

**DUAL BIPOLAR OPERATIONAL AMPLIFIERS****AZ4559****General Description**

The AZ4559 consists of two high performance operational amplifiers. The IC features high gain, low equivalent input noise voltage, excellent channel separation, wide range of operating voltage and internal frequency compensation.

It can work with $\pm 18\text{V}$ maximum power supply voltage or single power supply up to 36V .

The AZ4559 is available in DIP-8 and SOIC-8 packages.

Features

- Internally Frequency Compensated
- Large Signal Voltage Gain: 100dB Typical
- Gain and Phase Match between Amplifiers
- Gain Bandwidth Product (at 10KHz): 6MHz
- Slew Rate: $3\text{V}/\mu\text{s}$ Typical
- Pin to Pin Compatible with MC1458

Applications

- Audio AC-3 Decoder System
- Audio Amplifier

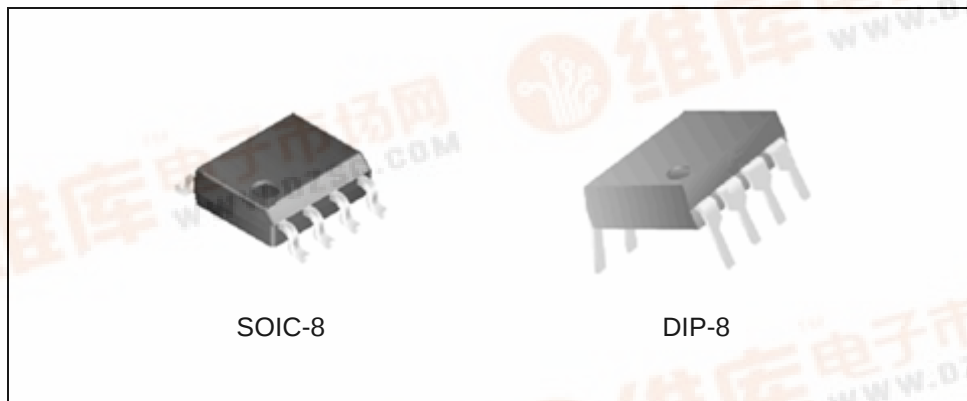


Figure 1. Package Types of AZ4559



DUAL BIPOLAR OPERATIONAL AMPLIFIERS

AZ4559

Pin Configuration

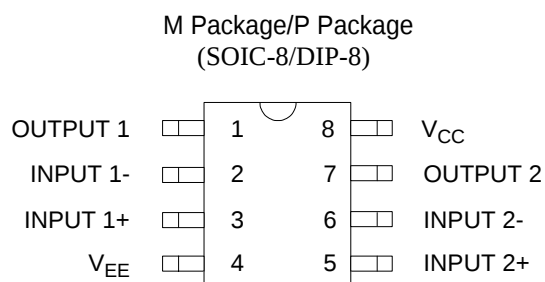


Figure 2. Pin Configuration of AZ4559 (Top View)

Functional Block Diagram

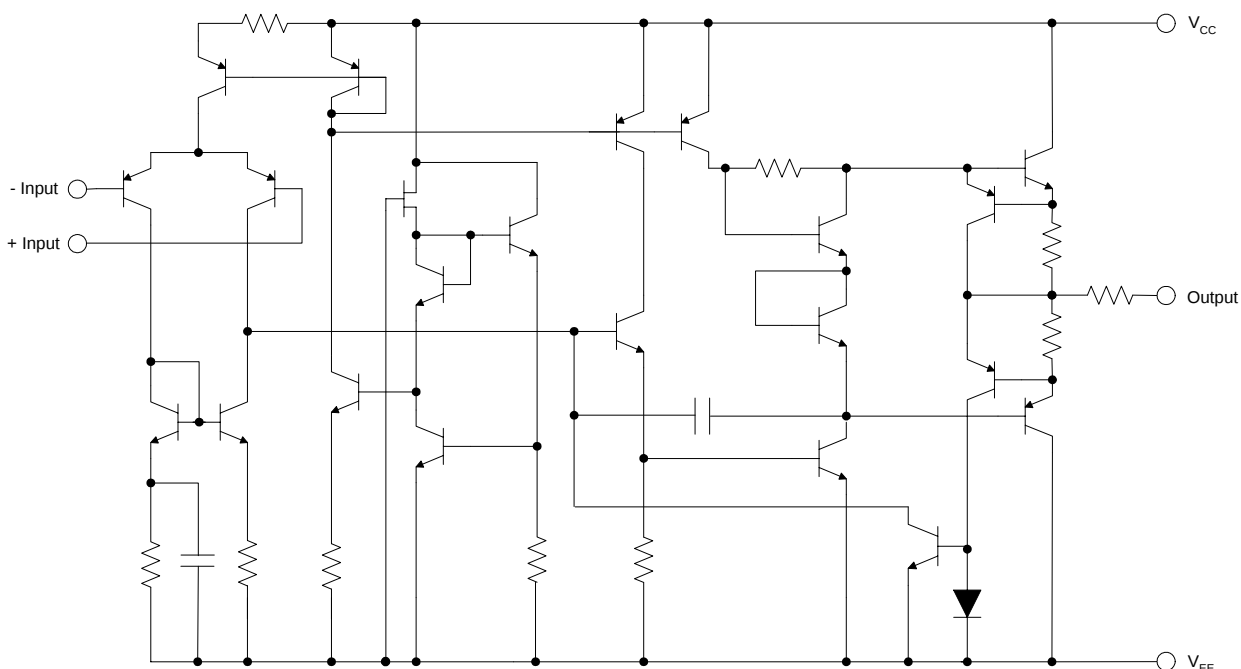


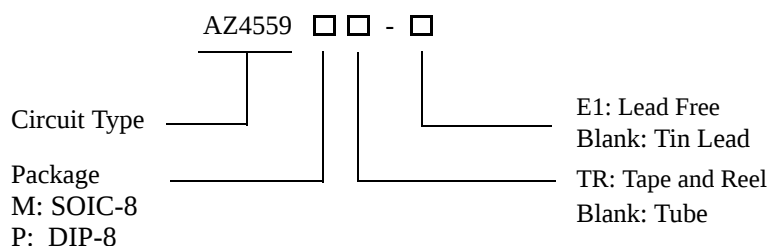
Figure 3. Functional Block Diagram of AZ4559 (Each Amplifier)



DUAL BIPOLAR OPERATIONAL AMPLIFIERS

AZ4559

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Tin Lead	Lead Free	Tin Lead	Lead Free	
SOIC-8	-40 to 85°C	AZ4559M	AZ4559M-E1	4559M	4559M-E1	Tube
		AZ4559MTR	AZ4559MTR-E1	4559M	4559M-E1	Tape & Reel
DIP-8	-40 to 85°C	AZ4559P	AZ4559P-E1	AZ4559P	AZ4559P-E1	Tube

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

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value		Unit
Power Supply Voltage	V_{CC}	+20		V
	V_{EE}	-20		V
Input Voltage	V_I	± 15		V
Differential Input Voltage	V_{ID}	± 30		V
Operating Junction Temperature	T_J	150		°C
Storage Temperature Range	T_{STG}	-65 to 150		°C
Lead Temperature (Soldering 10s)	T_L	260		°C
Power Dissipation	P_D	DIP	800	mW
		SOIC	500	

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.

Recommended Operating Conditions

Parameter	Min	Max	Unit
Supply Voltage	± 2	± 18	V
Operating Temperature Range	-40	85	°C



DUAL BIPOLAR OPERATIONAL AMPLIFIERS

AZ4559

Electrical Characteristics

Operating Conditions: $V_{CC}=+15V$, $V_{EE}=-15V$, $T_A=25^{\circ}C$, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}			0.5	3	mV
Input Offset Current	I_{IO}	$V_{CM}=0V$		10	100	nA
Input Bias Current	I_{IB}	$V_{CM}=0V$		70	400	nA
Large Signal Voltage Gain	A_{VD}	$R_L=2k\Omega$, $V_O=\pm 10V$	85	100		dB
Supply Voltage Rejection Ratio	SVR	$R_S \leq 10k\Omega$	80	95		dB
Supply Current	I_{CC}	All Amplifiers, No Load		2.5	5.0	mA
Input Common Mode Voltage Range	V_{ICM}		± 12			V
Common Mode Rejection Ratio	CMRR	$R_S \leq 10k\Omega$	70	95		dB
Output Voltage Swing	V_O	$R_L \geq 10k\Omega$	± 12	± 14		V
		$R_L \geq 2k\Omega$	± 10	± 13		
Slew Rate	SR	$V_I=\pm 10V$, $R_L=2k\Omega$, $C_L=100pF$, unity gain		3.0		V/ μs
Rise Time	T_R	$V_I=\pm 20mV$, $R_L=2k\Omega$, $C_L=100pF$, unity gain		0.25		μs
Overshoot	K_{OV}	$V_I=\pm 20mV$, $R_L=2k\Omega$, $C_L=100pF$, unity gain		9		%
Input Resistance	R_I		0.3	0.7		$M\Omega$
Output Resistance	R_O			45		Ω
Unity Gain Bandwidth	B			3.5		MHz
Gain Bandwidth Product	GBWP	$V_I=\pm 10mV$, $R_L=2k\Omega$, $C_L=100pF$, $f=10kHz$		6.0		MHz
Total Harmonic Distortion Plus Noise	THD+N	$f=1kHz$, $A_V=6dB$, $R_L=10k\Omega$, $V_O=1V_{RMS}$		0.002		%
Equivalent Input Noise Voltage Density	e_N	$R_S=100\Omega$, $f=1kHz$		10		$\frac{nV}{\sqrt{Hz}}$
Output Current	I_{SINK}	$V=-1V$, $V+=0V$, $V_O=2V$		65		mA
	I_{SOURCE}	$V+=1V$, $V-=0V$, $V_O=2V$		35		



DUAL BIPOLAR OPERATIONAL AMPLIFIERS

AZ4559

Typical Performance Characteristics

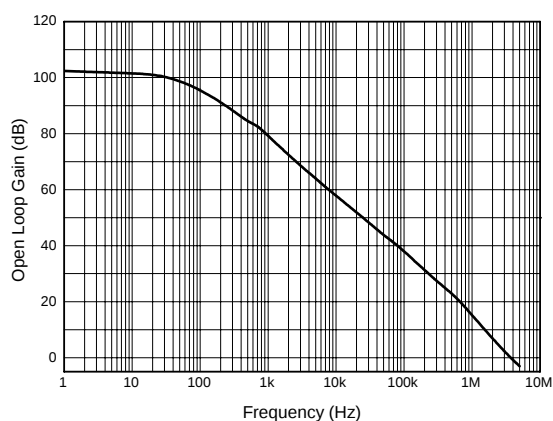


Figure 4. Open Loop Voltage Gain vs. Frequency

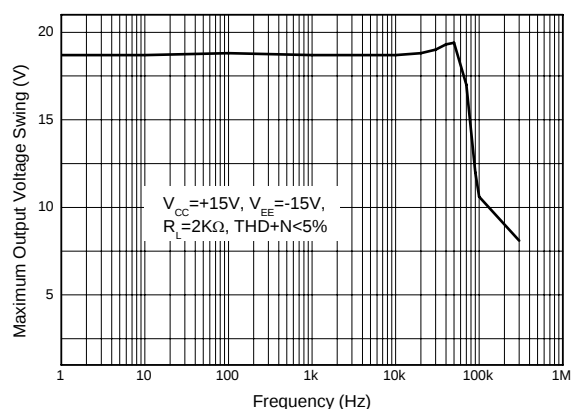


Figure 5. Maximum Output Voltage Swing vs. Frequency

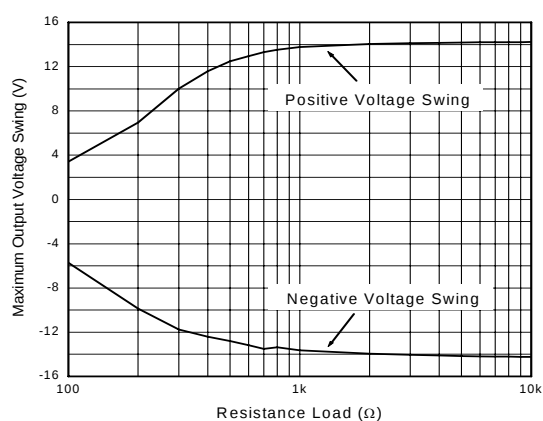


Figure 6. Maximum Output Voltage Swing vs. Load Resistance

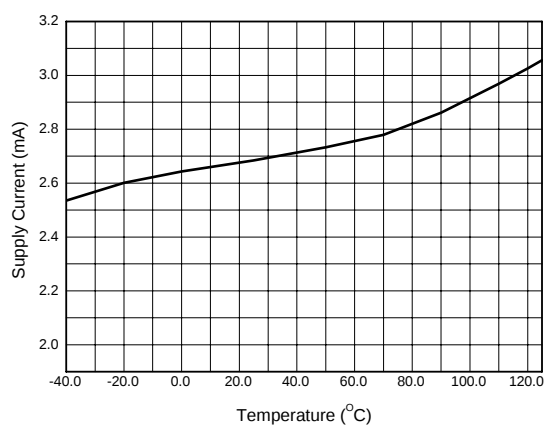


Figure 7. Supply Current vs. Temperature



DUAL BIPOLAR OPERATIONAL AMPLIFIERS

AZ4559

Typical Performance Characteristics (Continued)

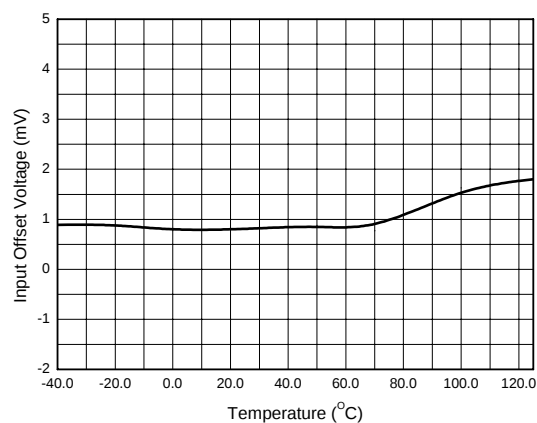


Figure 8. Input Offset Voltage vs. Temperature

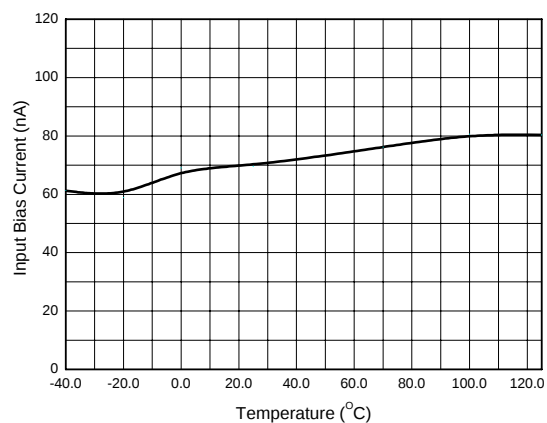


Figure 9. Input Bias Current vs. Temperature

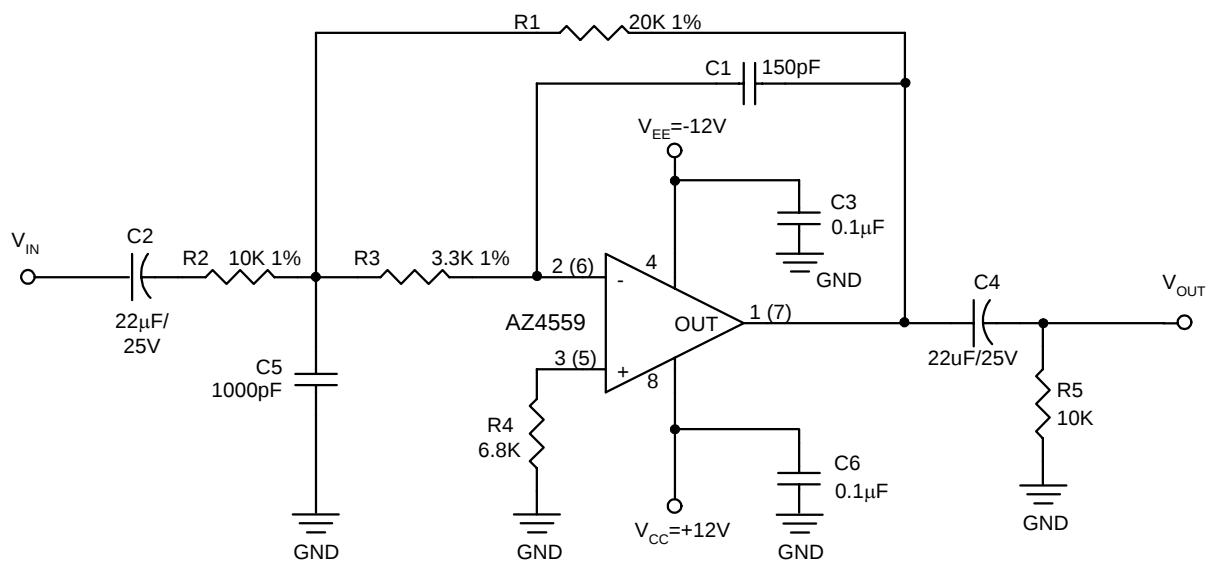
**DUAL BIPOLAR OPERATIONAL AMPLIFIERS****AZ4559****Typical Application**

Figure 10. Typical Application of AZ4559 in Audio 2nd Order Low Pass Filter
($F_O=50.58\text{KHz}$, $Q=0.7015$, Input impedance=10K, Gain=6dB, Group Delay=4.48ms)



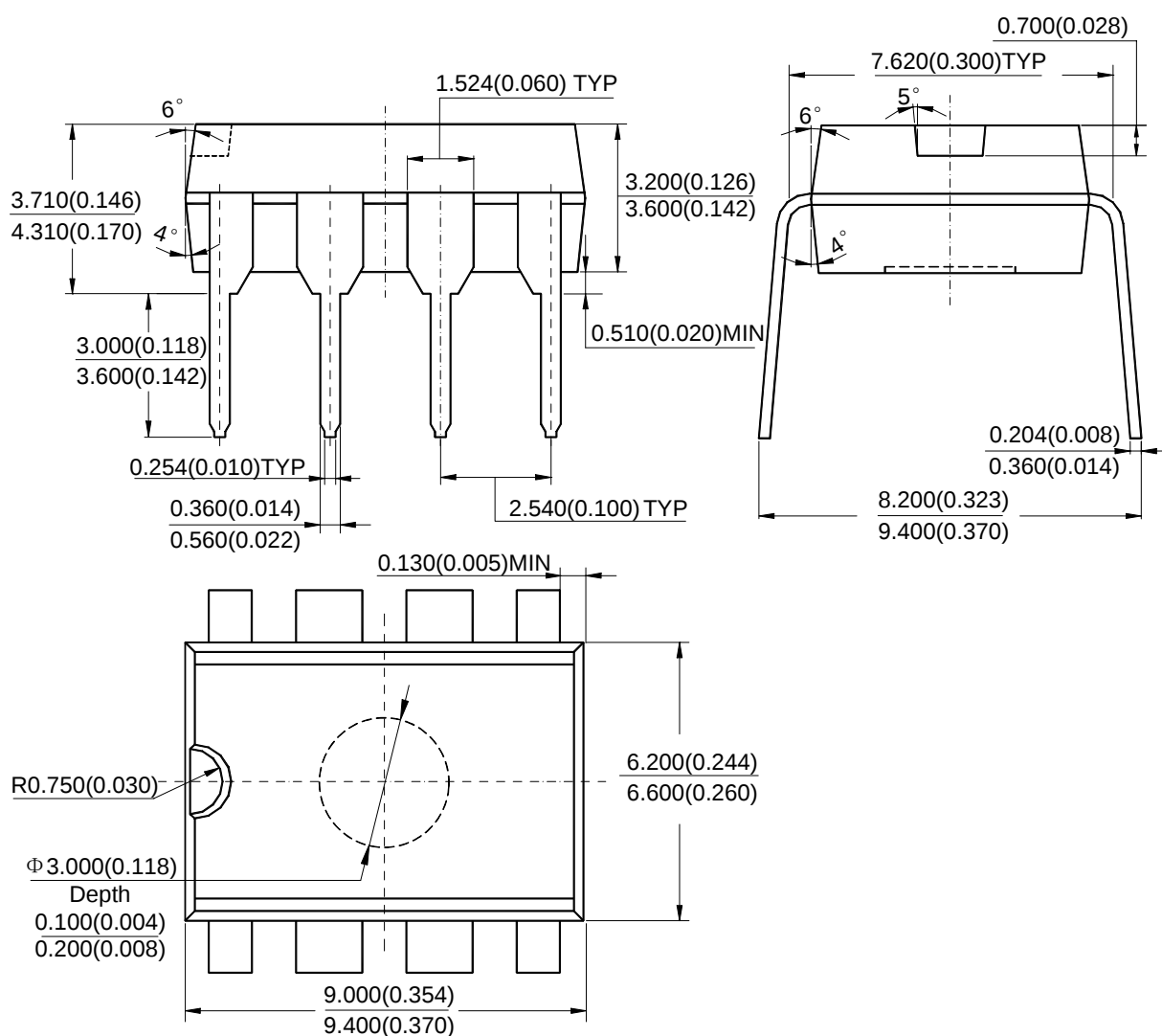
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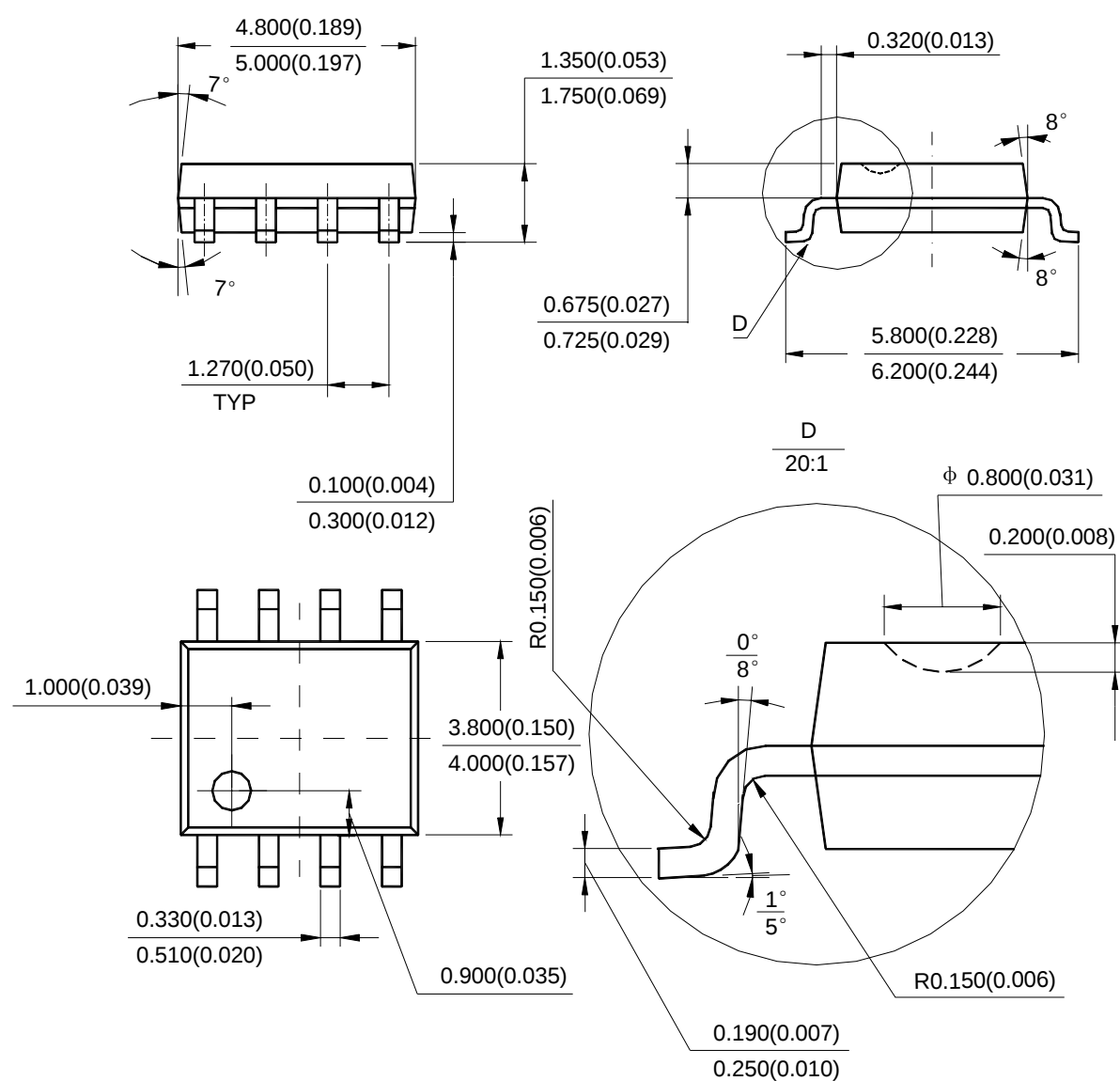
AZ4559

Mechanical Dimensions

DIP-8

Unit: mm(inch)



**DUAL BIPOLAR OPERATIONAL AMPLIFIERS****AZ4559****Mechanical Dimensions (Continued)****SOIC-8****Unit: mm(inch)**



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