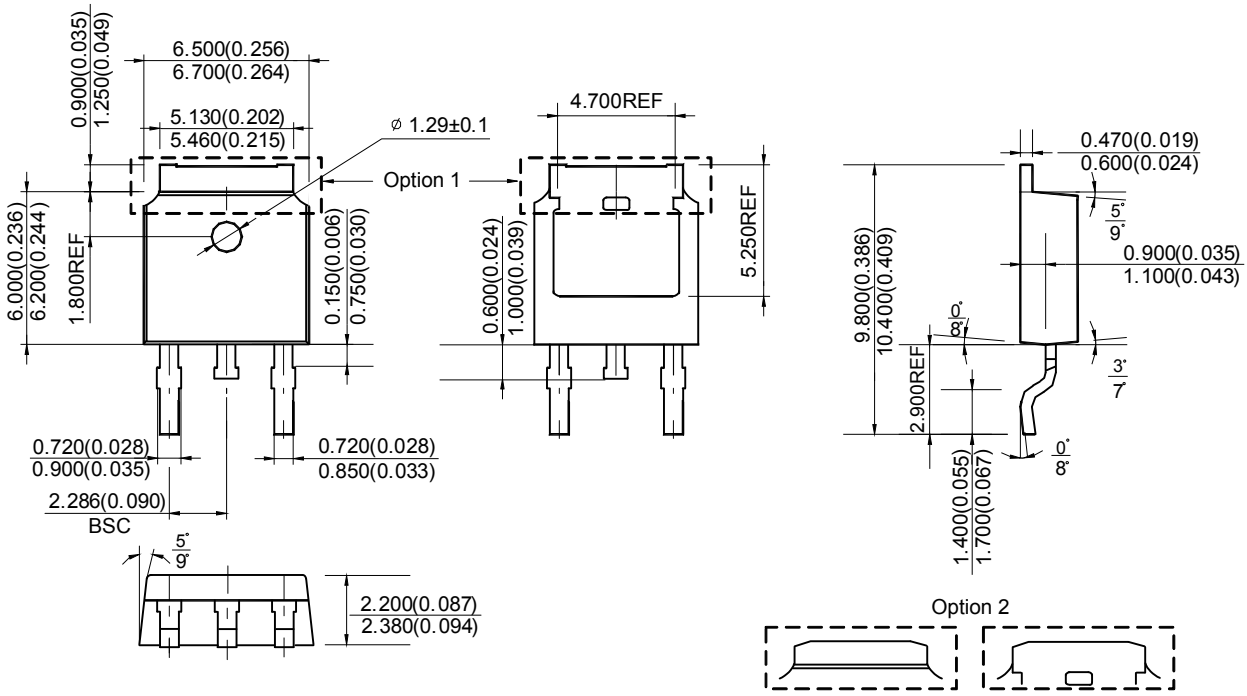
Mechanical Dimensions (Continued)

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



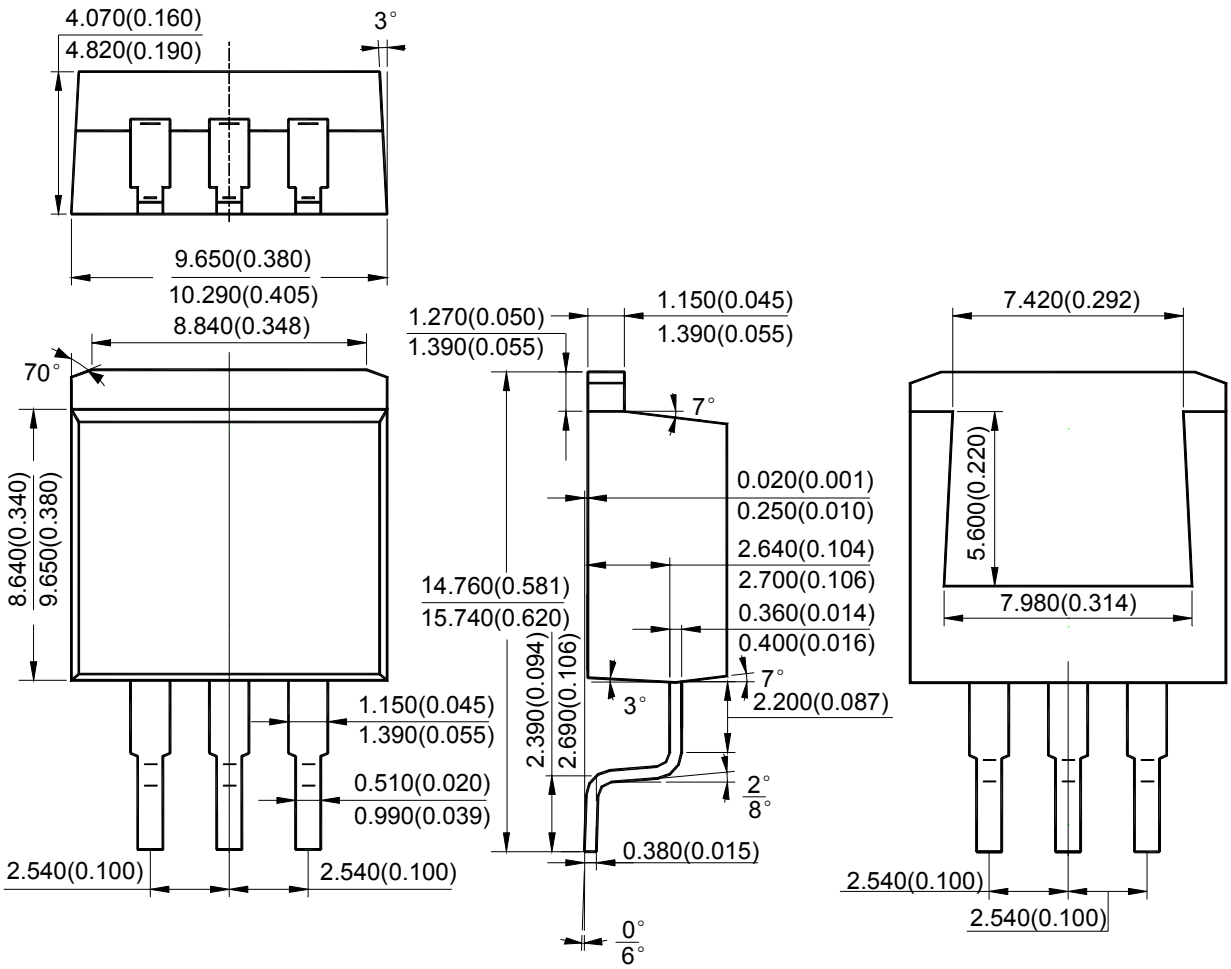
Mechanical Dimensions (Continued)

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



Mechanical Dimensions (Continued)

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





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