

**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**General Description**

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

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

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

The AZ1117 series is available in the industry standard SOT-223, SOT-89, TO-220-3, TO-252-2 (1), TO-252-2 (2), TO-252-2 (3), TO-252-2 (4) and TO-263-3 power packages.

**Features**

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

**Applications**

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

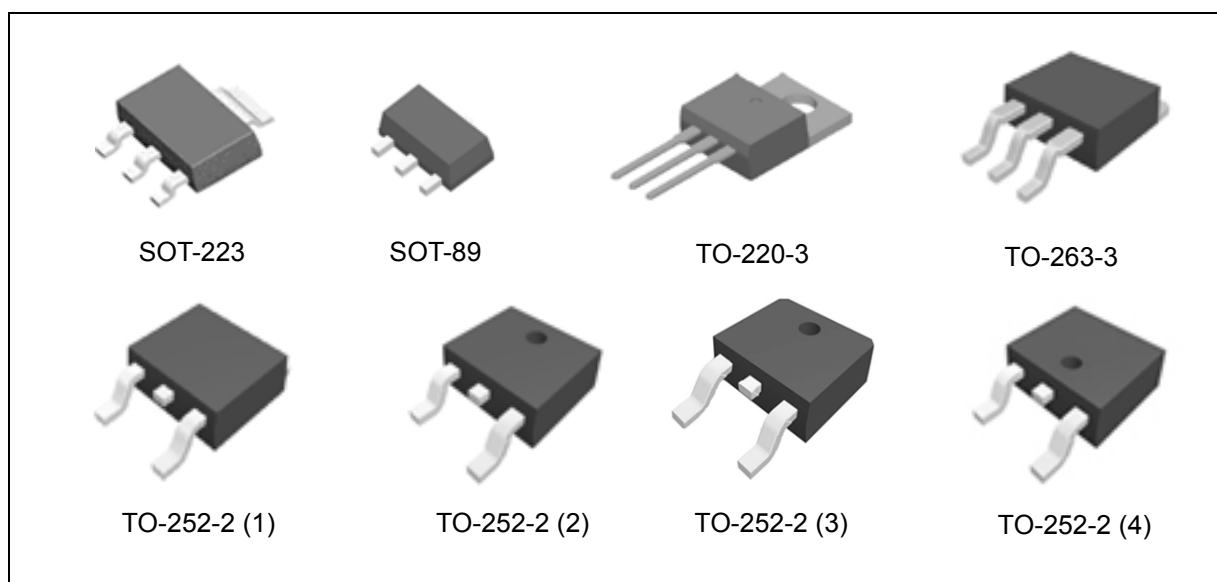


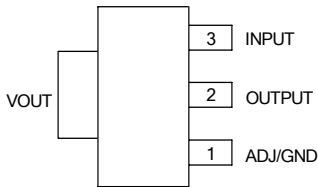
Figure 1. Package Types of AZ1117

**1A LOW DROPOUT LINEAR REGULATOR**

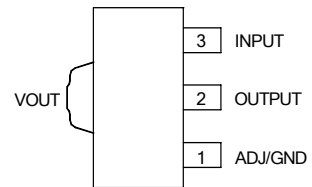
**AZ1117**

**Pin Configuration**

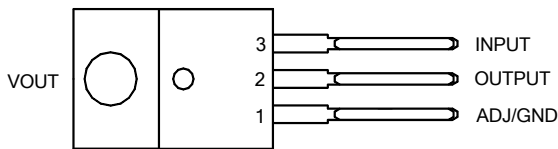
H Package  
(SOT-223)



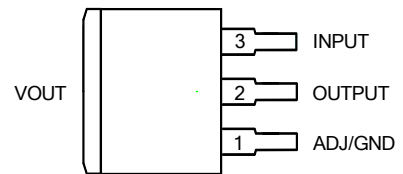
R Package  
(SOT-89)



T Package  
(TO-220-3)

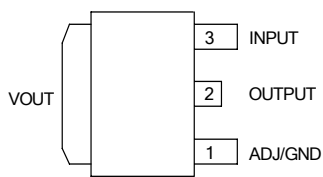


S Package  
(TO-263-3)

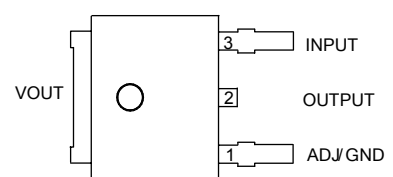


**D Package**

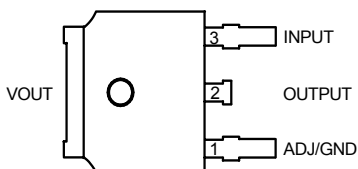
(TO-252-2 (1))



(TO-252-2 (2))



(TO-252-2 (3))



(TO-252-2 (4))

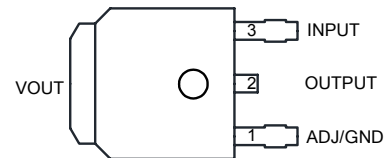


Figure 2. Pin Configuration of AZ1117

**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Functional Block Diagram**

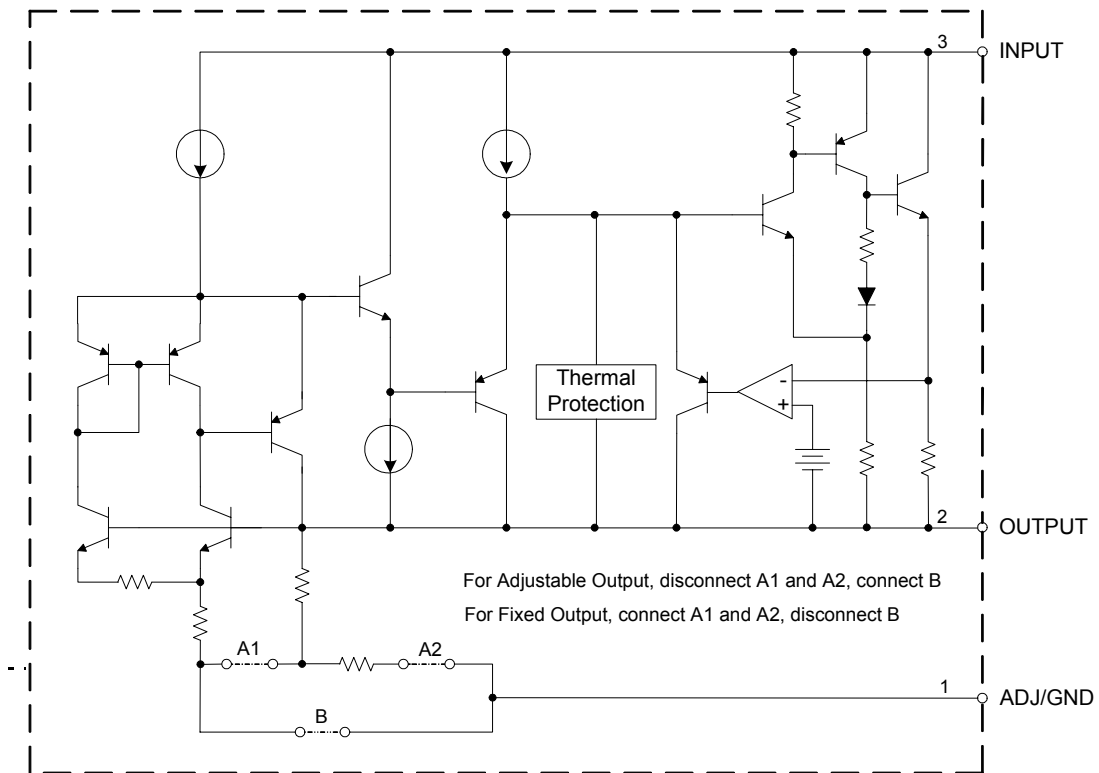


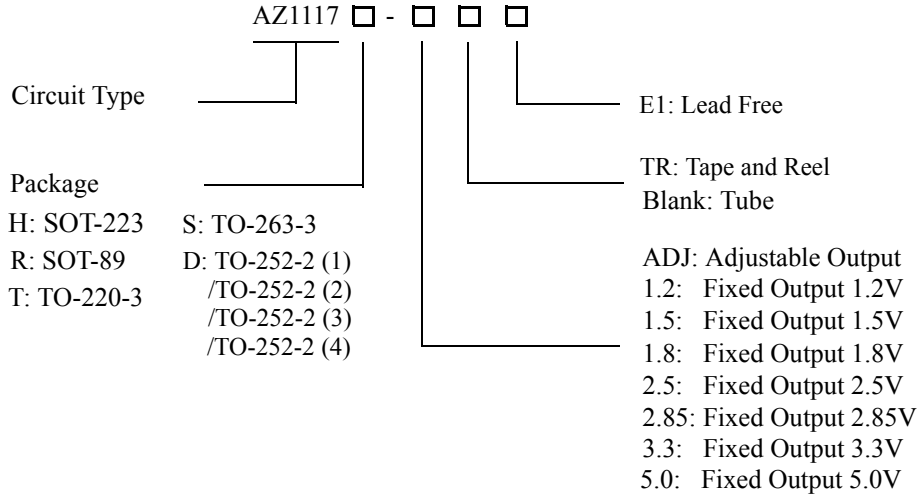
Figure 3. Functional Block Diagram of AZ1117



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Ordering Information**



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

**1A LOW DROPOUT LINEAR REGULATOR****AZ1117****Ordering Information (Continued)**

Package	Temperature Range	Part Number	Marking ID	Packing Type
TO-252-2 (1)/ TO-252-2 (2)/ TO-252-2 (3)/ TO-252-2 (4)	-40 to 125°C	AZ1117D-ADJE1	AZ1117D-ADJE1	Tube
		AZ1117D-ADJTRE1	AZ1117D-ADJE1	Tape & Reel
		AZ1117D-1.2E1	AZ1117D-1.2E1	Tube
		AZ1117D-1.2TRE1	AZ1117D-1.2E1	Tape & Reel
		AZ1117D-1.5E1	AZ1117D-1.5E1	Tube
		AZ1117D-1.5TRE1	AZ1117D-1.5E1	Tape & Reel
		AZ1117D-1.8E1	AZ1117D-1.8E1	Tube
		AZ1117D-1.8TRE1	AZ1117D-1.8E1	Tape & Reel
		AZ1117D-2.5E1	AZ1117D-2.5E1	Tube
		AZ1117D-2.5TRE1	AZ1117D-2.5E1	Tape & Reel
		AZ1117D-2.85E1	AZ1117D-2.85E1	Tube
		AZ1117D-2.85TRE1	AZ1117D-2.85E1	Tape & Reel
		AZ1117D-3.3E1	AZ1117D-3.3E1	Tube
		AZ1117D-3.3TRE1	AZ1117D-3.3E1	Tape & Reel
		AZ1117D-5.0E1	AZ1117D-5.0E1	Tube
		AZ1117D-5.0TRE1	AZ1117D-5.0E1	Tape & Reel
TO-263-3	-40 to 125°C	AZ1117S-ADJE1	AZ1117S-ADJE1	Tube
		AZ1117S-ADJTRE1	AZ1117S-ADJE1	Tape & Reel
		AZ1117S-1.2E1	AZ1117S-1.2E1	Tube
		AZ1117S-1.2TRE1	AZ1117S-1.2E1	Tape & Reel
		AZ1117S-1.5E1	AZ1117S-1.5E1	Tube
		AZ1117S-1.5TRE1	AZ1117S-1.5E1	Tape & Reel
		AZ1117S-1.8E1	AZ1117S-1.8E1	Tube
		AZ1117S-1.8TRE1	AZ1117S-1.8E1	Tape & Reel
		AZ1117S-2.5E1	AZ1117S-2.5E1	Tube
		AZ1117S-2.5TRE1	AZ1117S-2.5E1	Tape & Reel
		AZ1117S-2.85E1	AZ1117S-2.85E1	Tube
		AZ1117S-2.85TRE1	AZ1117S-2.85E1	Tape & Reel
		AZ1117S-3.3E1	AZ1117S-3.3E1	Tube
		AZ1117S-3.3TRE1	AZ1117S-3.3E1	Tape & Reel
		AZ1117S-5.0E1	AZ1117S-5.0E1	Tube
		AZ1117S-5.0TRE1	AZ1117S-5.0E1	Tape & Reel

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

**1A LOW DROPOUT LINEAR REGULATOR****AZ1117****Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Value	Unit	
Input Voltage	$V_{IN}$	20	V	
Operating Junction Temperature	$T_J$	150	°C	
Storage Temperature	$T_S$	-65 to 150	°C	
Lead Temperature (Soldering, 10sec)	$T_{LEAD}$	260	°C	
Thermal Resistance (No Heatsink, Note 2)	$\theta_{JA}$	SOT-223	120	°C/W
		SOT-89	165	
		TO-220-3	60	
		TO-252-2 (1)/TO-252-2 (2)/ TO-252-2 (3)/TO-252-2 (4)	100	
		TO-263-3	60	
ESD (Human Body Model)	ESD	2000	V	
ESD (Machine Model)	ESD	250	V	

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

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

**Recommended Operating Conditions**

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



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**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	$\Delta V_{OUT}$	$I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$		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, $V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$	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	$\theta_{JC}$	SOT-223		25		$^\circ C/W$
		SOT-89		30		
		TO-220-3		10		
		TO-252-2 (1)/TO-252-2 (2) /TO-252-2 (3)/TO-252-2 (4)		17		
		TO-263-3		10		



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Electrical Characteristics (Continued)**

**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	$\Delta V_{OUT}$	$I_{OUT}=10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$		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, $V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$	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	$\theta_{JC}$	SOT-223		25		$^\circ C/W$
		SOT-89		30		
		TO-220-3		10		
		TO-252-2 (1)/TO-252-2 (2) /TO-252-2 (3)/TO-252-2 (4)		17		
		TO-263-3		10		





**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Electrical Characteristics (Continued)**

**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	$\Delta V_{OUT}$	$I_{OUT}=10mA$ , $1.5V \leq V_{IN}-V_{OUT} \leq 10V$		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, $V_{IN}-V_{OUT}=3V$ , $I_{OUT}=1A$	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	$\theta_{JC}$	SOT-223		25		$^\circ C/W$
		SOT-89		30		
		TO-220-3		10		
		TO-252-2 (1)/TO-252-2 (2) /TO-252-2 (3)/TO-252-2 (4)		17		
		TO-263-3		10		



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Electrical Characteristics (Continued)**

**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	$\Delta V_{OUT}$	$I_{OUT}=10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$		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, $V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$	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	$\theta_{JC}$	SOT-223		25		$^\circ C/W$
		SOT-89		30		
		TO-220-3		10		
		TO-252-2 (1)/TO-252-2 (2) /TO-252-2 (3)/TO-252-2 (4)		17		
		TO-263-3		10		



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Electrical Characteristics (Continued)**

**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	$\Delta V_{OUT}$	$I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$		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, $V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$	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	$\theta_{JC}$	SOT-223		25		$^\circ C/W$
		SOT-89		30		
		TO-220-3		10		
		TO-252-2 (1)/TO-252-2 (2) /TO-252-2 (3)/TO-252-2 (4)		17		
		TO-263-3		10		



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Electrical Characteristics (Continued)**

**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	$\Delta V_{OUT}$	$I_{OUT}=10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$		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, $V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$	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	$\theta_{JC}$	SOT-223		25		$^\circ C/W$
		SOT-89		30		
		TO-220-3		10		
		TO-252-2 (1)/TO-252-2 (2) /TO-252-2 (3)/TO-252-2 (4)		17		
		TO-263-3		10		



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Electrical Characteristics (Continued)**

**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	$\Delta V_{OUT}$	$I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$		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, $V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$	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	$\theta_{JC}$	SOT-223		25		$^\circ C/W$
		SOT-89		30		
		TO-220-3		10		
		TO-252-2 (1)/TO-252-2 (2) /TO-252-2 (3)/TO-252-2 (4)		17		
		TO-263-3		10		



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Electrical Characteristics (Continued)**

**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	$\Delta V_{OUT}$	$I_{OUT} = 10mA$ , $1.5V \leq V_{IN} - V_{OUT} \leq 10V$		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, $V_{IN} - V_{OUT} = 3V$ , $I_{OUT} = 1A$	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	$\theta_{JC}$	SOT-223		25		$^\circ C/W$
		SOT-89		30		
		TO-220-3		10		
		TO-252-2 (1)/TO-252-2 (2) /TO-252-2 (3)/TO-252-2 (4)		17		
		TO-263-3		10		



1A LOW DROPOUT LINEAR REGULATOR

AZ1117

Typical Performance Characteristics

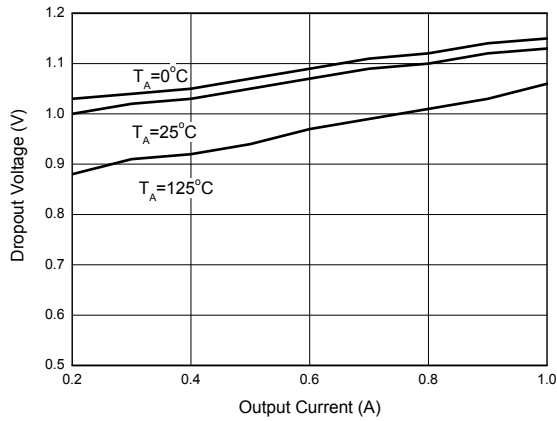


Figure 4. Dropout Voltage vs. Output Current

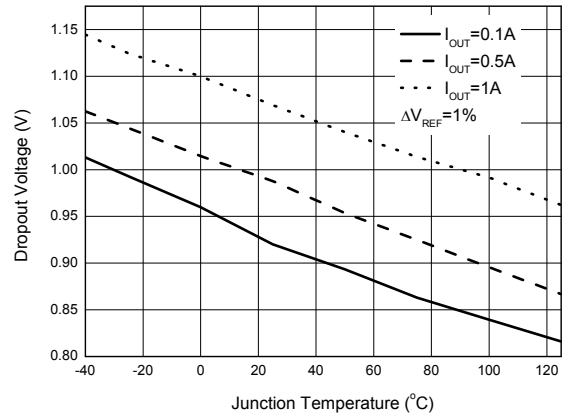


Figure 5. Dropout Voltage vs. Junction Temperature

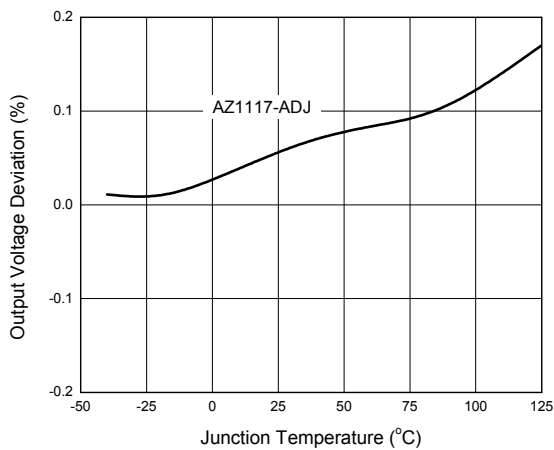


Figure 6. Load Regulation vs. Junction Temperature

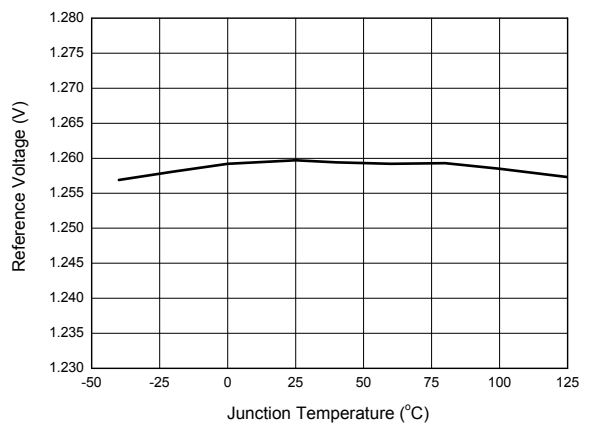


Figure 7. Reference Voltage vs. Junction Temperature



**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Typical Performance Characteristics (Continued)**

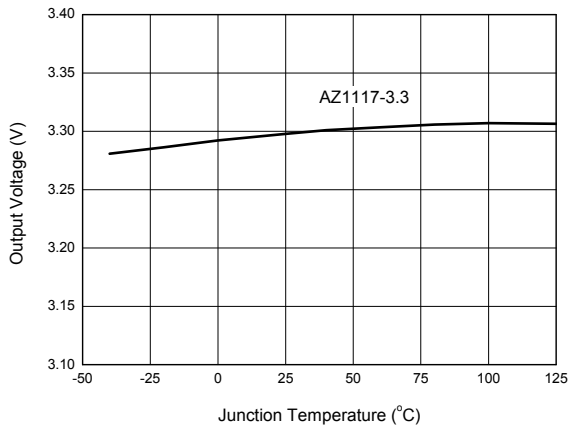


Figure 8. Output Voltage vs. Junction Temperature

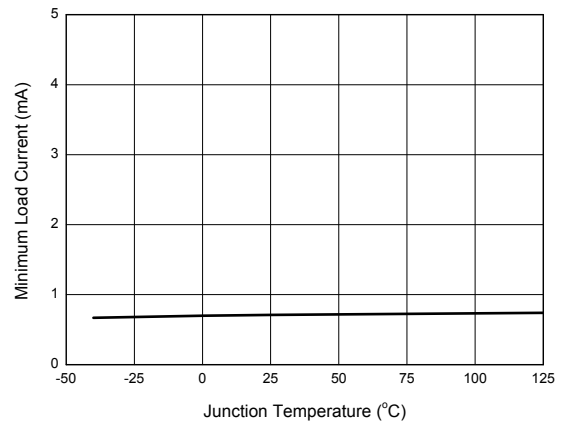


Figure 9. Minimum Load Current vs. Junction Temperature

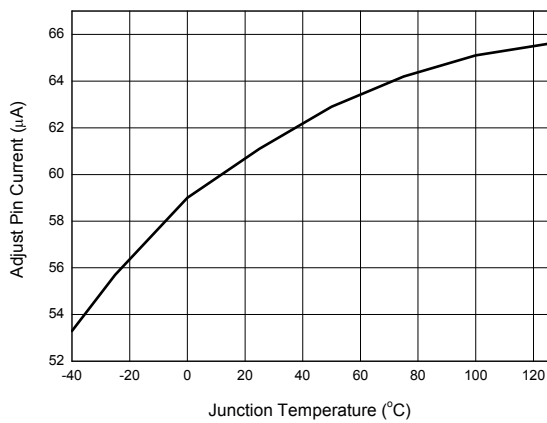


Figure 10. Adjust Pin Current vs. Junction Temperature

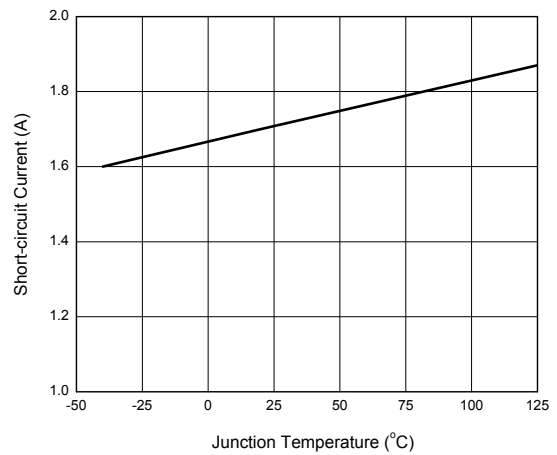


Figure 11. Short-circuit Current vs. Junction Temperature





1A LOW DROPOUT LINEAR REGULATOR

AZ1117

Typical Performance Characteristics (Continued)

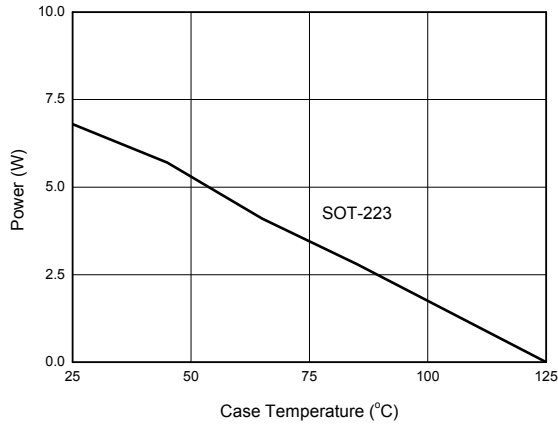


Figure 12. Maximum Power Dissipation

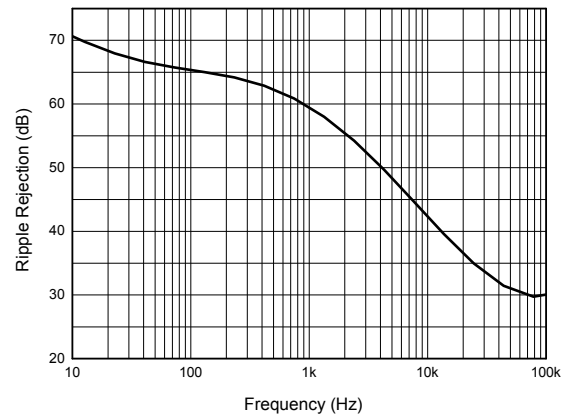


Figure 13. Ripple Rejection vs. Frequency

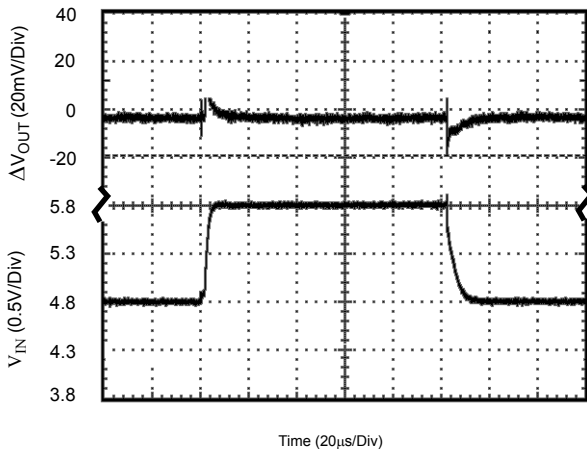


Figure 14. Line Transient Response  
(Conditions:  $V_{IN}$ =4.8 to 5.8V,  $V_{OUT}$ =3.33V,  
 $I_{OUT}$ =0.1A,  $C_{IN}$ =1μF,  $C_{OUT}$ =10μF)

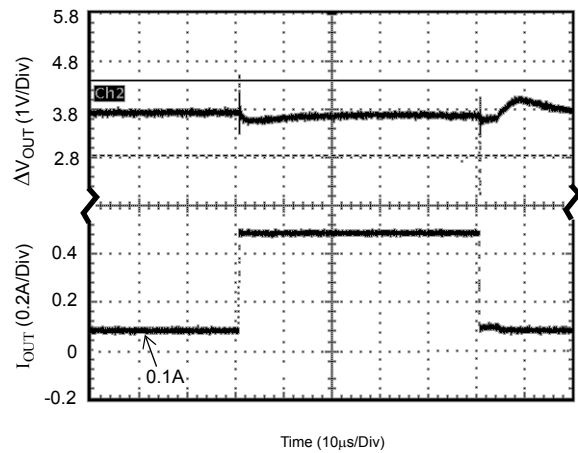


Figure 15. Load Transient Response  
(Conditions:  $V_{IN}$ =4.8V,  $V_{OUT}$ =3.33V,  
 $I_{OUT}$ =0.1 to 0.5A,  $C_{IN}$ = $C_{OUT}$ =10μF)

**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Typical Applications**

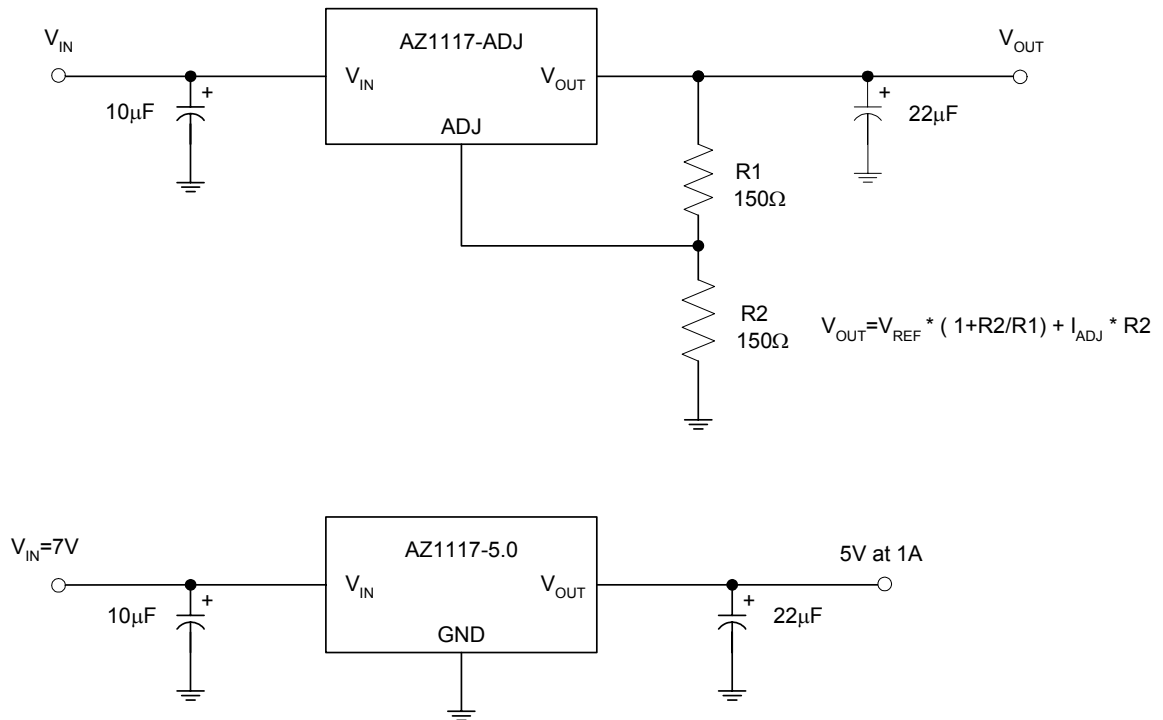


Figure 16. Typical Applications of AZ1117



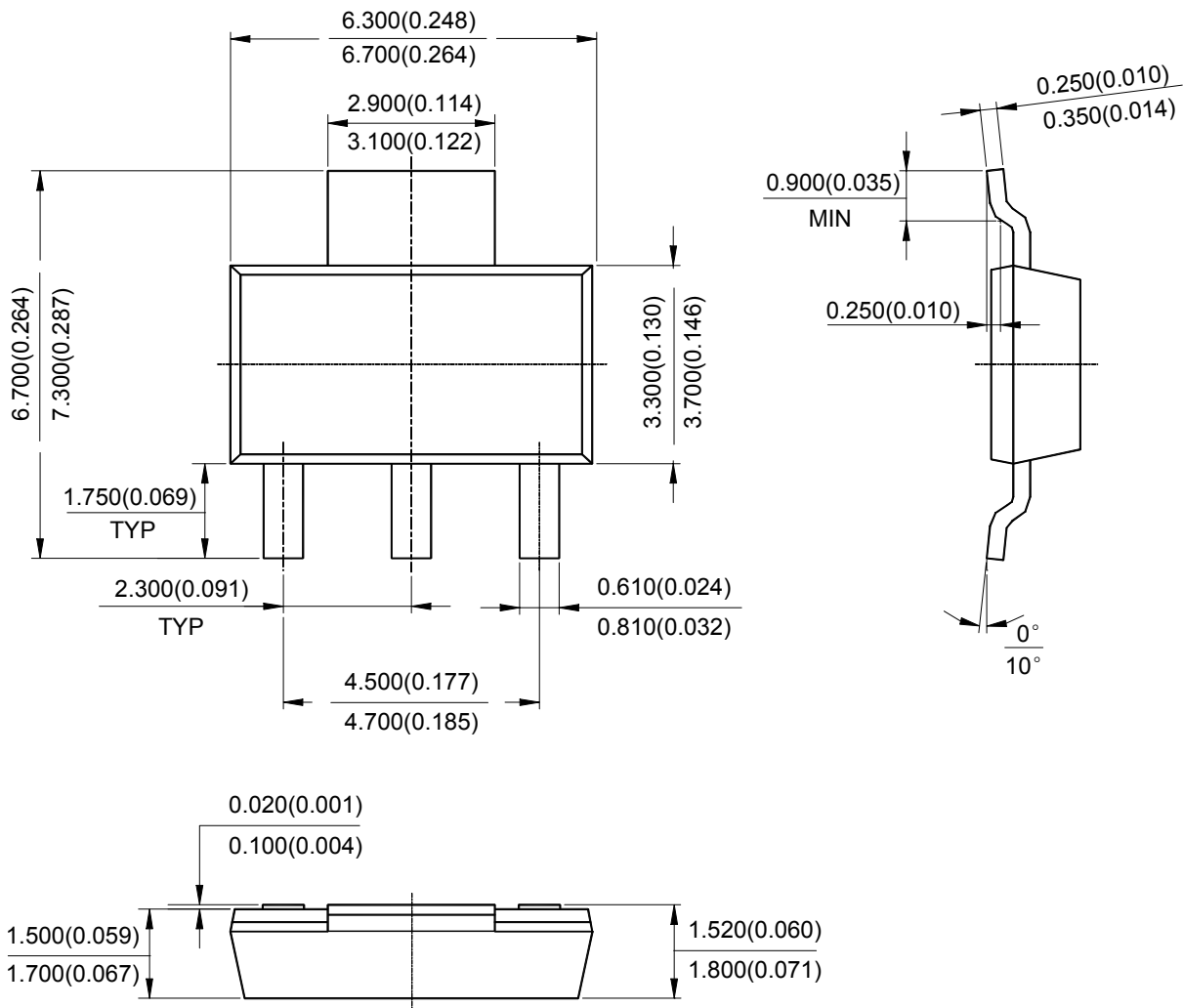
**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Mechanical Dimensions**

**SOT-223**

**Unit: mm(inch)**





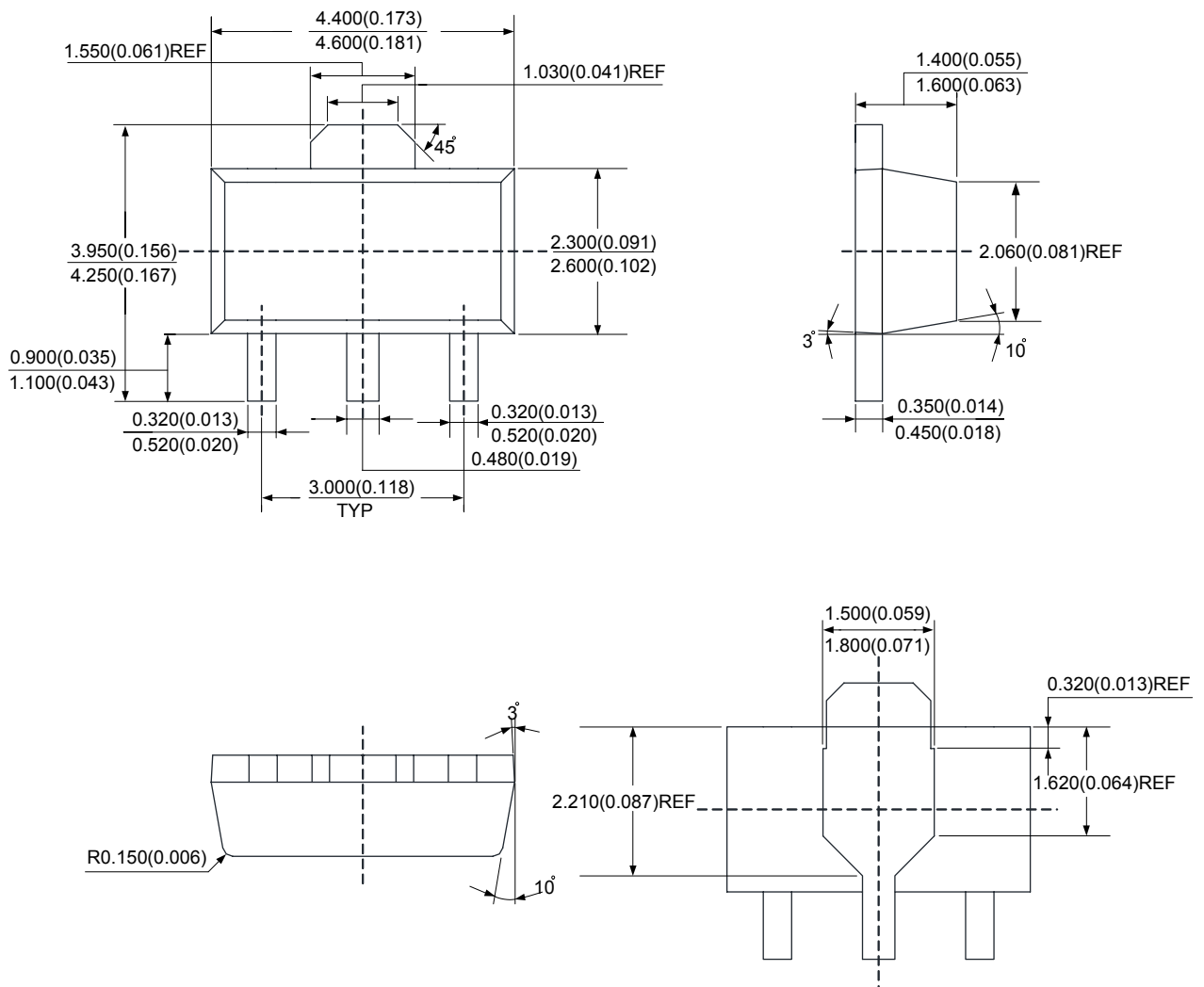
1A LOW DROPOUT LINEAR REGULATOR

AZ1117

Mechanical Dimensions (Continued)

SOT-89

Unit: mm(inch)





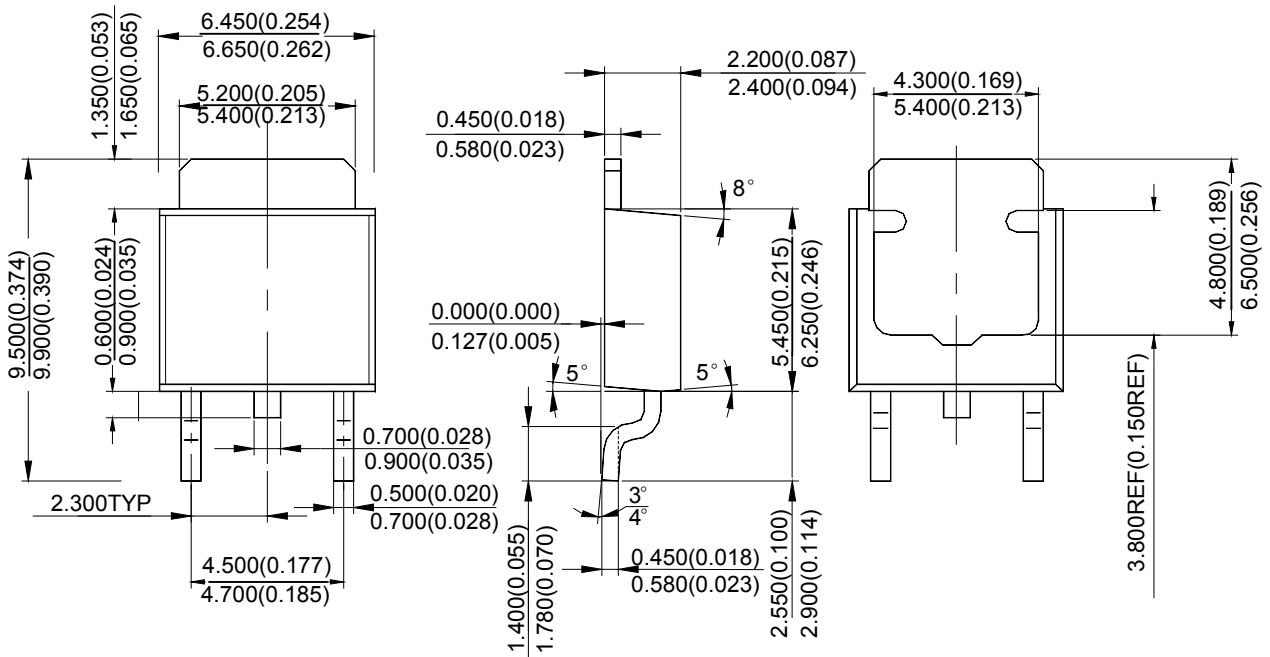
**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Mechanical Dimensions (Continued)**

**TO-252-2 (1)**

**Unit: mm(inch)**





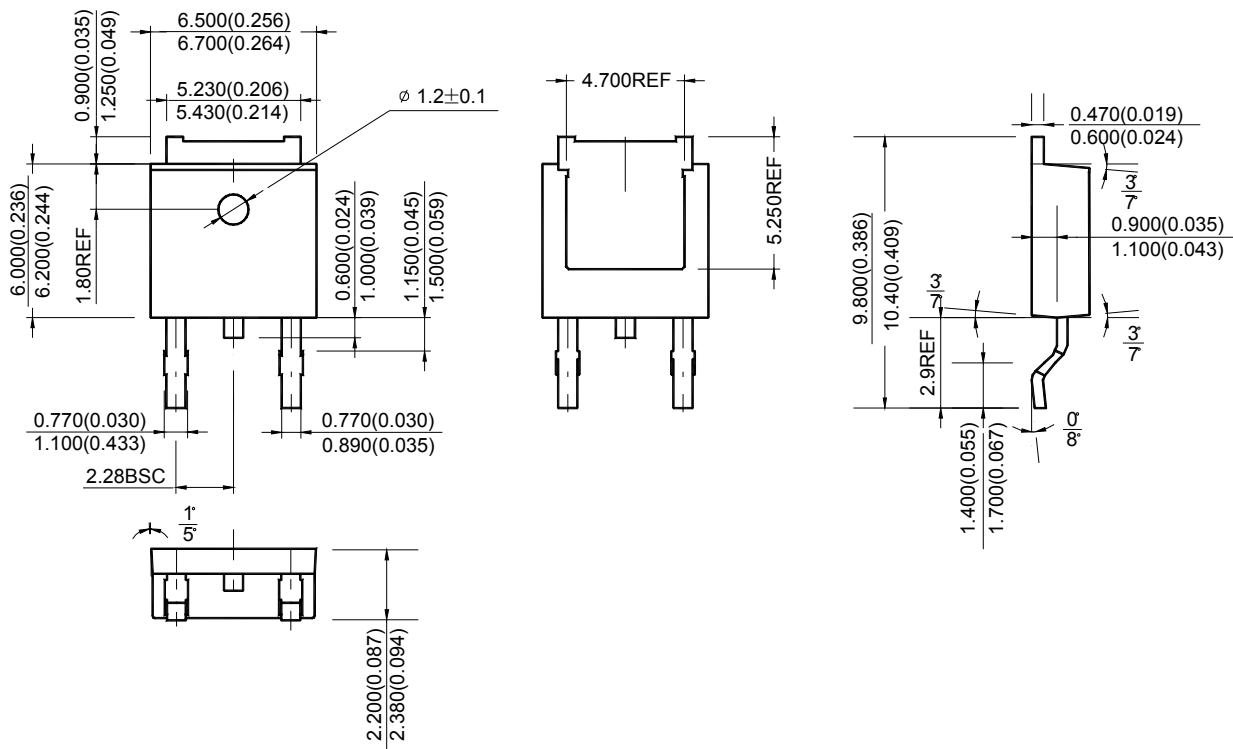
1A LOW DROPOUT LINEAR REGULATOR

AZ1117

Mechanical Dimensions (Continued)

TO-252-2 (2)

Unit: mm(inch)





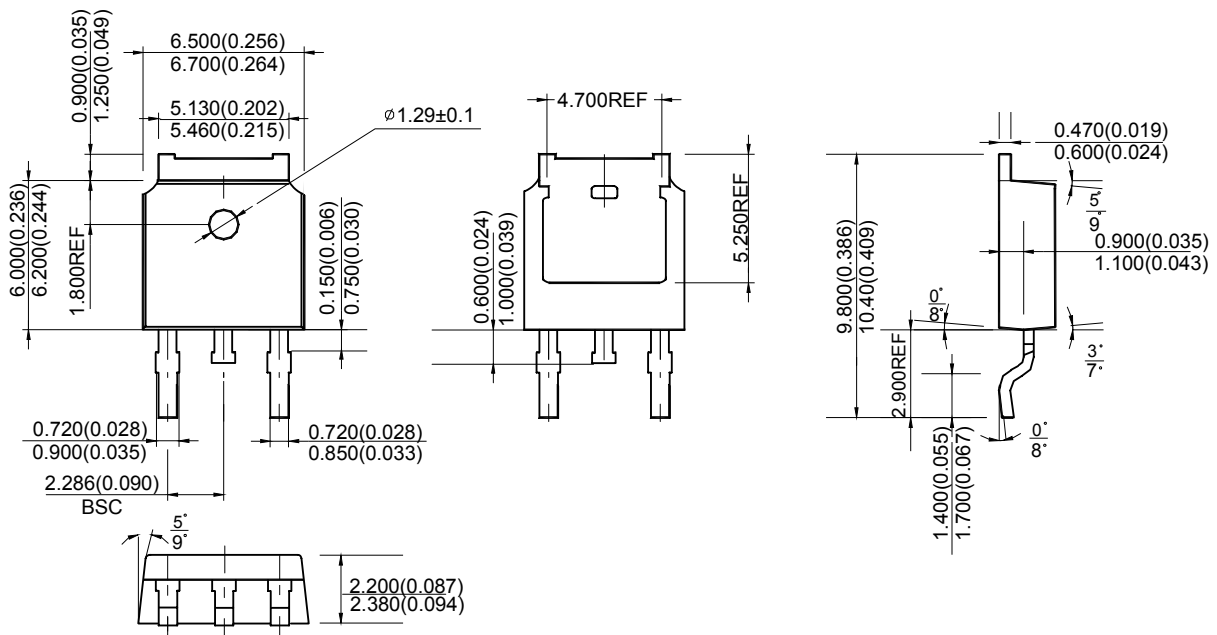
1A LOW DROPOUT LINEAR REGULATOR

AZ1117

Mechanical Dimensions (Continued)

TO-252-2 (3)

Unit: mm(inch)





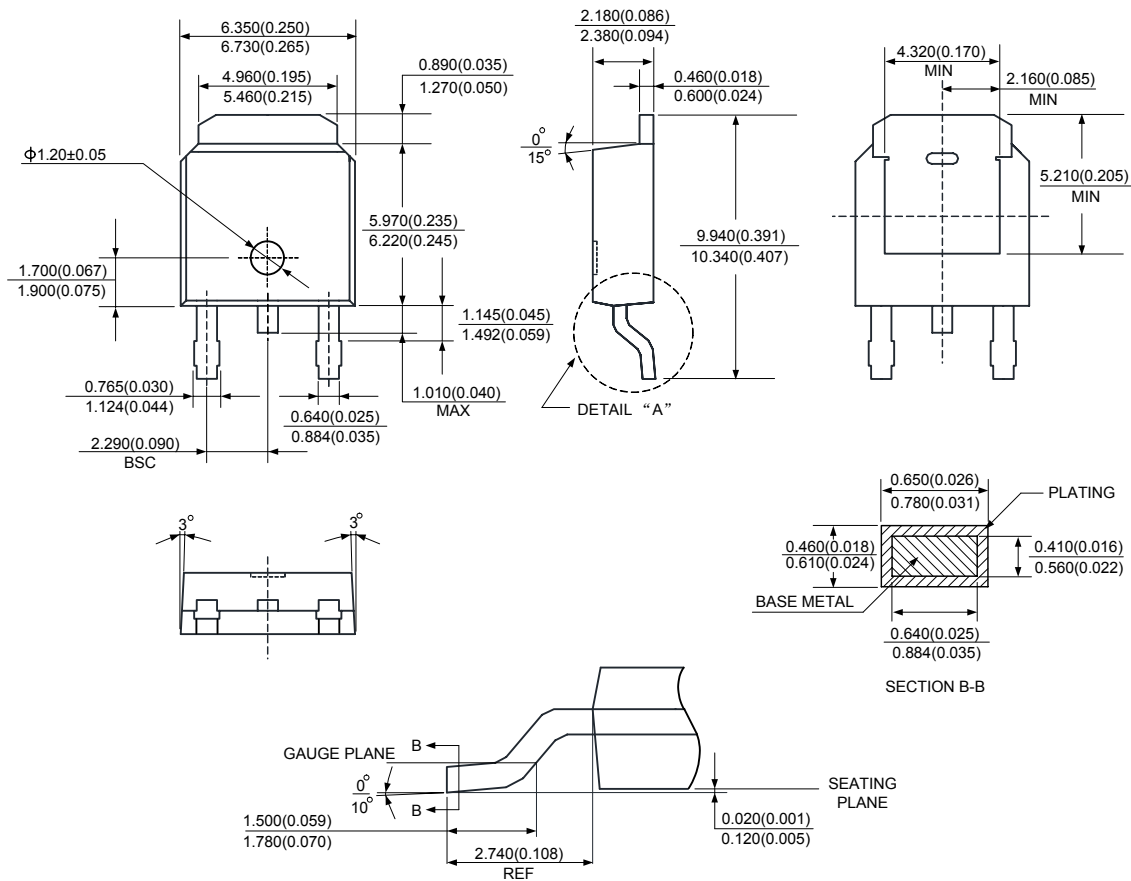
1A LOW DROPOUT LINEAR REGULATOR

AZ1117

Mechanical Dimensions (Continued)

TO-252-2 (4)

Unit: mm(inch)







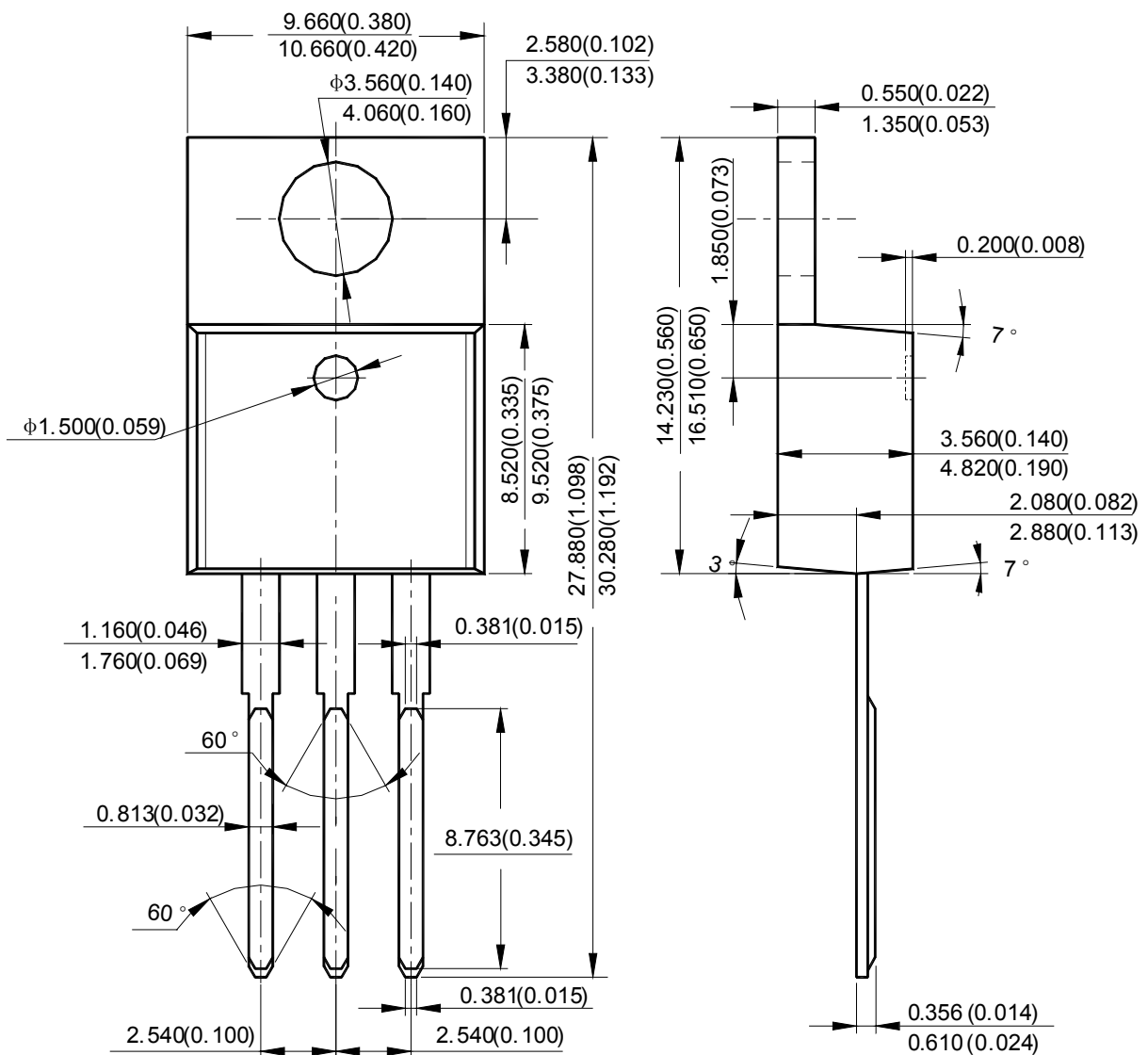
1A LOW DROPOUT LINEAR REGULATOR

AZ1117

Mechanical Dimensions (Continued)

TO-220-3

Unit: mm(inch)





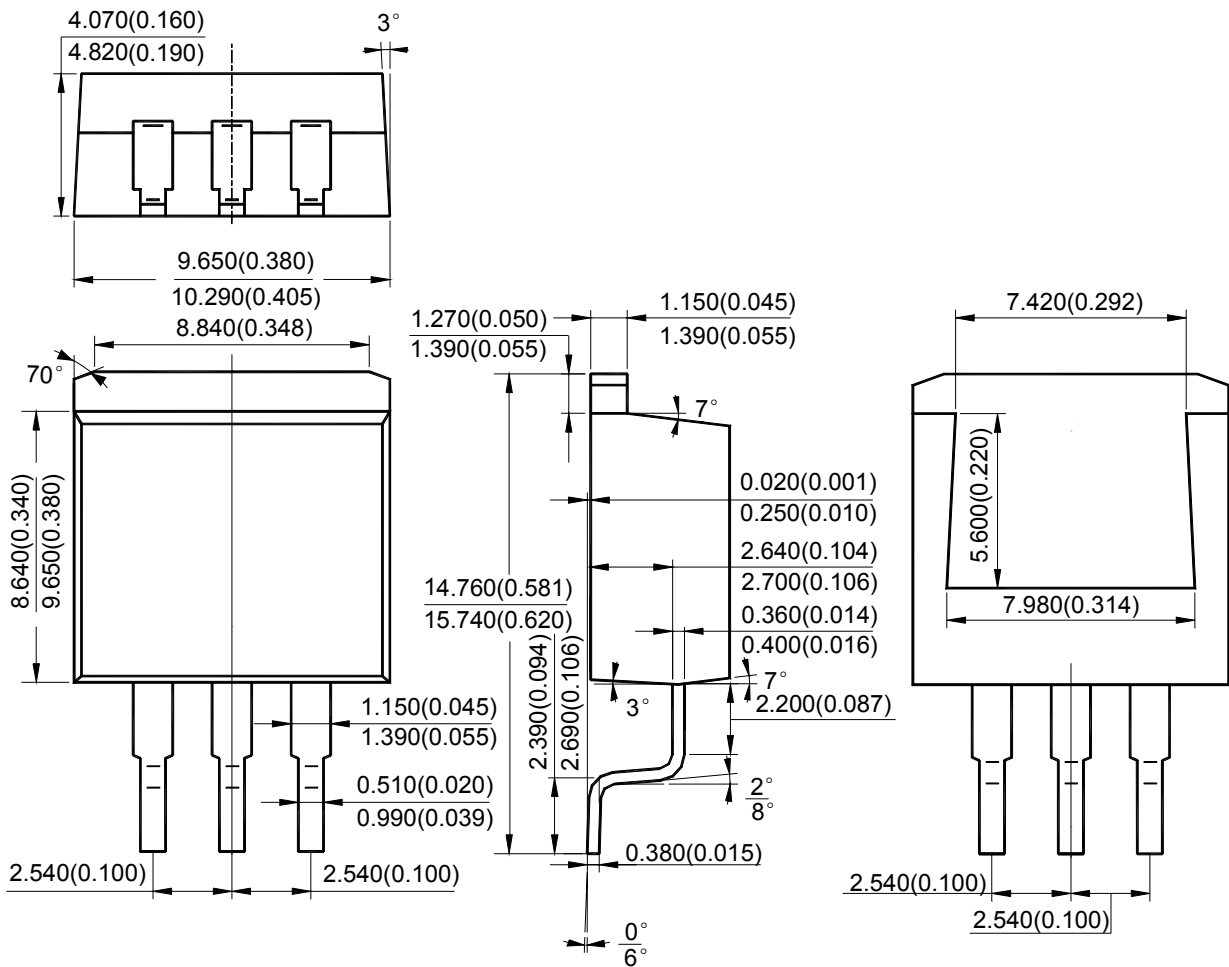
**1A LOW DROPOUT LINEAR REGULATOR**

**AZ1117**

**Mechanical Dimensions (Continued)**

**TO-263-3**

**Unit: mm(inch)**





## **BCD Semiconductor Manufacturing Limited**

<http://www.bcdsemi.com>

### **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.

---

#### **MAIN SITE**

##### **- Headquarters**

##### **BCD Semiconductor Manufacturing Limited**

No. 1600, Zi Xing Road, Shanghai Zizhu Science-based Industrial Park, 200241, China  
Tel: +86-21-24162266, Fax: +86-21-24162277

##### **- Wafer Fab**

##### **Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.**

800 Yi Shan Road, Shanghai 200233, China  
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

#### **REGIONAL SALES OFFICE**

##### **Shenzhen Office**

##### **Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office**

Unit A Room 1203, Skyworth Bldg., Gaoxin Ave. 1.S., Nanshan District, Shenzhen, China  
Tel: +86-755-8826 7951  
Fax: +86-755-8826 7865

##### **Taiwan Office**

##### **BCD Semiconductor (Taiwan) Company Limited**

4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan  
Tel: +886-2-2656 2808  
Fax: +886-2-2656 2806

##### **USA Office**

##### **BCD Semiconductor Corp.**

30920 Huntwood Ave. Hayward, CA 94544, USA  
Tel : +1-510-324-2988  
Fax: +1-510-324-2788