

MB432

Low Voltage 1.25V Adjustable Precision Shunt Regulator



CBC Microelectronics
<http://www.cbcv.net>

Description

The MB432 is a 3-terminal adjustable shunt regulator with guaranteed temperature stability over the entire temperature range of operation. The output voltage may be set at any level greater than 1.25V (V_{REF}) up to 18V merely by selecting two external resistors that act as a voltage divided network. Due to the sharp turn-on characteristics this device is an excellent replacement for many zener diode applications.

Features

- Average temperature coefficient 20 ppm/°C
- Temperature compensated for operation over the full temperature range
- Programmable output voltage
- Fast turn-on response low output noise
- Wide Operating Range of -40 to 125
- Wide Programmable Precise Output Voltage from 1.25V to 18V
- Low Dynamic Output Resistance: 0.05Ω Typical

Pin Configuration

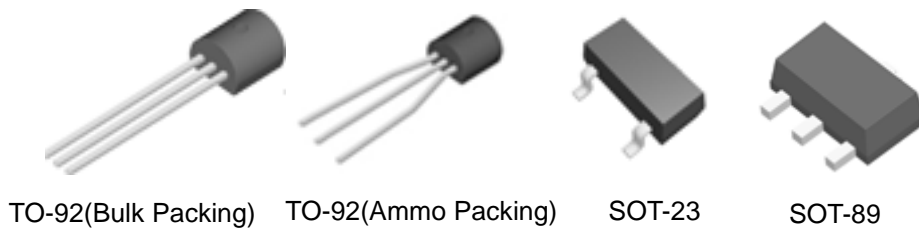
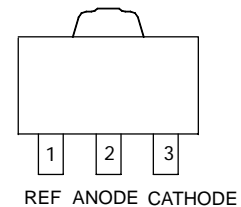
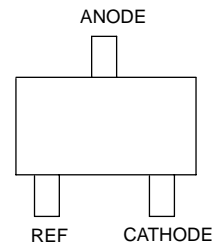
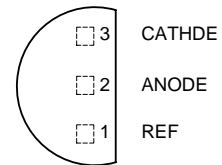
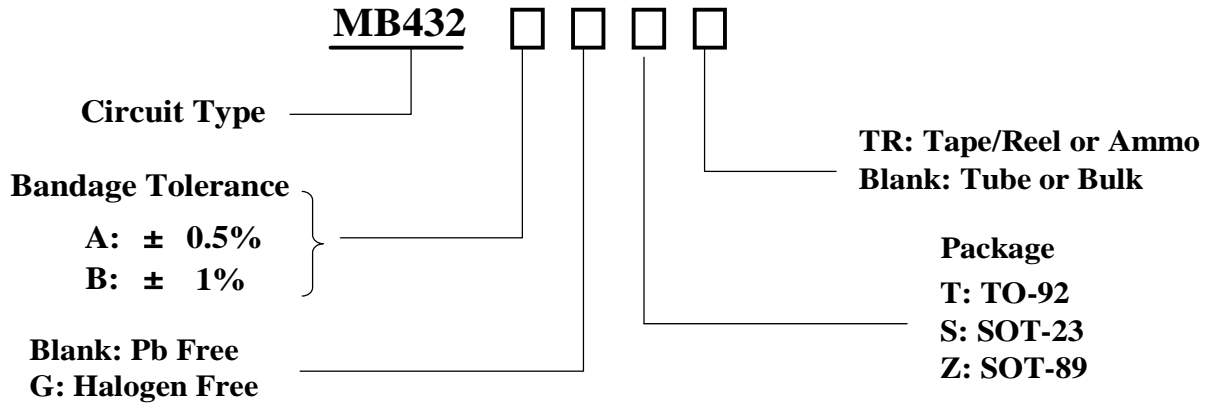


Figure 1. Package Types of MB432

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Order Information



Package	Part Number		Marking ID		Packing Type
	Pb-free	Halogen-Free	Pb-free	Halogen-Free	
TO-92	MB432AT	MB432AGT	MB432A	MB432AG	Bulk
	MB432ATTR	MB432AGTTR	MB432A	MB432AG	Ammo
	MB432BT	MB432BGT	MB432B	MB432BG	Bulk
	MB432BTTR	MB432BGTR	MB432B	MB432BG	Ammo
SOT-23	MB432ASTR	MB432AGSTR	32A	32AG	Tape & Reel
	MB432BSTR	MB432BGSTR	32B	32BG	Tape & Reel
SOT-89	MB432AZTR	MB432AGZTR	A32	A32G	Tape & Reel
	MB432BZTR	MB432BGZTR	B32	B32G	Tape & Reel

Functional Block Diagram

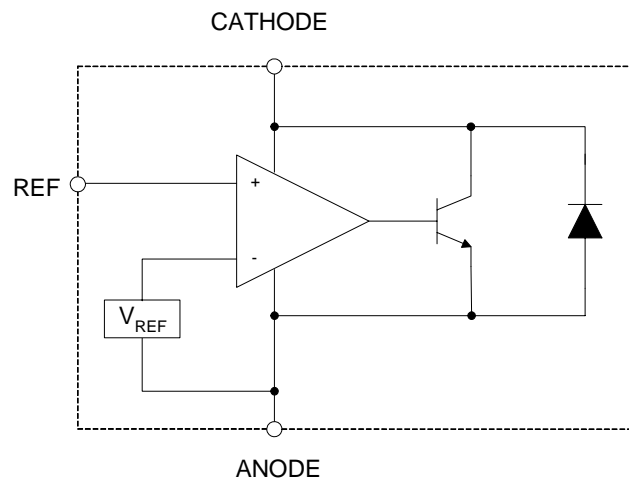


Figure 2. Functional Block Diagram of MB432

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Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Cathode Voltage	V_{KA}	20	V
Cathode Current Range (Continuous)	I_{KA}	-100 to 150	mA
Reference Input Current Range	I_{REF}	10	mA
Power Dissipation	P_D	T,Z Package: 750	mW
		S Package: 350	
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C
Package Thermal Impedance	θ_{JA}	TO-92: 150	°C/W
		SOT-23-3: 90	
		SOT-89: 100	

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Cathode Voltage	V_{KA}	V_{REF}	18	V
Cathode Current	I_{KA}	0.1	100	mA
Operating Ambient Temperature Range	T_A	-40	+125	°C

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Electrical Characteristics

Operating Conditions: $T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified.

Parameter	Test Circuit	Symbol	Conditions	MB432			Unit	
				Min	Typ	Max		
Reference Voltage	3	V_{REF}	$V_{KA}=V_{REF}$ $I_{KA}=10\text{mA}$	A	1.244	1.25	1.256	V
				B	1.238		1.262	V
Deviation of Reference Voltage Over-Temperature	3	ΔV_{REF}	0 to $70\text{ }^\circ\text{C}$			2	10	mV
			-20 to $+85\text{ }^\circ\text{C}$			3	10	
Ratio of Change in Reference Voltage to the Change in Cathode Voltage	4	$\Delta V_{REF} / \Delta V_{KA}$	$I_{KA}=10\text{mA}$ $\Delta V_{KA}=V_{REF}$ to 16V			-0.5	-1.5	mV/V
Reference Current	4	I_{REF}	$I_{KA}=10\text{mA}$ $R1=10\text{k } \Omega$, $R2=\infty$			0.15	0.4	μA
Deviation of Reference Current Over Full Temperature Range	4	ΔI_{REF}	$I_{KA}=10\text{mA}$ $R1=10\text{k } \Omega$, $R2=\infty$ $T_A=-20$ to $+85\text{ }^\circ\text{C}$			0.1	0.4	μA
Minimum Cathode Current for Regulation	3	$I_{KA(\text{min})}$	$V_{KA}=V_{REF}$			0.055	0.080	mA
Off-State Cathode Current	5	$I_{KA(\text{off})}$	$V_{KA}=36\text{V}$, $V_{REF}=0$			0.04	0.1	μA
Dynamic Impedance	3	Z_{KA}	$V_{KA}=V_{REF}$ $I_{KA}=1$ to 100mA $f \leq 1.0\text{k Hz}$			0.05	0.15	ohm

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Test Circuits

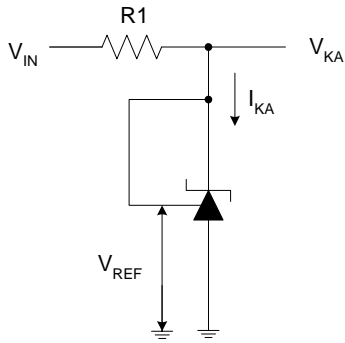


Figure 3 .Test Circuit 3 for $V_{KA} = V_{REF}$

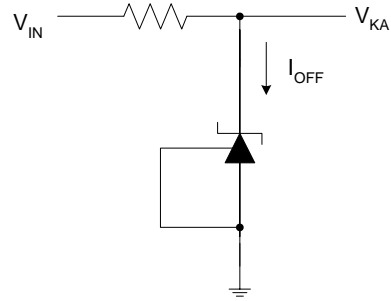


Figure 4 .Test Circuit 4 for I_{off}

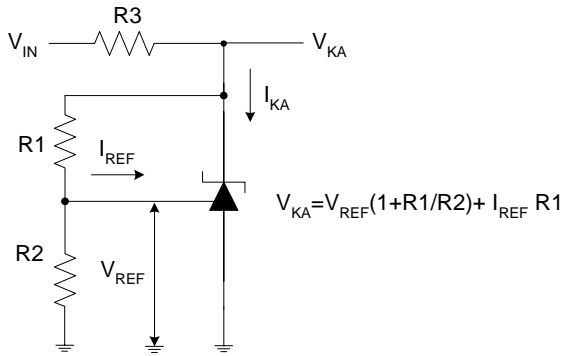


Figure 5 .Test Circuit 5 for $V_{KA} > V_{REF}$

Typical Performance Characteristics

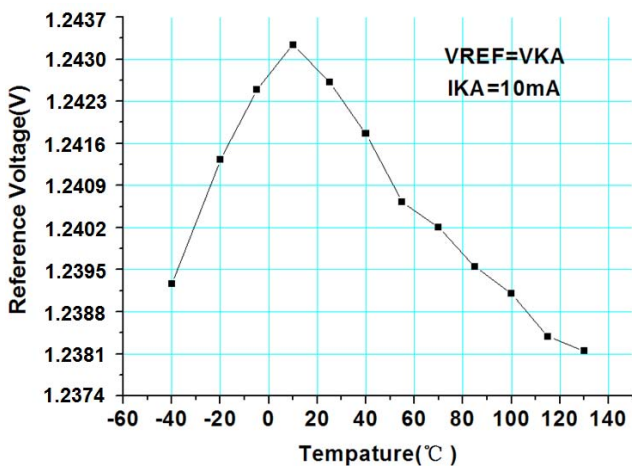


Figure 6. V_{REF} vs. Ambient Temperature

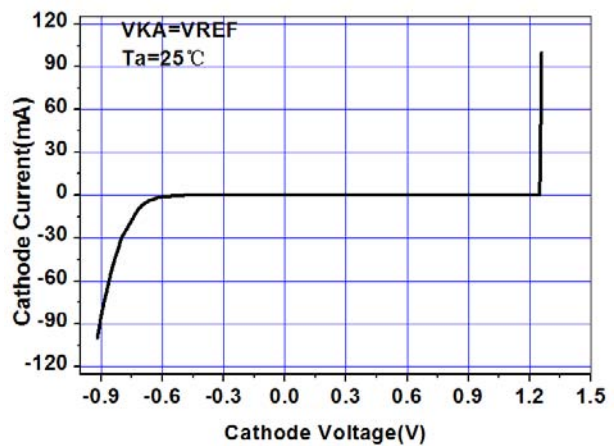


Figure 7. V_{KA} vs. I_{KA}

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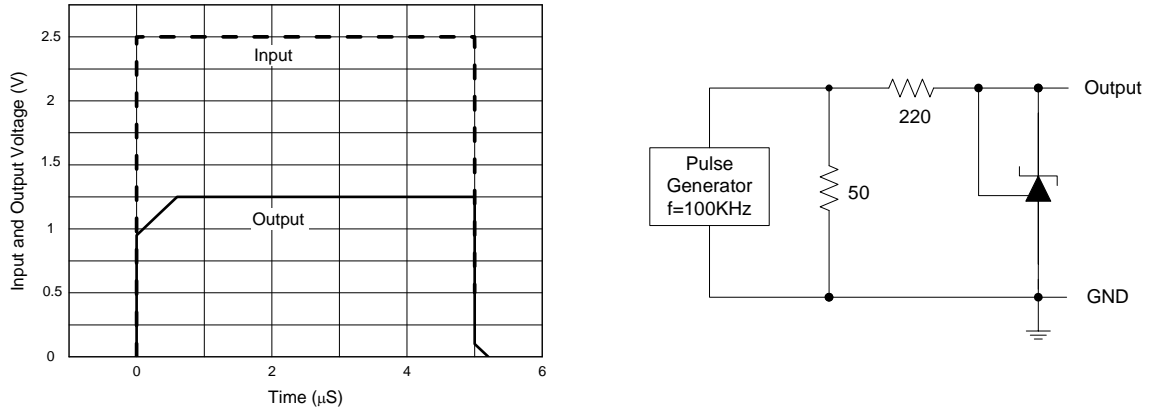


Figure 8. Pulse Response of Input and Output Voltage

Typical Applications

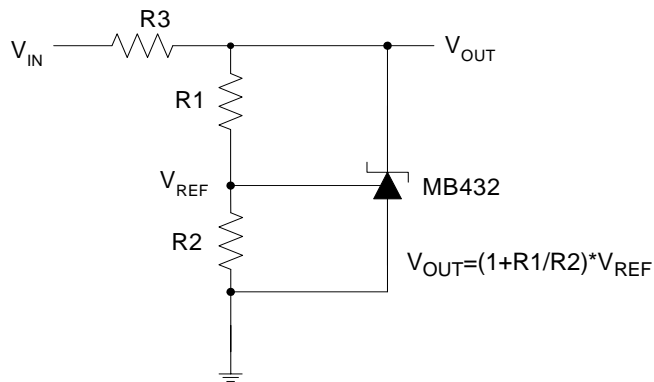


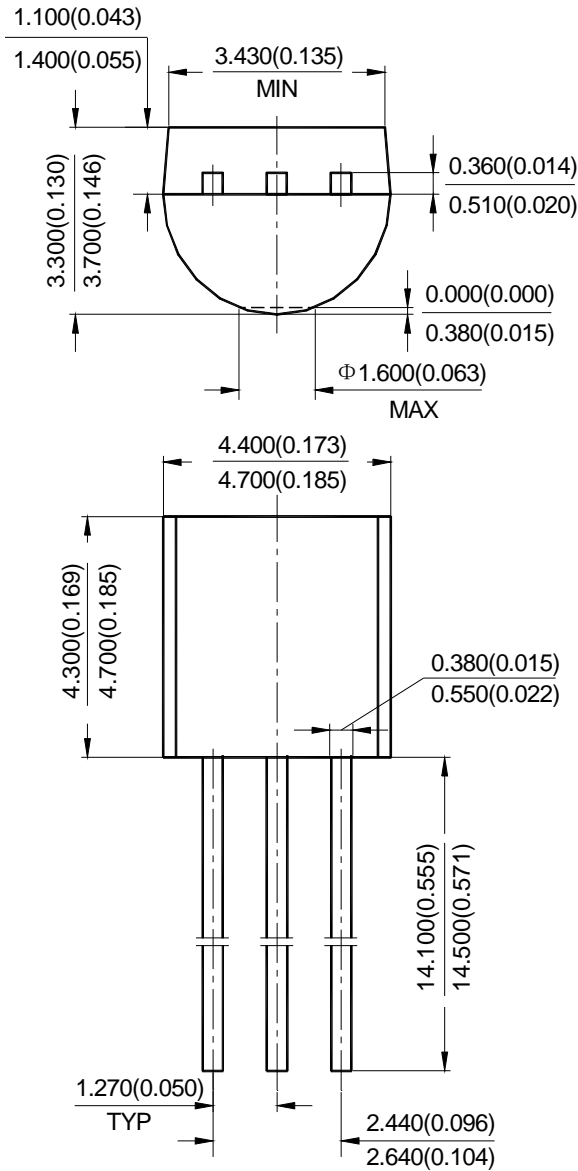
Figure 9. Shunt Regulator

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Mechanical Dimensions

TO-92(Bulk Packing)

Unit: mm(inch)

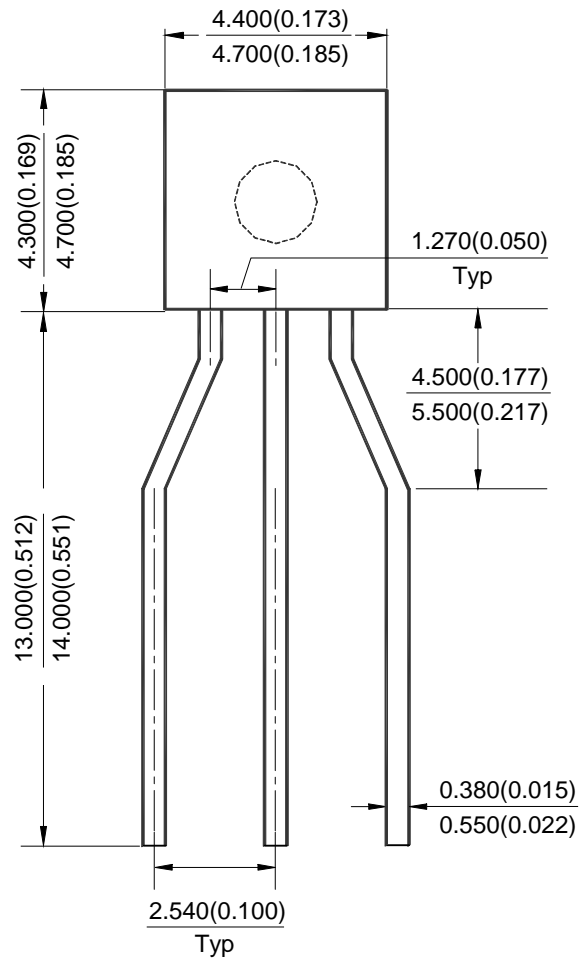
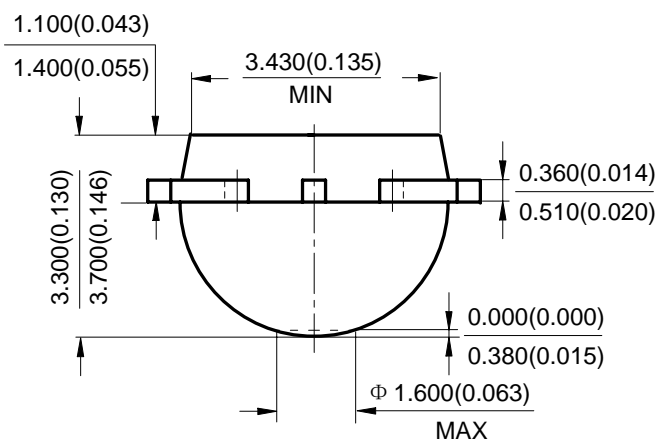


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Mechanical Dimensions (Cont'd)

TO-92(Ammo Packing)

Unit: mm(inch)

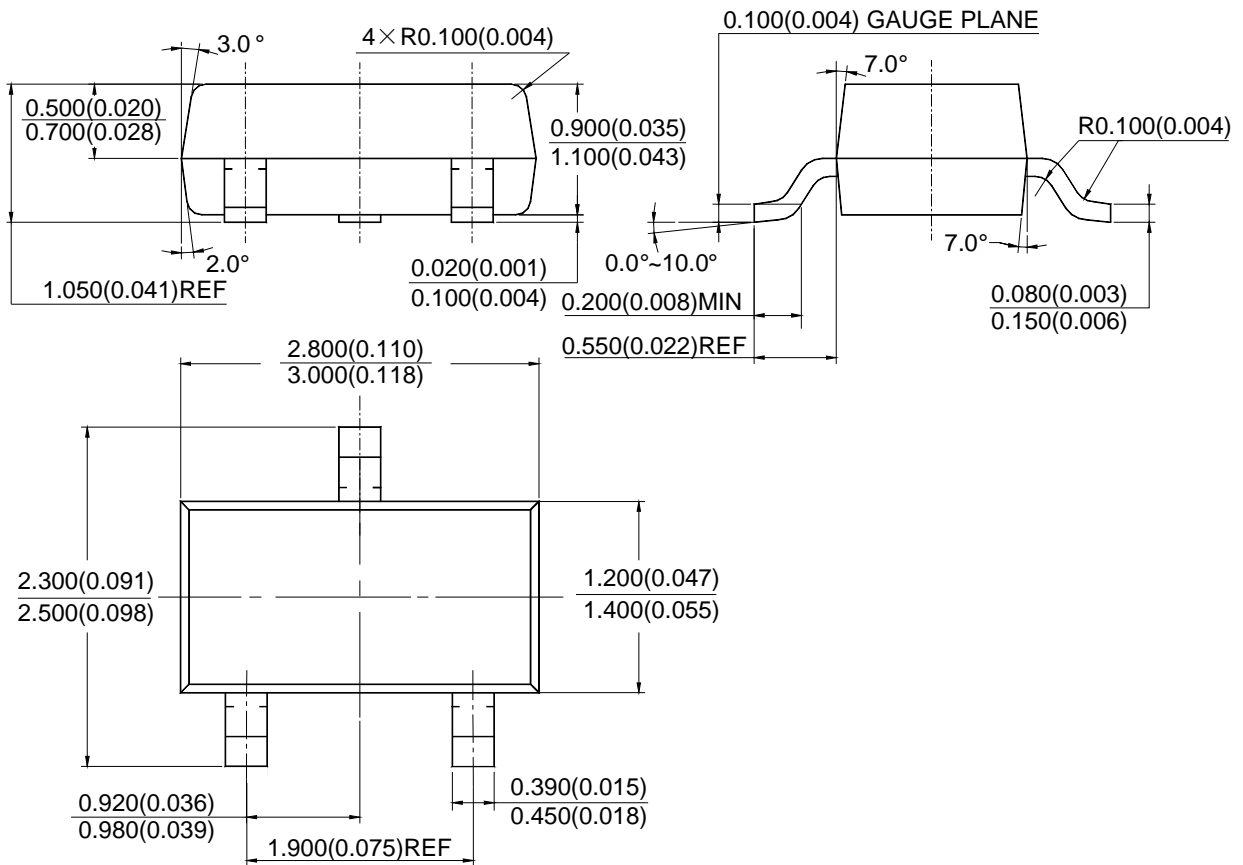


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Mechanical Dimensions (Cont'd)

SOT-23

Unit: mm(inch)

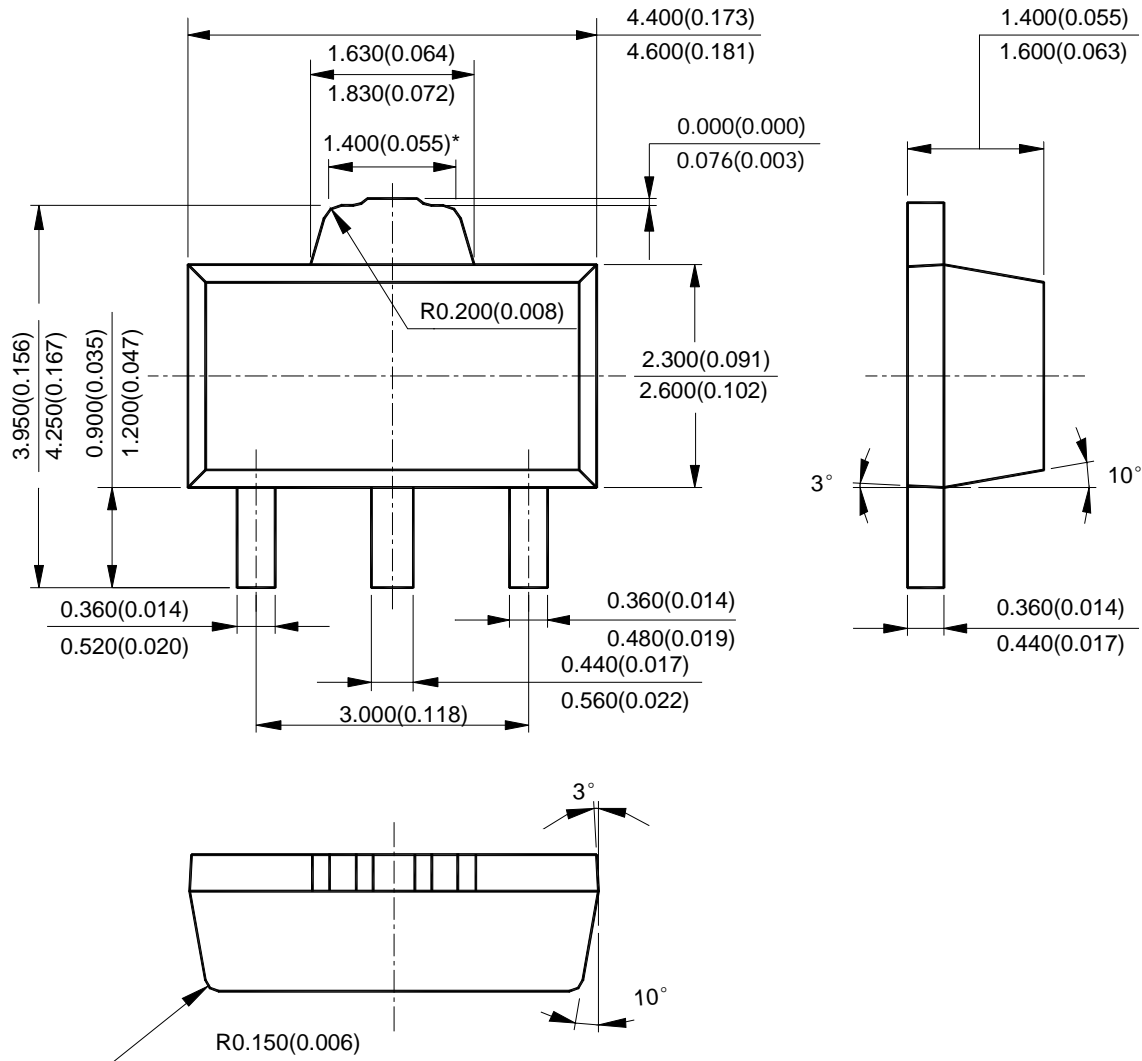


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Mechanical Dimensions (Cont'd)

SOT-89

Unit: mm(inch)



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