

**DUAL LOW NOISE OPERATIONAL AMPLIFIERS****AZ4580****General Description**

The AZ4580 is a monolithic dual low noise operational amplifier. It is specifically designed for audio systems to improve tone control; it can also be used in pre-amplifier, industrial measurement tools and applications where gain and phase matched channels are mandatory.

The IC features internal frequency compensation, low noise, low distortion, high gain and high bandwidth. The AZ4580 can operate under dual power supply voltage up to  $\pm 18V$  or single power supply up to 36V.

The AZ4580 is available in DIP-8, SOIC-8, SIP-8 and TSSOP-8 packages.

**Features**

- Large Signal Voltage Gain: 110dB Typical
- Low Input Noise Voltage:  $0.7 \mu V_{RMS}$  (RIAA) Typical
- Wide Gain Bandwidth Product: 15 MHz at 10KHz Typical
- Low Distortion: 0.0005% Typical
- Slew Rate:  $7V/\mu s$  Typical

**Applications**

- Audio AC-3 Decoder System
- Audio Amplifier

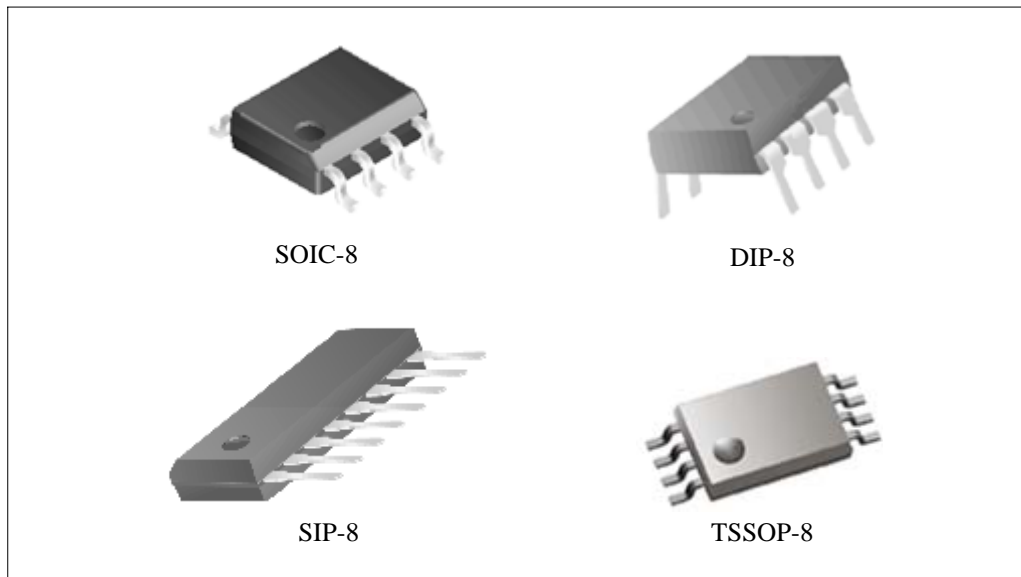


Figure 1. Package Types of AZ4580



**DUAL LOW NOISE OPERATIONAL AMPLIFIERS**

**AZ4580**

**Pin Configuration**

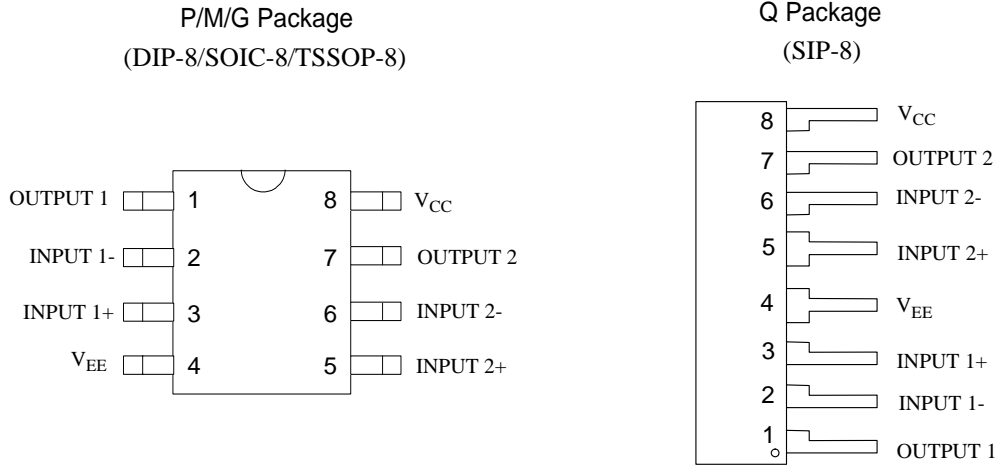


Figure 2. Pin Configuration of AZ4580 (Top View)

**Pin Description**

Pin No.	Function	Pin No.	Function	Pin No.	Function	Pin No.	Function
1	OUTPUT 1	2	INPUT 1-	3	INPUT 1+	4	$V_{EE}$
5	INPUT 2+	6	INPUT 2-	7	OUTPUT 2	8	$V_{CC}$



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**Functional Block Diagram**

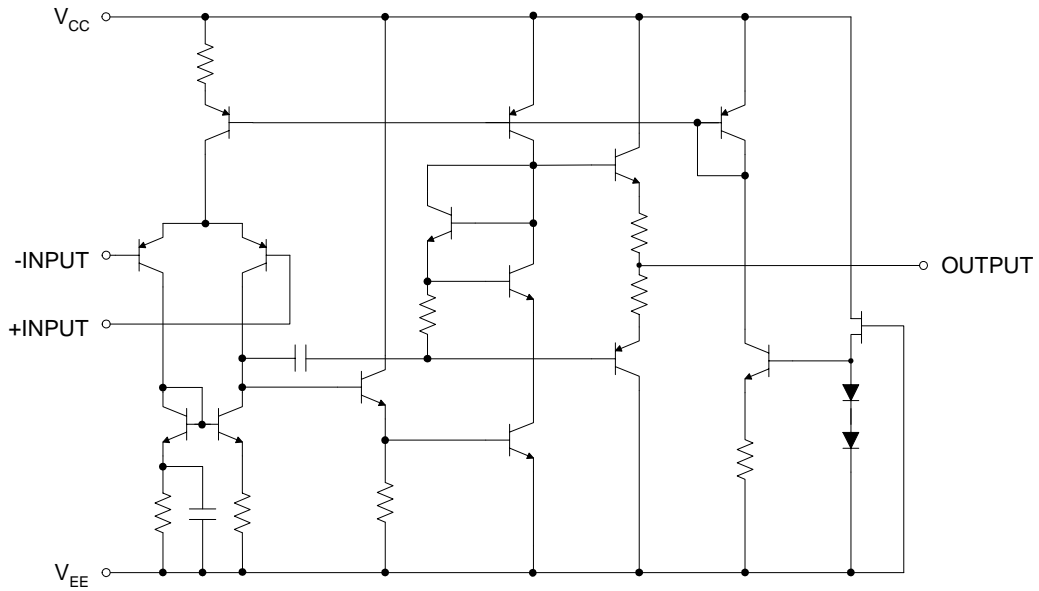


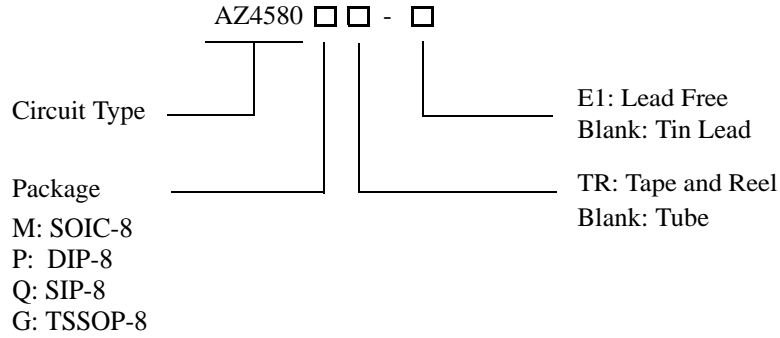
Figure 3. Representative Schematic Diagram of AZ4580 (Each Amplifier)



**DUAL LOW NOISE OPERATIONAL AMPLIFIERS**

**AZ4580**

**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	AZ4580M	AZ4580M-E1	4580M	4580M-E1	Tube
		AZ4580MTR	AZ4580MTR-E1	4580M	4580M-E1	Tape & Reel
DIP-8	-40 to 85°C	AZ4580P	AZ4580P-E1	AZ4580P	AZ4580P-E1	Tube
SIP-8	-40 to 85°C	AZ4580Q	AZ4580Q-E1	AZ4580Q	AZ4580Q-E1	Tube
TSSOP-8	-40 to 85°C	AZ4580G	AZ4580G-E1	G80	EG80	Tube
		AZ4580GTR	AZ4580GTR-E1	G80	EG80	Tape & Reel

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

**DUAL LOW NOISE OPERATIONAL AMPLIFIERS****AZ4580****Absolute Maximum Ratings (Note 1)**

Parameter	Smbol	Value		Unit
Power Supply Voltage	$V_{CC}$	+ 20		V
	$V_{EE}$	- 20		
Input Voltage	$V_I$	$\pm 15$		V
Differential Input Voltage	$V_{ID}$	$\pm 30$		V
Operating Junction Temperature	$T_J$	150		$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-65 to 150		$^{\circ}C$
Lead Temperature (Soldering 10s)	$T_L$	260		$^{\circ}C$
Power Dissipation ( $T_A=25^{\circ}C$ )	$P_D$	TSSOP-8	400	mW
		SOIC-8	500	
		SIP-8	750	
		DIP-8	800	

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	$\pm 2$	$\pm 18$	V
Operating Temperature Range	-40	85	$^{\circ}C$

**DUAL LOW NOISE OPERATIONAL AMPLIFIERS****AZ4580****Electrical Characteristics**Operating Conditions:  $V_{CC}=+15V$ ,  $V_{EE}=-15V$ ,  $T_A=25^{\circ}C$  unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit
Supply Current	no load		4	7	mA
Input Offset Voltage	$R_S \leq 10K\Omega$		0.5	3	mV
Input Offset Current	$V_{CM}=0V$		5	100	nA
Input Bias Current	$V_{CM}=0V$		150	500	nA
Input Common Mode Voltage Range		$\pm 12$	$\pm 13.5$		V
Common Mode Rejection Ratio	$V_{CM}=0V$ to $V_{CC}-1.5V$ , $R_S \leq 10K\Omega$	80	110		dB
Large Signal Voltage Gain	$R_L=2K\Omega$ , $V_O=\pm 10V$	90	110		dB
Power Supply Rejection Ratio	$R_S \leq 10K\Omega$	80	110		dB
Output Sink Current	$V_-=1V$ , $V_+=0V$ , $V_O=2V$		80		mA
Output Source Current	$V_+=1V$ , $V_-=0V$ , $V_O=2V$		45		mA
Slew Rate	$R_L \geq 2K\Omega$		7		V/ $\mu$ S
Gain Bandwidth Product	$R_L=2K\Omega$ , $f=10KHz$		15		MHz
Total Harmonic Distortion	$A_V=20dB$ , $V_O=5V$ $R_L=2K\Omega$ , $f=1KHz$		0.0005		%
Equivalent Input Noise Voltage	RIAA $R_S=50\Omega$ , 30KHz LPF		0.7		$\mu V_{RMS}$



DUAL LOW NOISE OPERATIONAL AMPLIFIERS

AZ4580

Typical Performance Characteristics

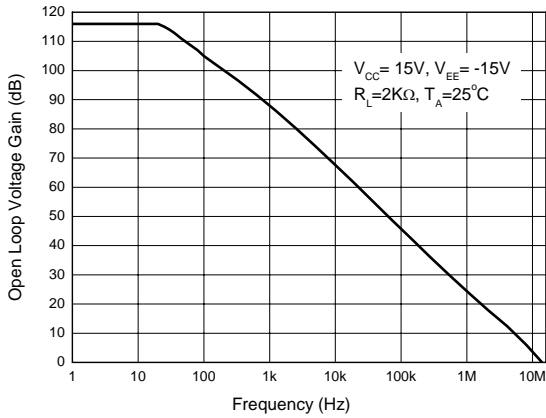


Figure 4. Open Loop Voltage Gain vs. Frequency

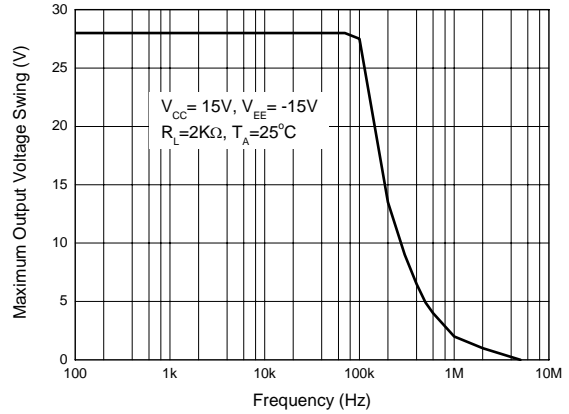


Figure 5. Maximum Output Voltage Swing vs. Frequency

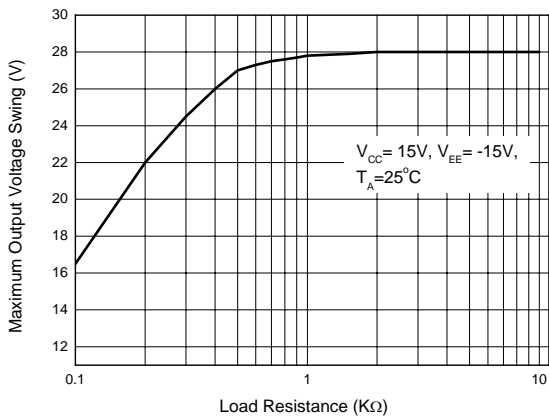


Figure 6. Maximum Output Voltage Swing vs. Load Resistance

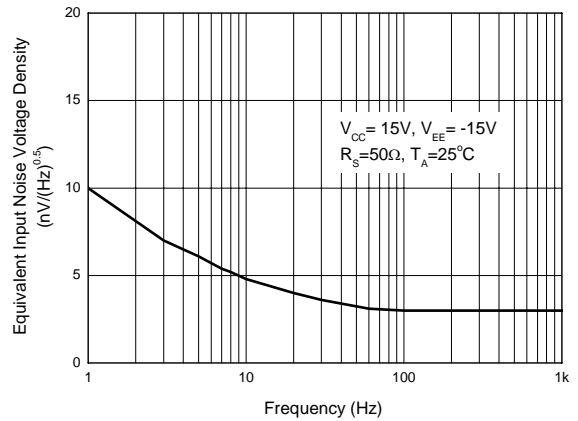


Figure 7. Equivalent Input Noise Voltage Density vs. Frequency



**DUAL LOW NOISE OPERATIONAL AMPLIFIERS**

**AZ4580**

**Typical Performance Characteristics (Continued)**

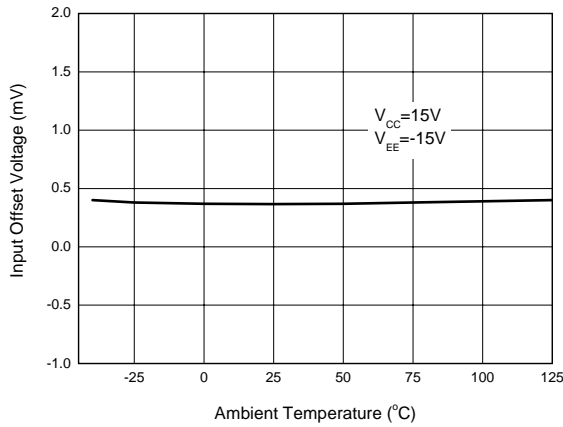


Figure 8. Input Offset Voltage vs. Temperature

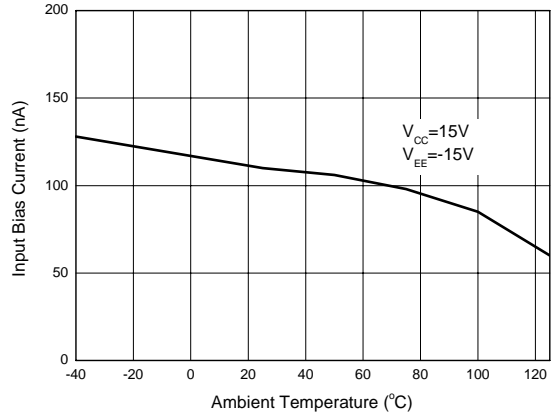


Figure 9. Input Bias Current vs. Temperature

**Typical Applications**

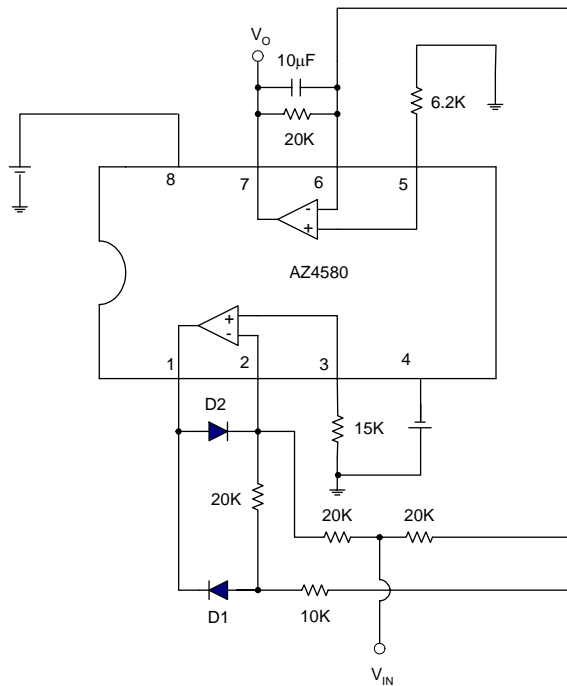


Figure 10. Application of AZ4580 in an AC/DC Converter





**DUAL LOW NOISE OPERATIONAL AMPLIFIERS**

**AZ4580**

**Typical Applications (Continued)**

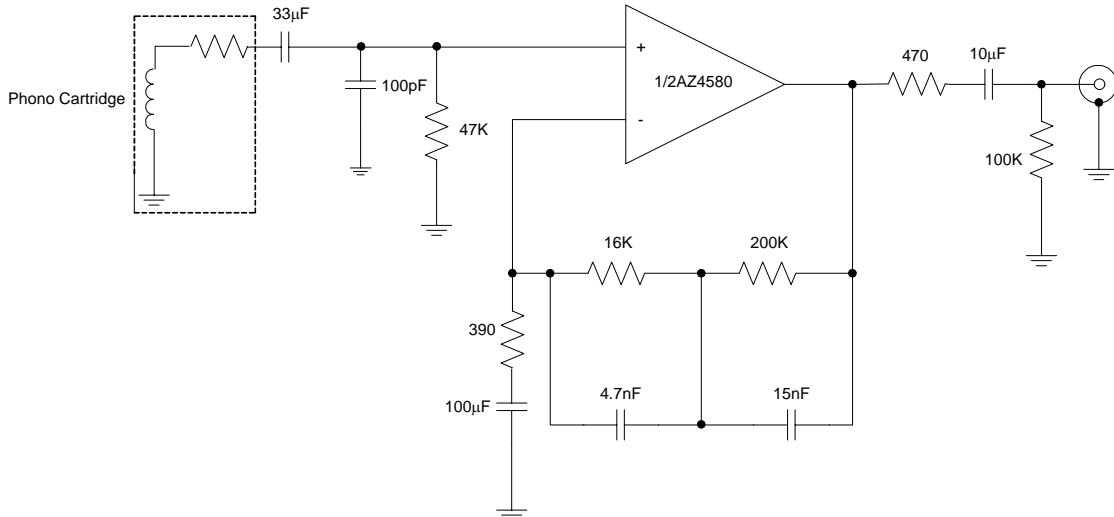


Figure11. Application of AZ4580 in a RIAA Preamp

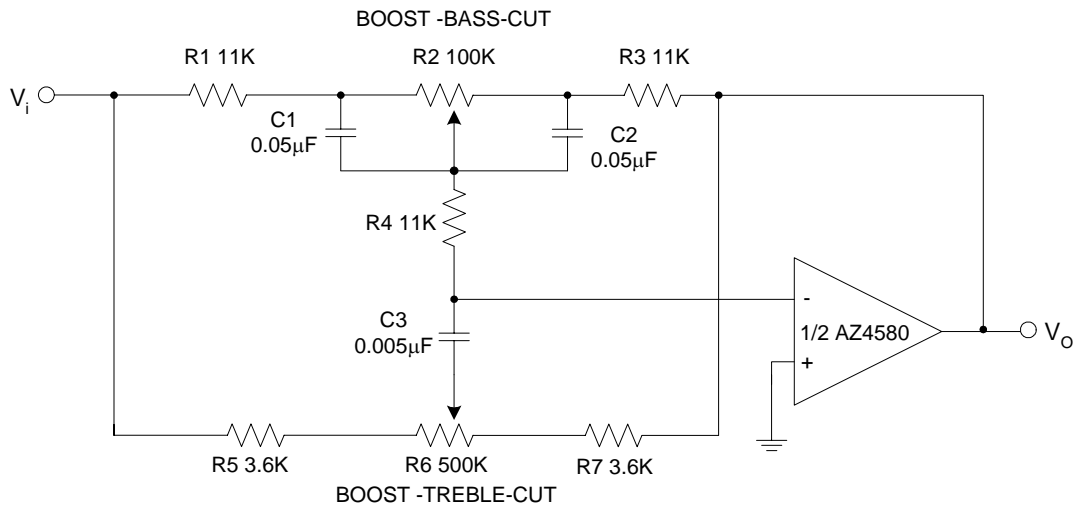


Figure12. Application of AZ4580 in Tone Control



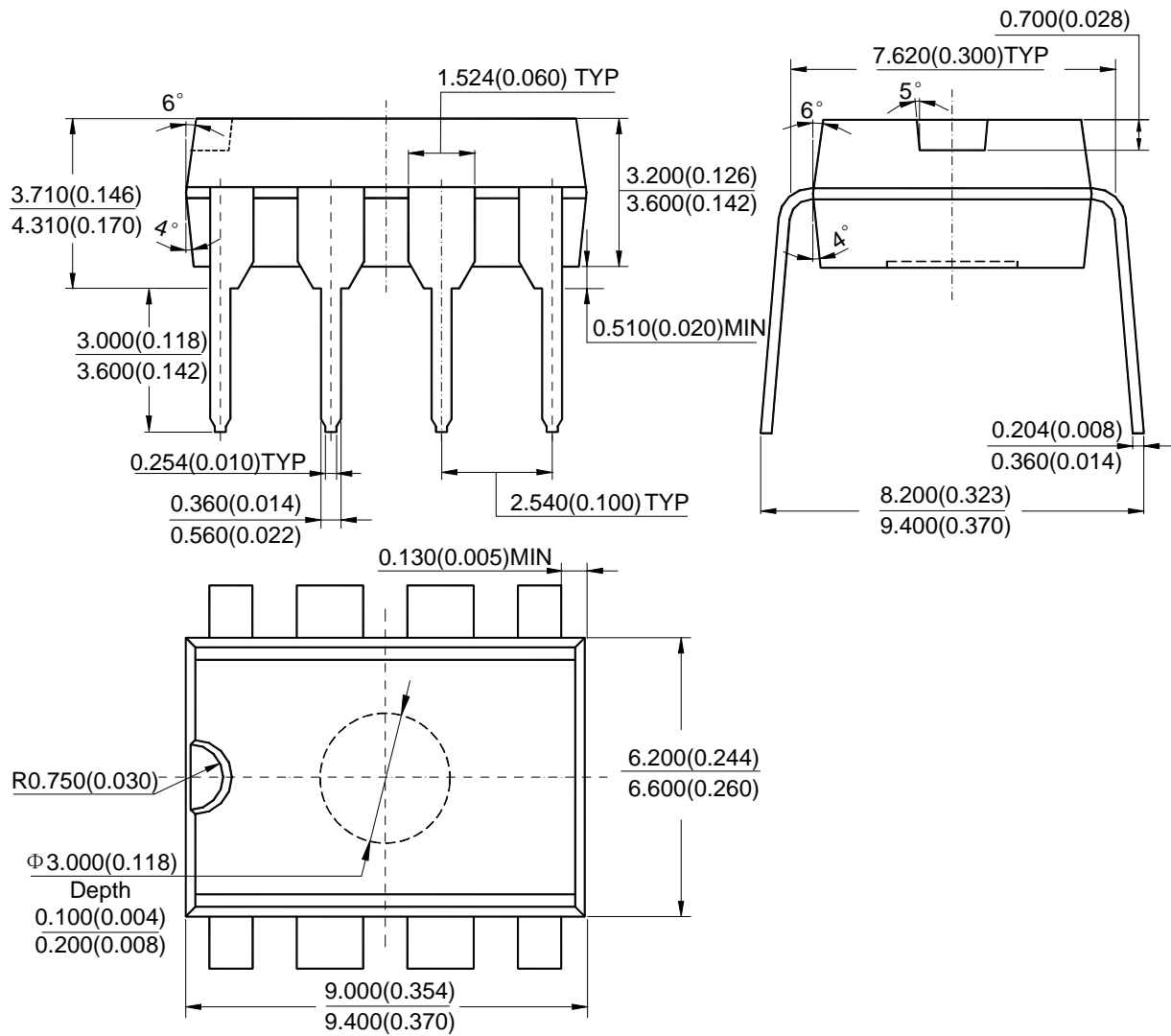
**DUAL LOW NOISE OPERATIONAL AMPLIFIERS**

**AZ4580**

**Mechanical Dimensions**

**DIP-8**

**Unit: mm(inch)**





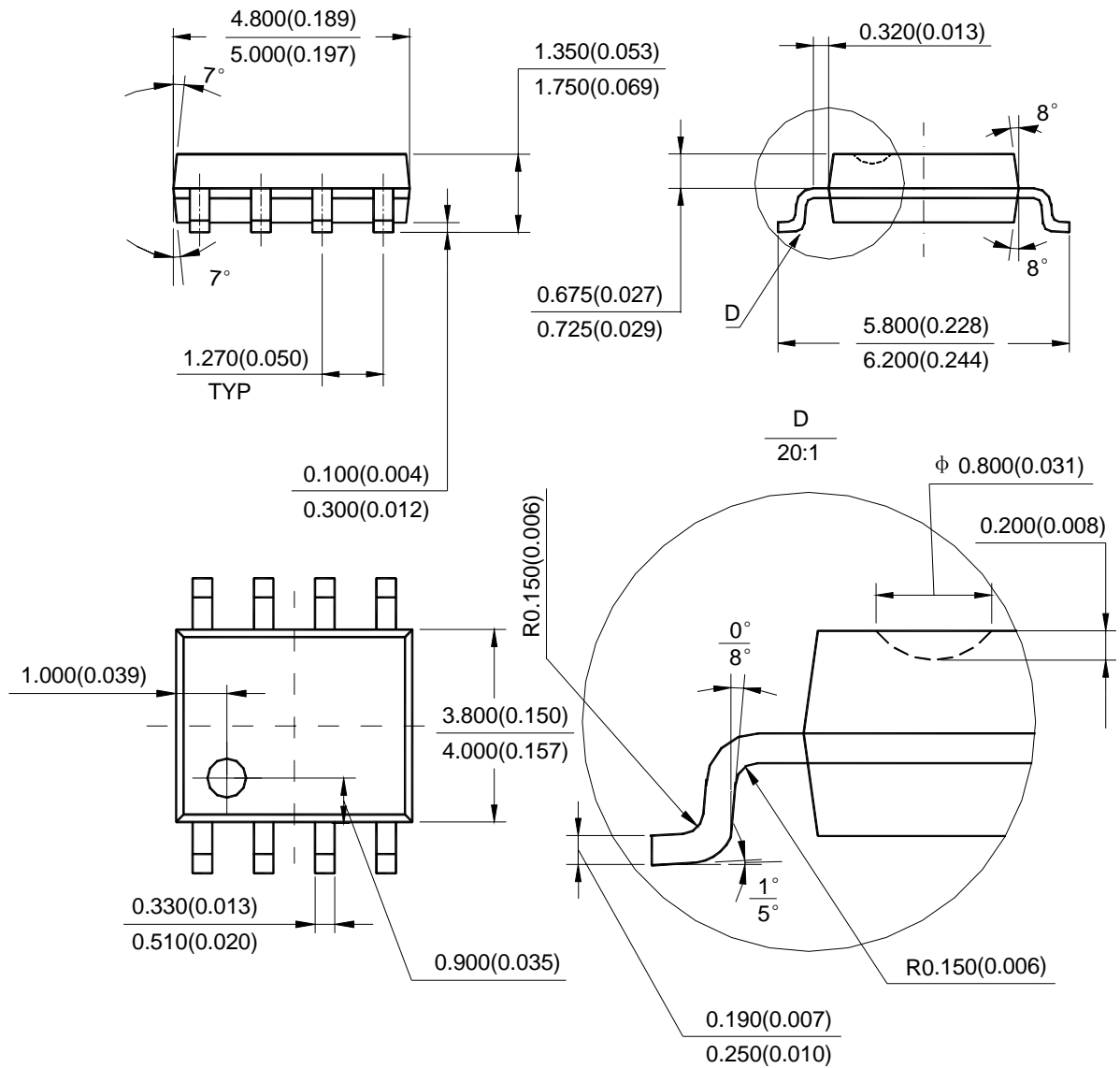
**DUAL LOW NOISE OPERATIONAL AMPLIFIERS**

**AZ4580**

**Mechanical Dimensions (Continued)**

**SOIC-8**

**Unit: mm(inch)**





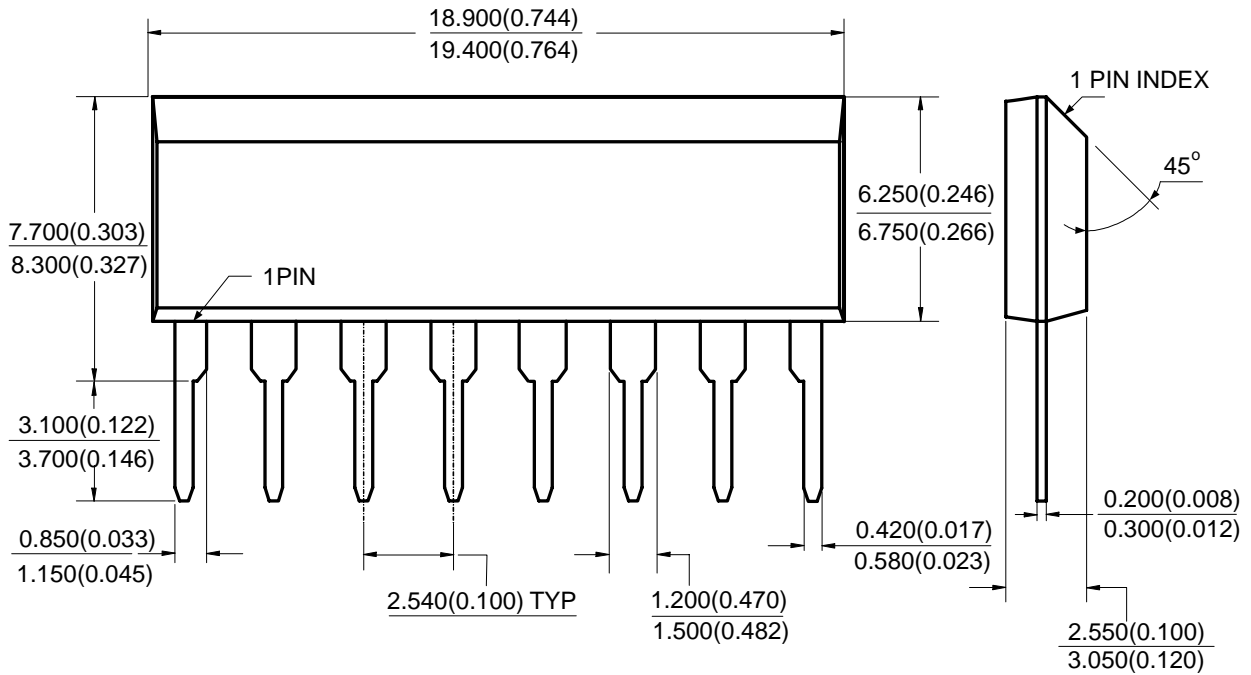
**DUAL LOW NOISE OPERATIONAL AMPLIFIERS**

**AZ4580**

**Mechanical Dimensions (Continued)**

**SIP-8**

**Unit: mm(inch)**





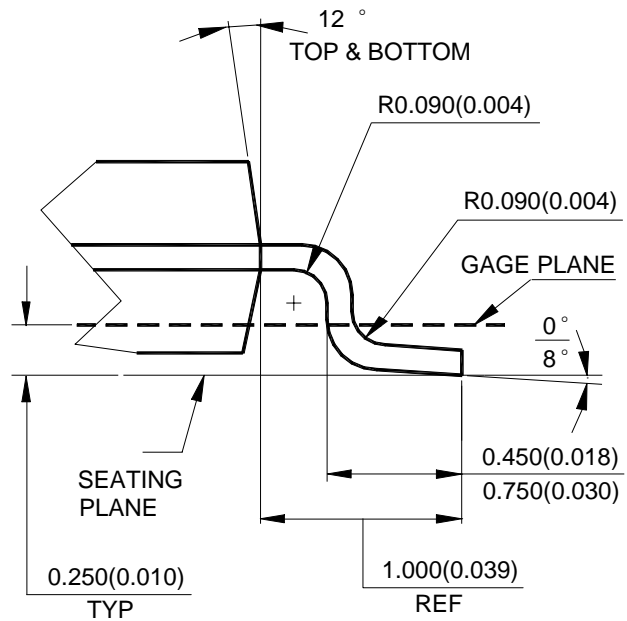
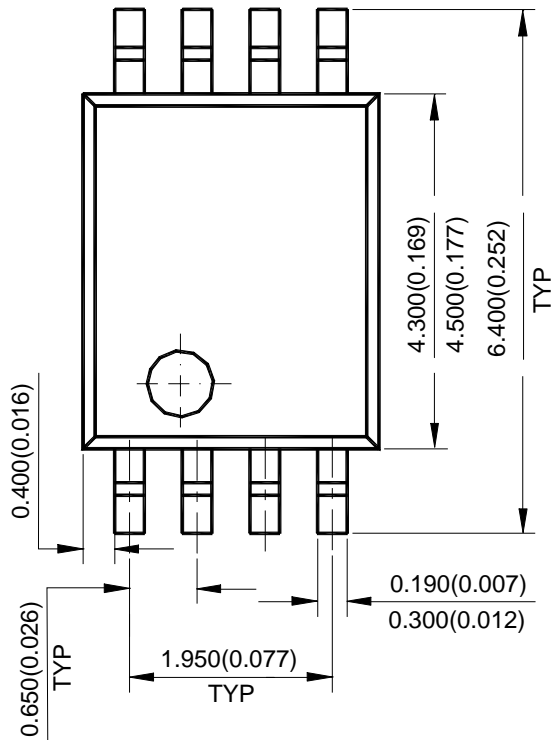
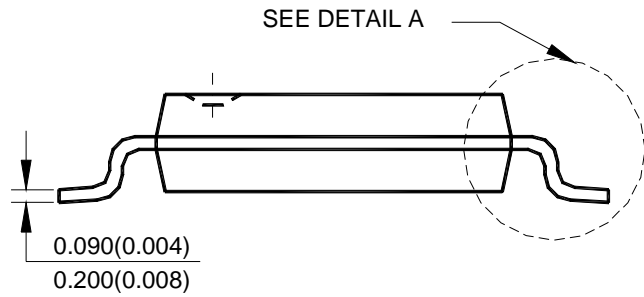
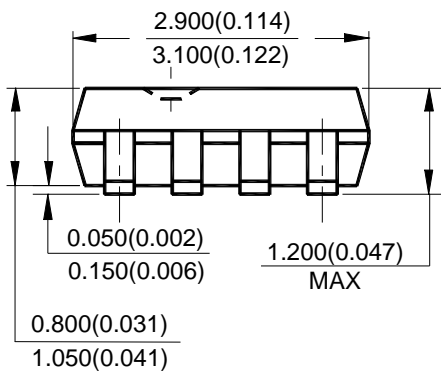
**DUAL LOW NOISE OPERATIONAL AMPLIFIERS**

**AZ4580**

**Mechanical Dimensions (Continued)**

**TSSOP-8**

**Unit: mm(inch)**





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