

1.0A LOW DROPOUT LINEAR REGULATOR
AZ1117E
General Description

The AZ1117E is a low dropout three-terminal regulator with 1.0A output current ability, and the dropout voltage is specified at typical 1.1V at 1.0A current load, decreasing at lower load currents.

The AZ1117E has been optimized for low voltage where transient response and minimum input voltage are critical. It provides current limit and thermal shutdown protection solutions. Its circuit includes a trimmed band gap reference to assure output voltage accuracy to be within $\pm 1\%$. On-chip thermal shutdown provides protection against a combination of high current and ambient temperature that would create excessive junction temperature.

The AZ1117E is available in 1.2V, 1.5V, 1.8V, 2.5V, 3.3V and 5.0V fixed output voltage versions and ADJ output voltage version. The fixed versions integrate the adjust resistors.

The AZ1117E is available in the industry-standard TO-252-2 (3) and SOT-223 packages.

Features

- Provide ADJ version ($V_{REF}=1.25V$) and fixed voltage 1.2V, 1.5V, 1.8V, 2.5V, 3.3V and 5.0V with accuracy $\pm 1\%$ (except 1.2V)
- Current Limit: 1.3A (Typ.)
- Dropout Voltage: 1.1V (Typ.) @ $I_{OUT}=1A$
- Regulator Stable with Low ESR MLCC
- Excellent Line Regulation: 0.001%/V (Typ.) @ $I_{OUT}=30mA$
- Excellent Load Regulation: 0.2%/A @ $I_{OUT}=1A$
- Quiescent Current: 3.5mA
- Low Output Noise
- PSRR: 70dB
- OTSD Protection
- Operation Junction Temperature: $-40^{\circ}C$ to $125^{\circ}C$

Applications

- TVs and LCD Monitors
- PC Peripherals: Notebooks, Motherboards
- STB



Figure 1. Package Types of AZ1117E

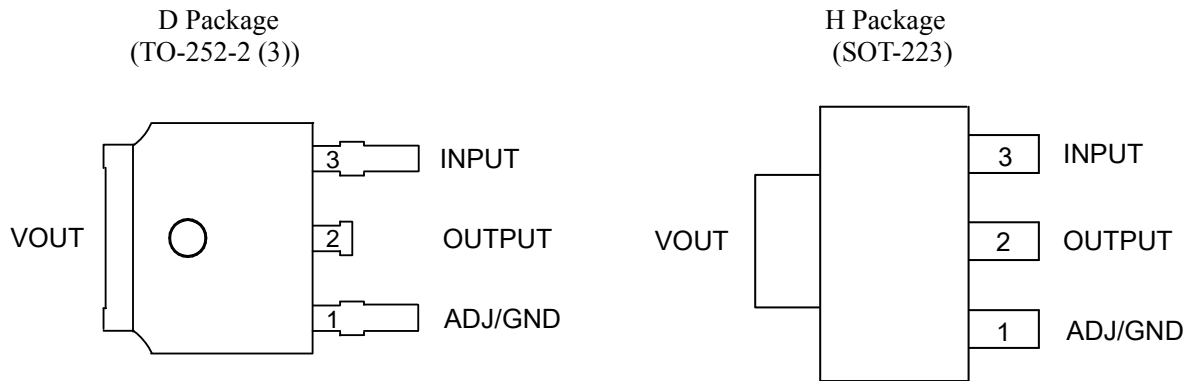
1.0A LOW DROPOUT LINEAR REGULATOR
AZ1117E
Pin Configuration


Figure 2. Pin Configuration of AZ1117E (Top View)

Pin Descriptions

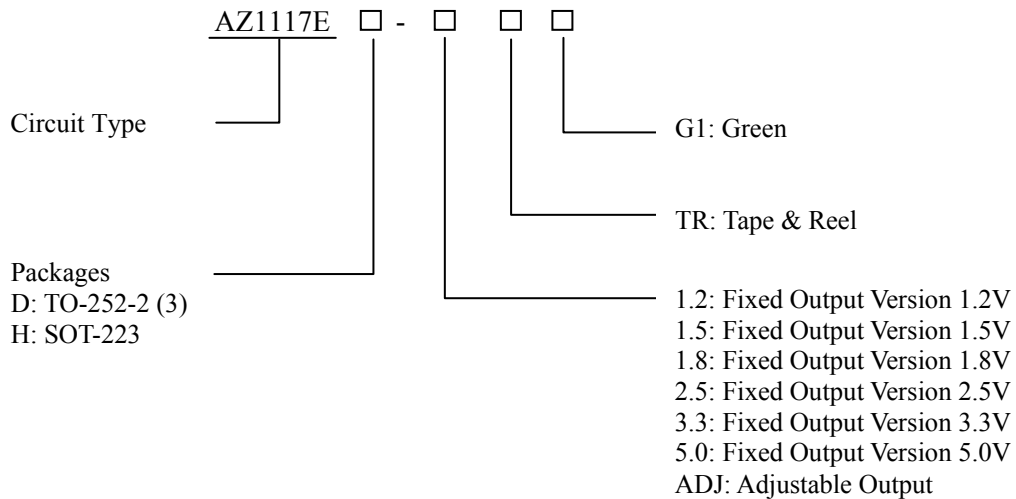
Pin Number	Pin Name	Function
1	ADJ/GND	Adjustable pin or ground pin
2	OUTPUT	Regulator output pin
3	INPUT	Supply voltage pin



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Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing Type
TO-252-2 (3)	-40 to 125°C	AZ1117ED-1.2TRG1	AZ1117ED-1.2G1	Tape & Reel
		AZ1117ED-1.5TRG1	AZ1117ED-1.5G1	Tape & Reel
		AZ1117ED-1.8TRG1	AZ1117ED-1.8G1	Tape & Reel
		AZ1117ED-2.5TRG1	AZ1117ED-2.5G1	Tape & Reel
		AZ1117ED-3.3TRG1	AZ1117ED-3.3G1	Tape & Reel
		AZ1117ED-5.0TRG1	AZ1117ED-5.0G1	Tape & Reel
		AZ1117ED-ADJTRG1	AZ1117ED-ADJG1	Tape & Reel
SOT-223	-40 to 125°C	AZ1117EH-1.2TRG1	GH23F	Tape & Reel
		AZ1117EH-1.5TRG1	GH27F	Tape & Reel
		AZ1117EH-1.8TRG1	GH18G	Tape & Reel
		AZ1117EH-2.5TRG1	GH23G	Tape & Reel
		AZ1117EH-3.3TRG1	GH27G	Tape & Reel
		AZ1117EH-5.0TRG1	GH18H	Tape & Reel
		AZ1117EH-ADJTRG1	GH23H	Tape & Reel

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

**1.0A LOW DROPOUT LINEAR REGULATOR****AZ1117E****Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{IN}	16	V
Operating Junction Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10sec)	T_{LEAD}	260	°C
Thermal Resistance (Junction to Ambient) (Note 2)	θ_{JA}	SOT-223	65
		TO-252-2 (3)	45
ESD (Machine Model)		200	V
ESD (Human Body Model)		2000	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: Chip is soldered to 200mm²(16mm*12.5mm) copper (top side solder mask) on 2oz.2 layers FR-4 PCB with 8*0.5mm vias.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{IN}		13	V
Operating Junction Temperature Range	T_J	-40	125	°C



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Electrical Characteristics

$V_{IN}=V_{OUT}+1.5V$, $C_{IN}=1.0\mu F$ (Ceramic), $C_{OUT}=1.0\mu F$ (Ceramic), Typical $T_A=25^\circ C$, **Bold** typeface applies over $-40^\circ C \leq T_J \leq 125^\circ C$ ranges, unless otherwise specified.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Reference Voltage	V_{REF}	$V_{OUT}+1.5V \leq V_{IN} \leq 12V$, $I_{OUT}=10mA$	1.238	1.250	1.262	V
			98%*V_{OUT}	V_{OUT}	102%*V_{OUT}	V
Output Voltage (Fixed Versions)	V_{OUT}	For 1.2V, $V_{OUT}+1.5V \leq V_{IN} \leq 12V$, $I_{OUT}=10mA$	98%*V_{OUT}	V_{OUT}	102%*V_{OUT}	V
			96%*V_{OUT}	V_{OUT}	104%*V_{OUT}	V
		For 1.5V to 5V, $V_{OUT}+1.5V \leq V_{IN} \leq 12V$, $I_{OUT}=10mA$	99%*V_{OUT}	V_{OUT}	101%*V_{OUT}	V
			98%*V_{OUT}	V_{OUT}	102%*V_{OUT}	V
Dropout Voltage	V_{DROP}	$I_{OUT}=1A$		1.1	1.3	V
Maximum Output Current	$I_{OUT(MAX)}$	$1.5V \leq V_{IN} - V_{OUT}$	1	1.3		A
Load Regulation	V_{RLOAD}	$V_{IN}=V_{OUT}+1.5V$ $1mA \leq I_{OUT} \leq 1A$		0.2	0.6	%/A
Line Regulation	V_{RLINE}	$1.5V \leq V_{IN} - V_{OUT} \leq 10V$, $I_{OUT}=30mA$		0.001	± 0.04	%/V
Quiescent Current	I_Q	For Fixed Voltage Version, $I_{OUT}=0$		3.5	6	mA
Minimum Load Current		For ADJ Version, $1.5V \leq V_{IN} - V_{OUT} \leq 10V$		2	5	mA
Adjustable Pin Current	I_{ADJ}			45	90	μA
Adjustable Pin Current Change		$1.5V \leq V_{IN} - V_{OUT} \leq 10V$		0.2	5	μA
Power Supply Rejection Ratio	PSRR	Ripple 1.0 Vp-p $V_{IN}=V_{OUT}+2V$, $I_{OUT}=100mA$	$f=120Hz$		70	dB
			$f=1kHz$		70	
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T} / V_{OUT}$	$I_{OUT}=30mA$		± 30		ppm/ $^\circ C$
RMS Output Noise	V_{NOISE}	$10Hz \leq f \leq 100kHz$, No Load		0.003		%
Thermal Shutdown Temperature	T_{OTSD}			170		$^\circ C$
Thermal Shutdown Hysteresis	T_{HYOTSD}			20		$^\circ C$
Thermal Resistance (Junction to Case)	θ_{JC}	SOT-223		40		$^\circ C/W$
		TO-252-2 (3)		24		

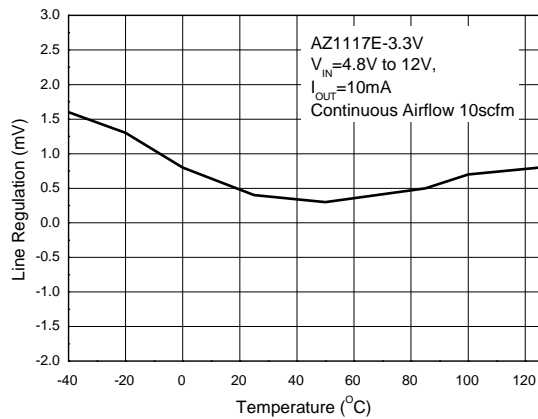
1.0A LOW DROPOUT LINEAR REGULATOR
AZ1117E
Typical Performance Characteristics


Figure 3. Line Regulation vs. Temperature

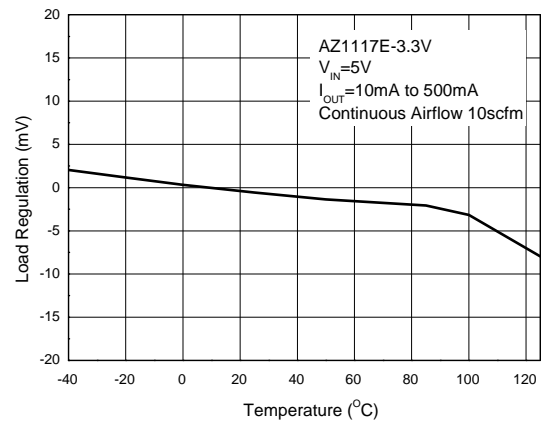


Figure 4. Load Regulation vs. Temperature

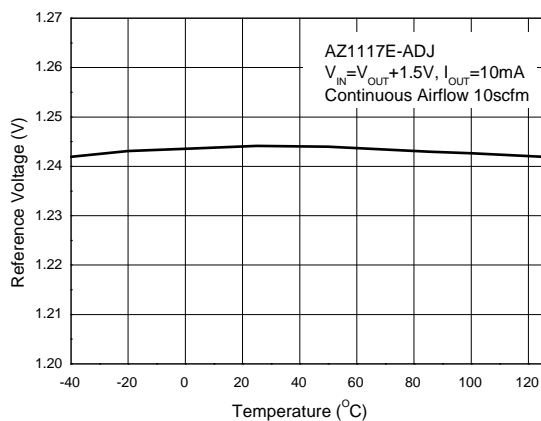


Figure 5. Reference Voltage vs. Temperature

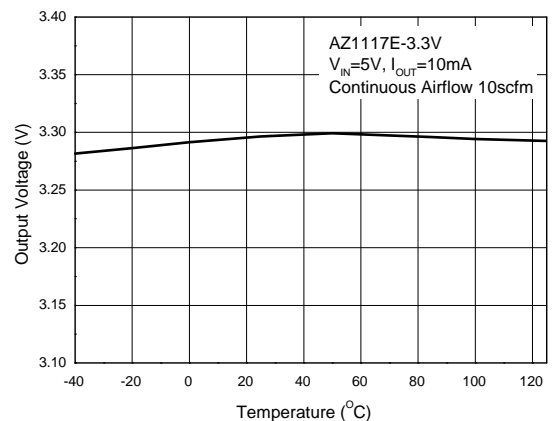


Figure 6. Output Voltage vs. Temperature



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AZ1117E

Typical Performance Characteristics (Continued)

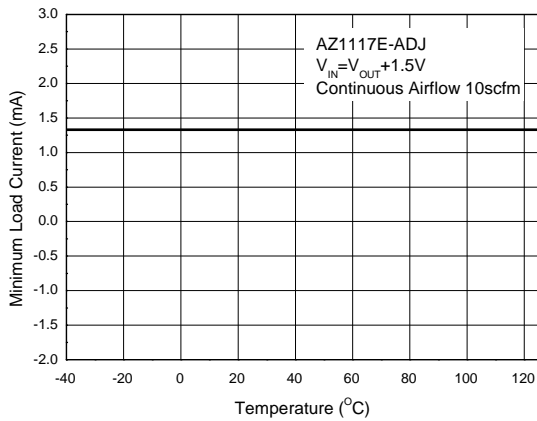


Figure 7. Minimum Load Current vs. Temperature

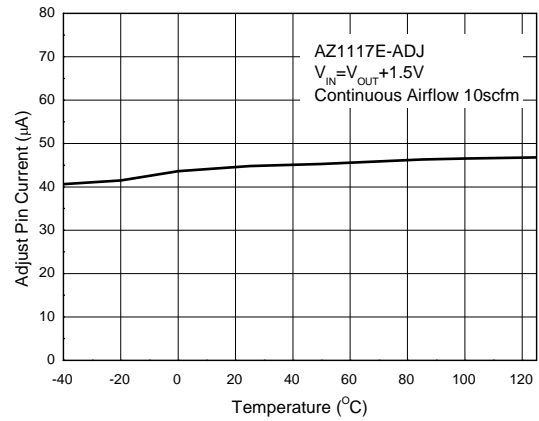


Figure 8. Adjust Pin Current vs. Temperature

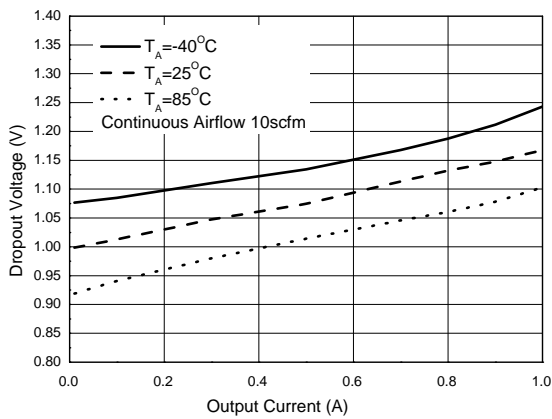


Figure 9. Dropout Voltage vs. Output Current

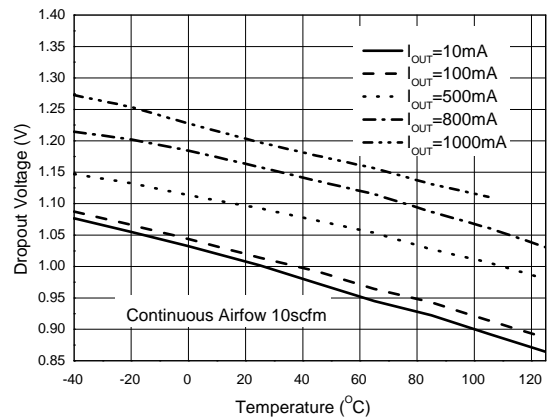


Figure 10. Dropout Voltage vs. Temperature



1.0A LOW DROPOUT LINEAR REGULATOR

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Typical Performance Characteristics (Continued)

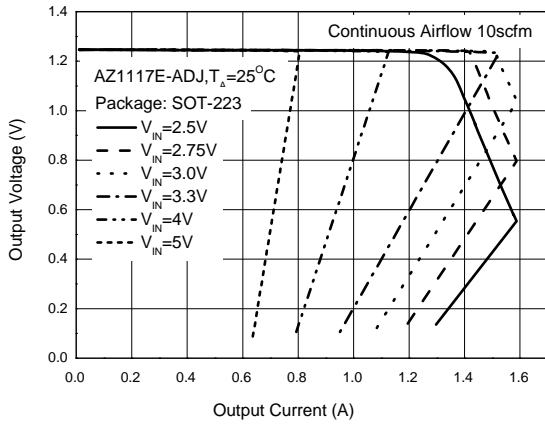


Figure 11. Output Voltage vs. Output Current

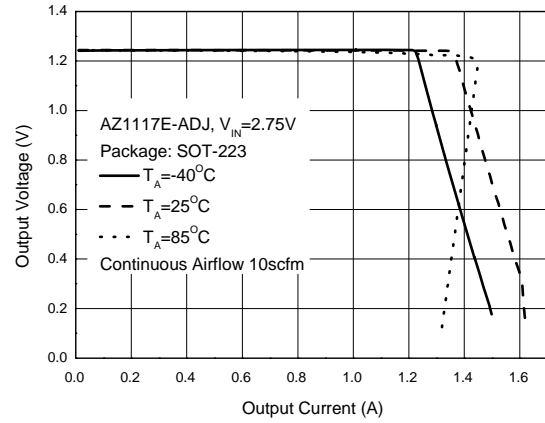


Figure 12. Output Voltage vs. Output Current

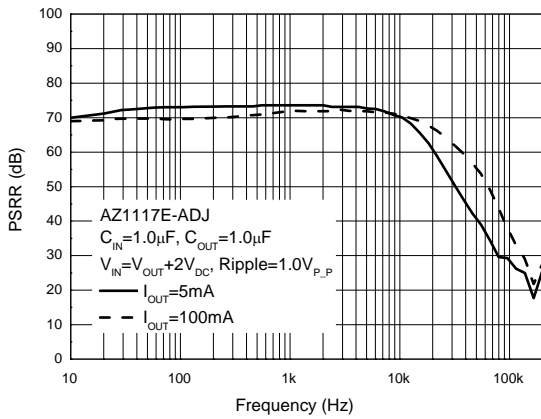


Figure 13. PSRR vs. Frequency

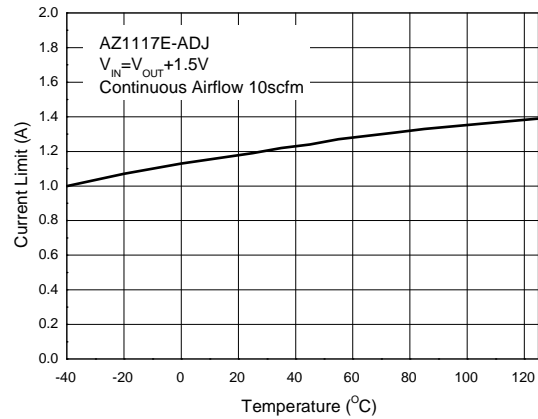


Figure 14. Current Limit vs. Temperature

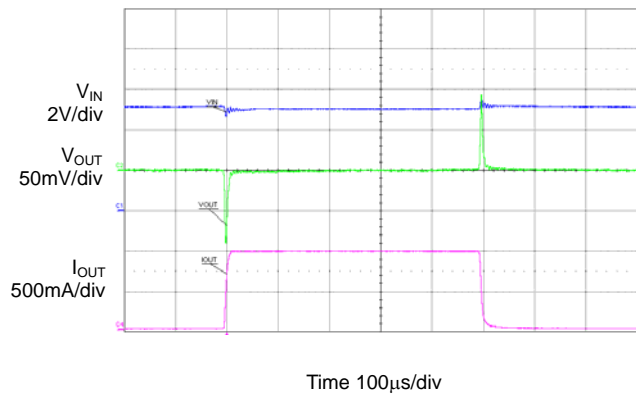
1.0A LOW DROPOUT LINEAR REGULATOR**AZ1117E****Typical Performance Characteristics (Continued)**

Figure 15. Load Transient Response
(AZ1117E-ADJ, $V_{IN}=5V$, $V_{OUT}=3.3V$,
 $C_{IN}=1.0\mu F$, $C_{OUT}=1.0\mu F$)

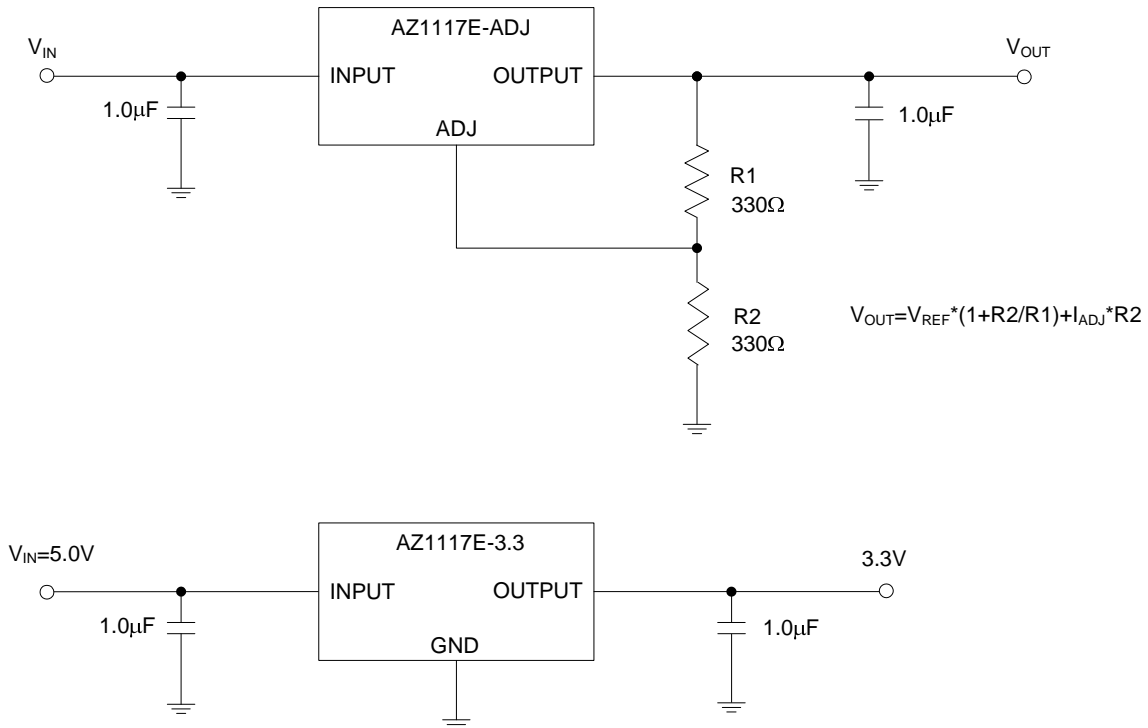
1.0A LOW DROPOUT LINEAR REGULATOR
AZ1117E
Typical Application


Figure 16. Typical Application of AZ1117E

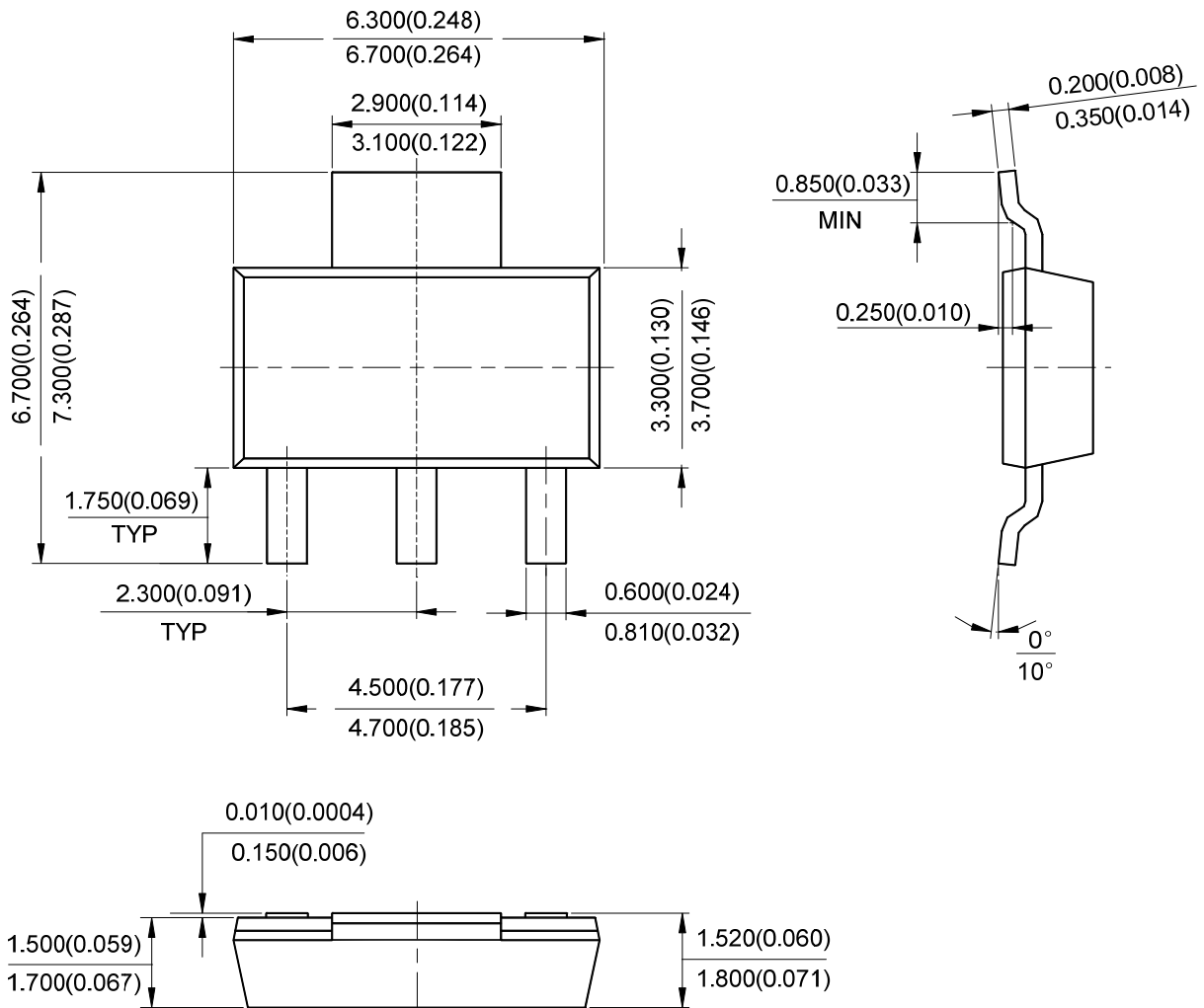
1.0A LOW DROPOUT LINEAR REGULATOR

AZ1117E

Mechanical Dimensions

SOT-223

Unit: mm(inch)





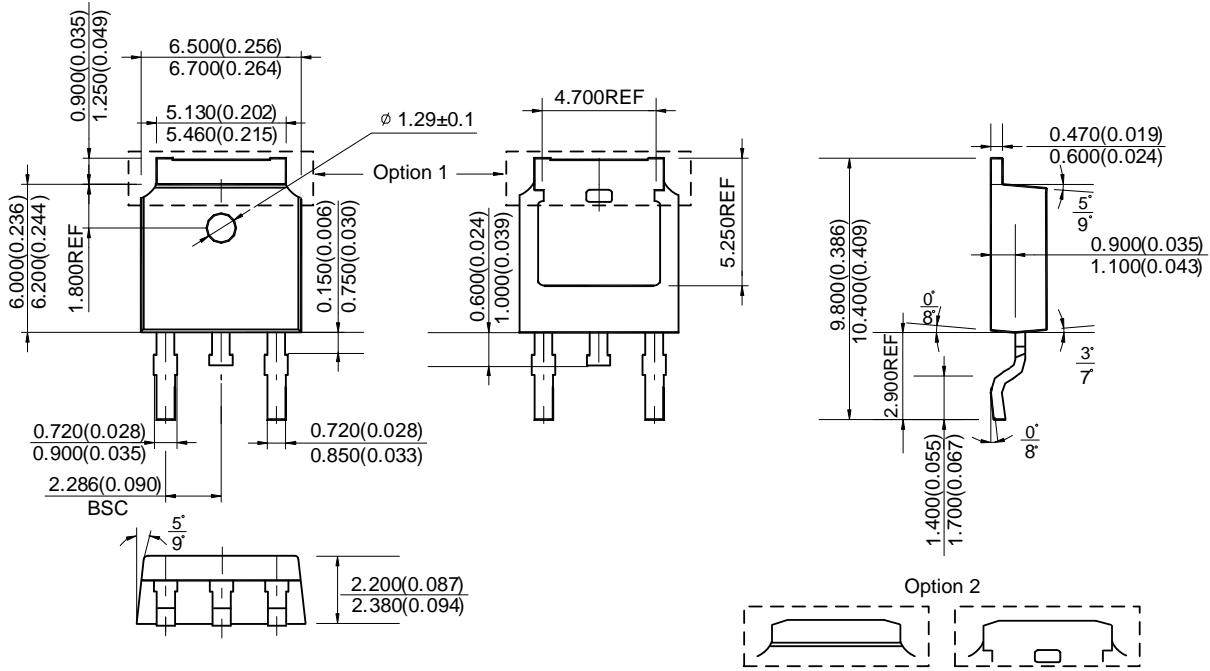
1.0A LOW DROPOUT LINEAR REGULATOR

AZ1117E

Mechanical Dimensions (Continued)

TO-252-2 (3)

Unit: mm(inch)





BCD Semiconductor Manufacturing Limited

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