



Advanced Analog Circuits

Data Sheet

DUAL BIPOLAR OPERATIONAL AMPLIFIERS**AZ4558C****General Description**

The AZ4558C consists of two high performance operational amplifiers. The IC features high gain, low equivalent input noise voltage, high input resistance, 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 AZ4558C 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): 5.5MHz
- Pin to Pin Compatible with MC1458

Applications

- Audio AC-3 Decoder System
- Audio Amplifier



Figure 1. Package Types of AZ4558C



DUAL BIPOLAR OPERATIONAL AMPLIFIERS

AZ4558C

Pin Configuration

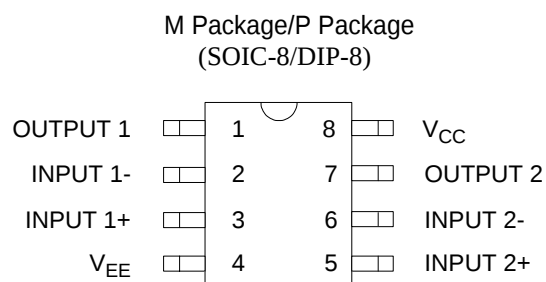


Figure 2. Pin Configuration of AZ4558C (Top View)

Functional Block Diagram

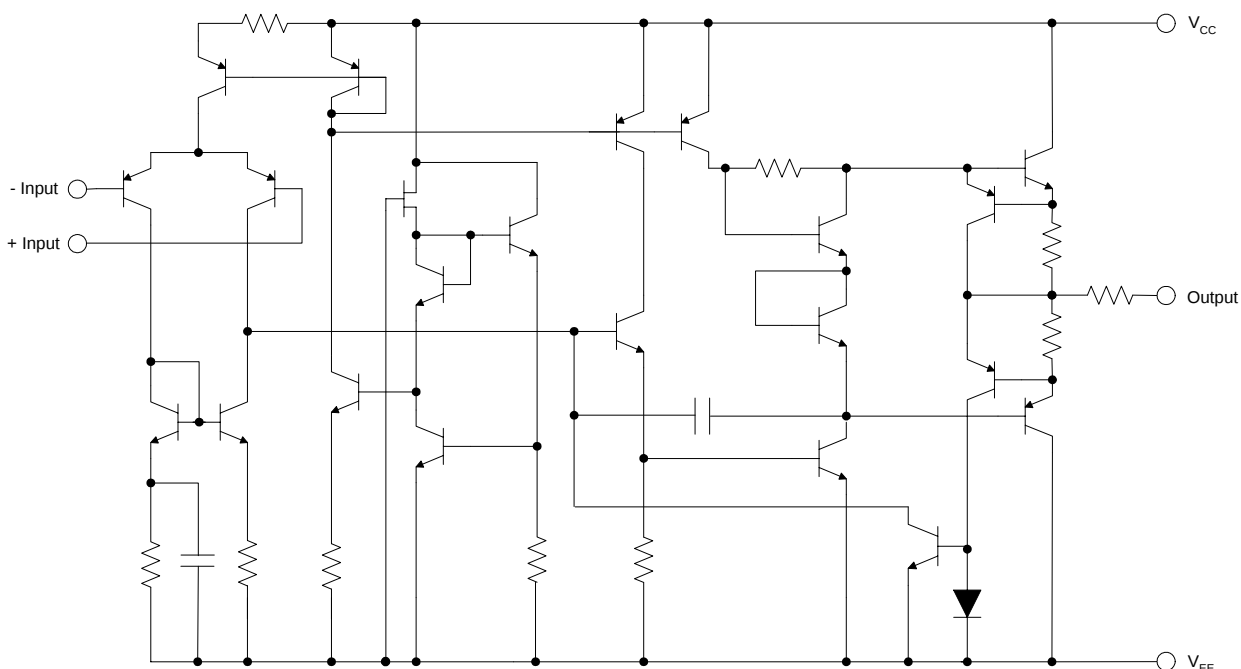


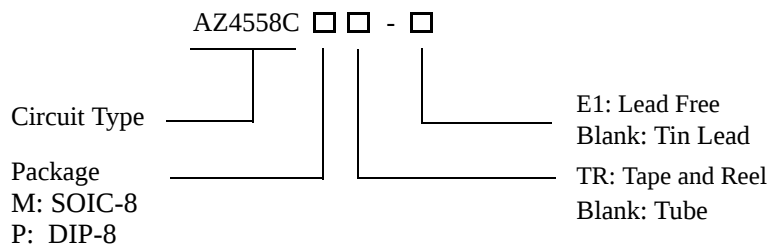
Figure 3. Functional Block Diagram of AZ4558C (Each Amplifier)



DUAL BIPOLAR OPERATIONAL AMPLIFIERS

AZ4558C

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	AZ4558CM	AZ4558CM-E1	4558CM	4558CM-E1	Tube
		AZ4558CMTR	AZ4558CMTR-E1	4558CM	4558CM-E1	Tape & Reel
DIP-8	-40 to 85°C	AZ4558CP	AZ4558CP-E1	AZ4558CP	AZ4558CP-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
Supply Voltage	V _{CC}	+20		V
	V _{EE}	-20		
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	mW

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



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AZ4558C

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}			1	5	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	100		dB
Supply Current	I_{CC}	All Amplifiers, No Load		2.5	4.5	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		1.8		V/ μs
Rise Time	T_R	$V_I=\pm 20mV$, $R_L=2K\Omega$, $C_L=100pF$, unity gain		0.3		μs
Overshoot	K_{OV}	$V_I=\pm 20mV$, $R_L=2K\Omega$, $C_L=100pF$, unity gain		15		%
Input Resistance	R_I			0.5		$M\Omega$
Output Resistance	R_O			45		Ω
Unity Gain Bandwidth	B	Gain=0dB		2.8		MHz
Gain Bandwidth Product	GBWP	$V_I=\pm 10mV$, $R_L=2K\Omega$, $C_L=100pF$, $f=10KHz$		5.5		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}	$V=-1V$, $V+=0V$, $V_O=2V$		60		mA
	I_{SOURCE}	$V+=1V$, $V-=0V$, $V_O=2V$		35		



Typical Performance Characteristics

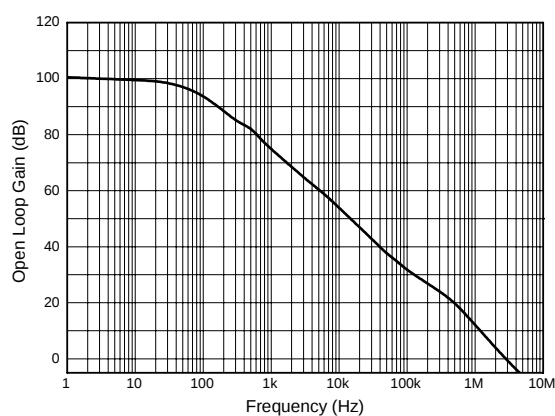


Figure 4. Open Loop Voltage Gain vs. Frequency

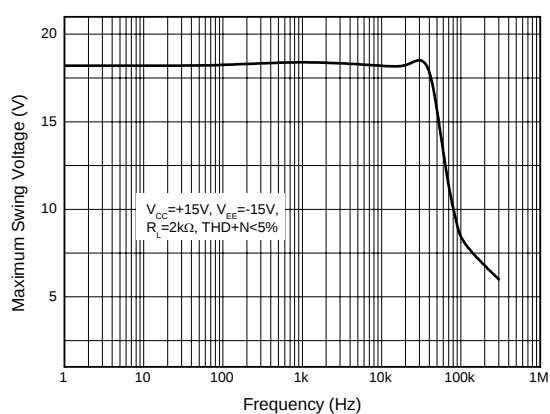


Figure 5. Maximum Output Voltage Swing vs. Frequency

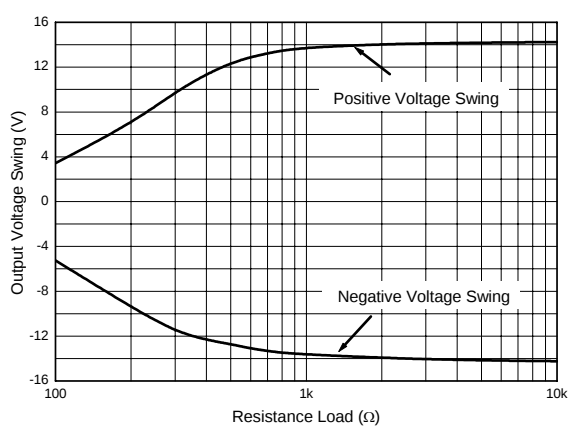


Figure 6. Maximum Output Voltage Swing vs. Load Resistance

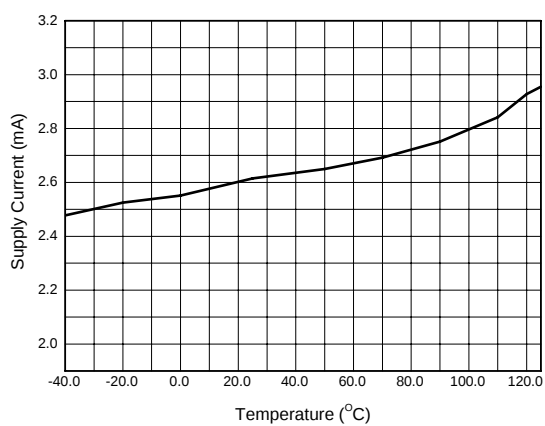


Figure 7. Supply Current vs. Temperature

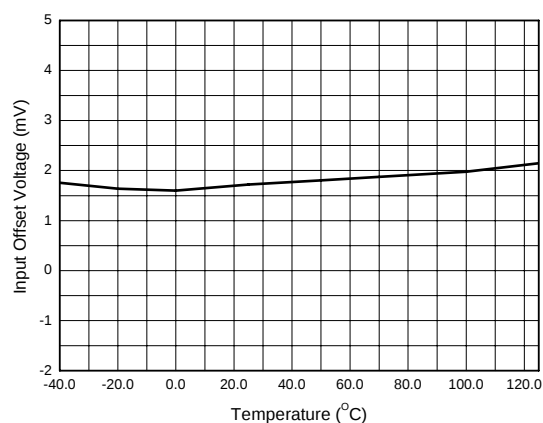
**DUAL BIPOLAR OPERATIONAL AMPLIFIERS****AZ4558C****Typical Performance Characteristics (Continued)**

Figure 8. Input Offset Voltage vs. Temperature

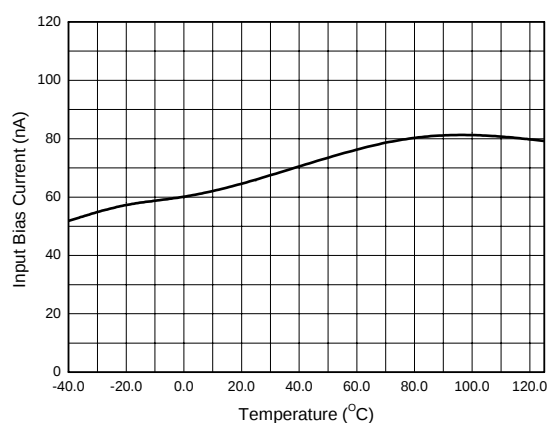


Figure 9. Input Bias Current vs. Temperature

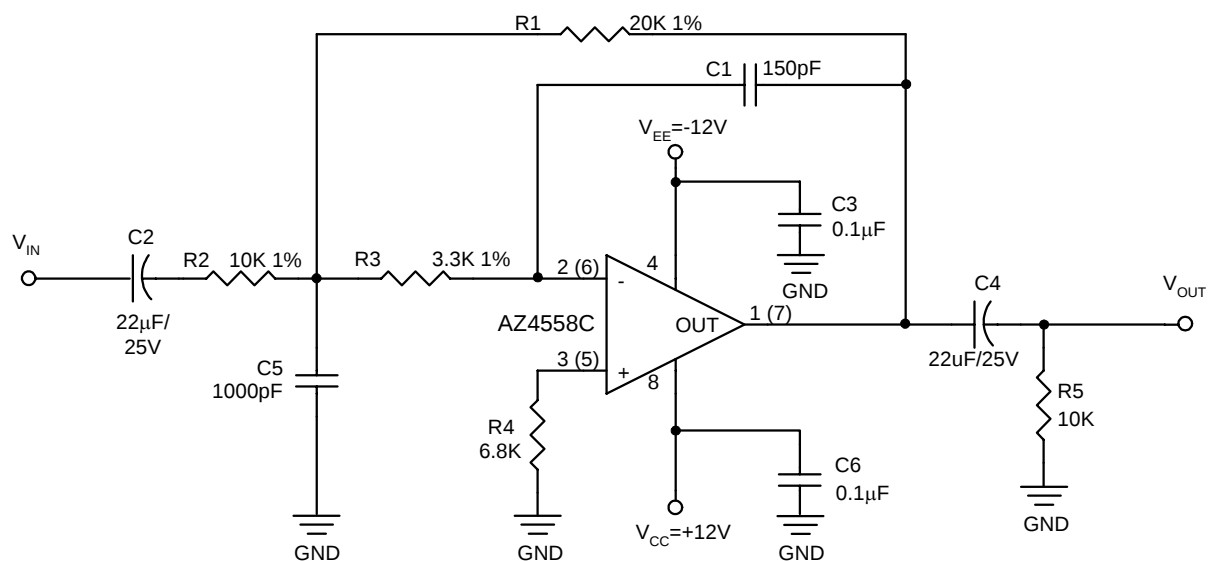
**DUAL BIPOLAR OPERATIONAL AMPLIFIERS****AZ4558C****Typical Application**

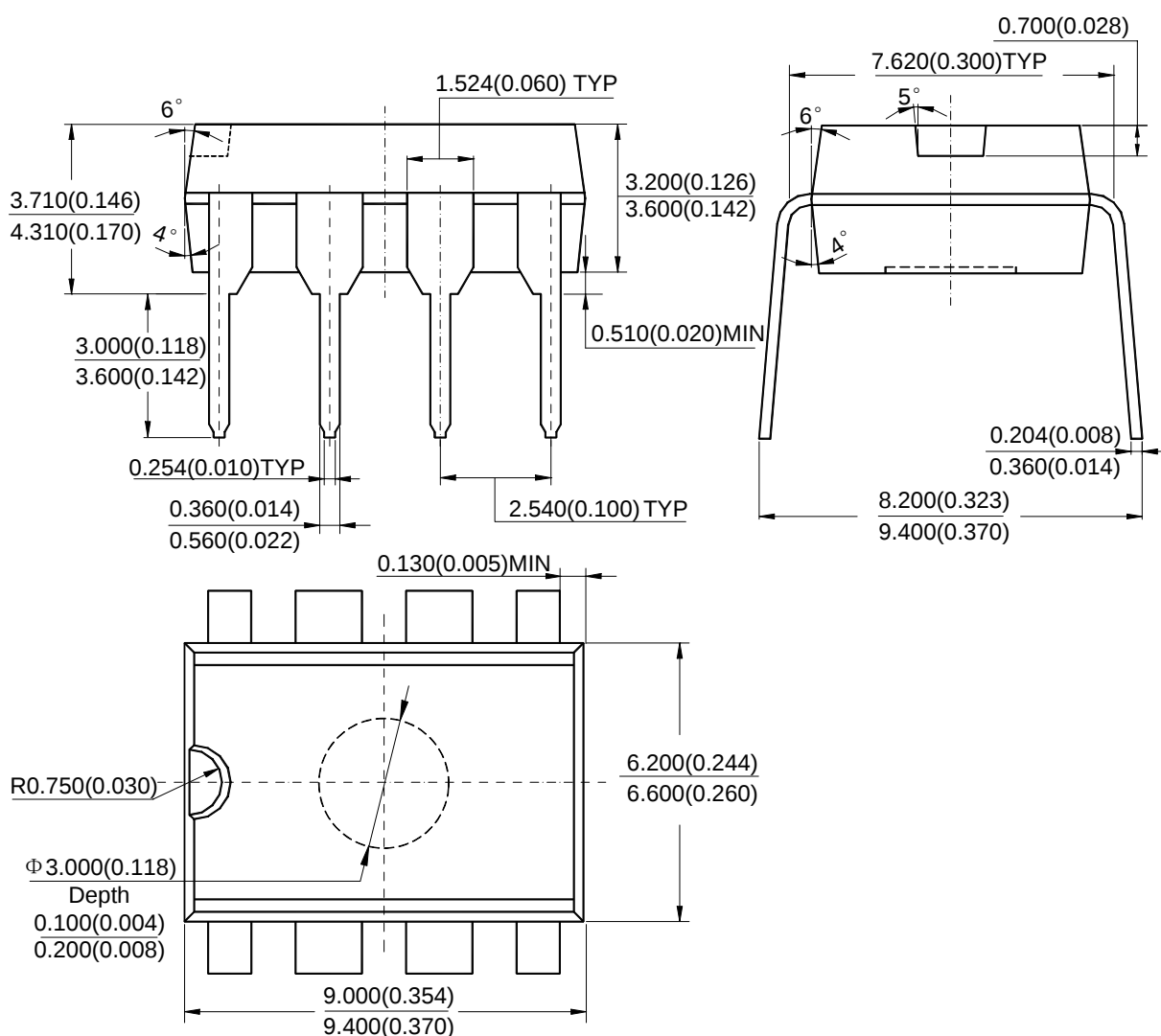
Figure 10. Typical Application of AZ4558C in Audio 2nd Order Low Pass Filter
($f_o=50.6\text{kHz}$, $Q=0.7015$, Input impedance=10K, Gain=6dB, Group delay=4.48 μs)



Mechanical Dimensions

DIP-8

Unit: mm(inch)



**SOIC-8**

Technical drawing of a 4-pin D-subminiature connector. The drawing includes three views: a front view, a side view, and a top view, along with a detailed view of the pin and housing interface.

Dimensions (inches in parentheses):

- Front View:**
 - Overall width: 4.800 (0.189)
 - Pin pitch: 1.270 (0.050) TYP
 - Pin diameter: 0.100 (0.004)
 - Overall height: 0.300 (0.012)
 - Pin height: 0.675 (0.027)
 - Pin spacing: 0.725 (0.029)
 - Pin angle: 7°
- Side View:**
 - Overall width: 5.800 (0.228)
 - Pin spacing: 6.200 (0.244)
 - Pin diameter: 0.320 (0.013)
 - Pin height: 1.350 (0.053)
 - Pin spacing: 1.750 (0.069)
 - Pin angle: 8°
- Top View:**
 - Overall width: 1.000 (0.039)
 - Pin pitch: 0.330 (0.013)
 - Pin spacing: 0.510 (0.020)
 - Pin height: 0.900 (0.035)
 - Pin angle: 0°/8°
 - Pin diameter: 0.190 (0.007)
 - Pin spacing: 0.250 (0.010)
 - Pin angle: 1°/5°
- Detail View:**
 - Pin diameter: 0.800 (0.031)
 - Pin spacing: 0.200 (0.008)
 - Pin angle: 0°/8°
 - Pin diameter: 0.190 (0.007)
 - Pin spacing: 0.250 (0.010)
 - Pin angle: 1°/5°



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