

**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  $\pm 18V$  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

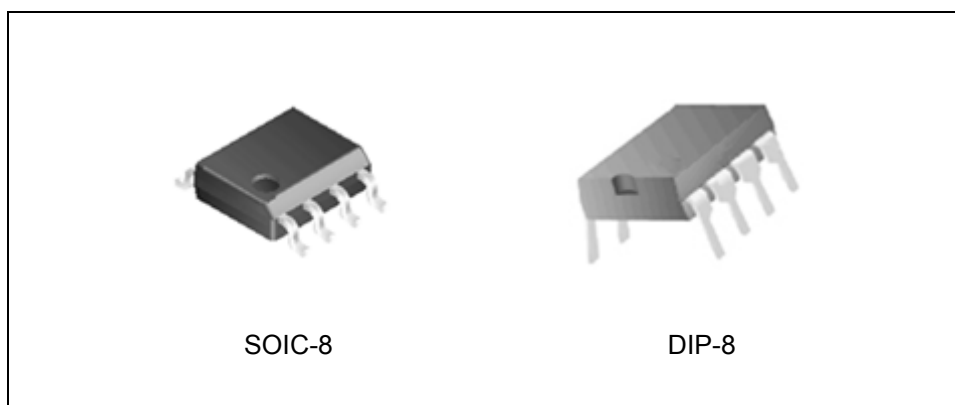


Figure 1. Package Types of AZ4558C

# DUAL BIPOLAR OPERATIONAL AMPLIFIERS

**AZ4558C**

## Pin Configuration

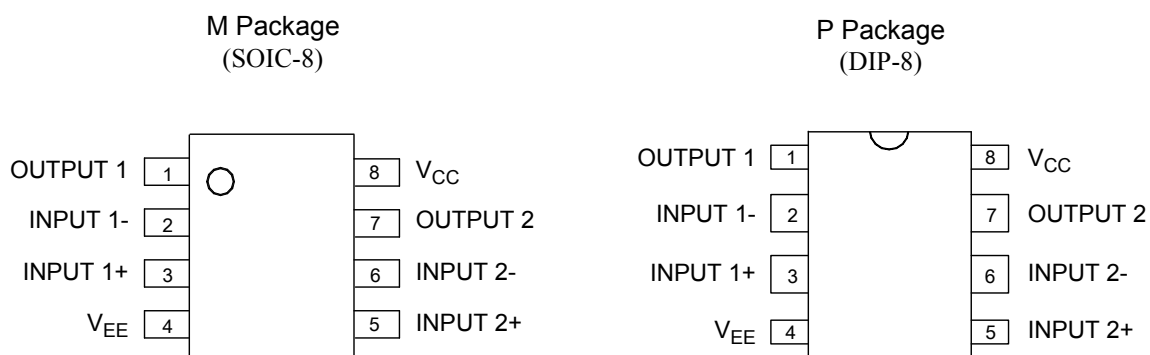


Figure 2. Pin Configuration of AZ4558C (Top View)

## Functional Block Diagram

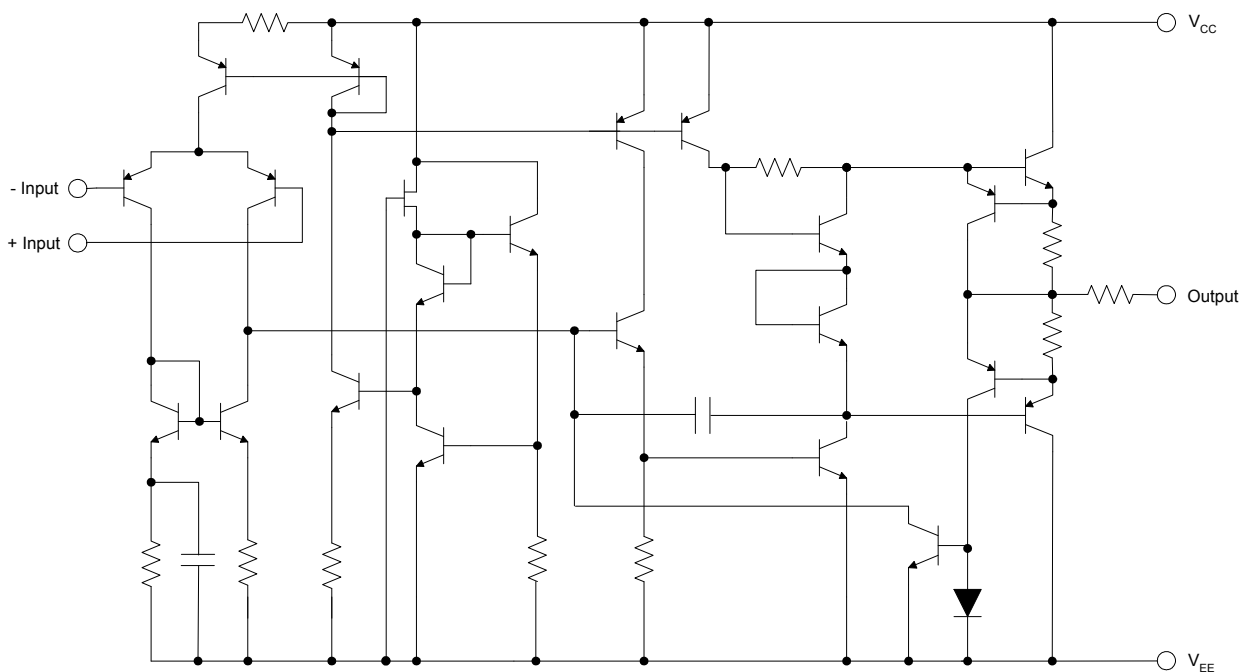


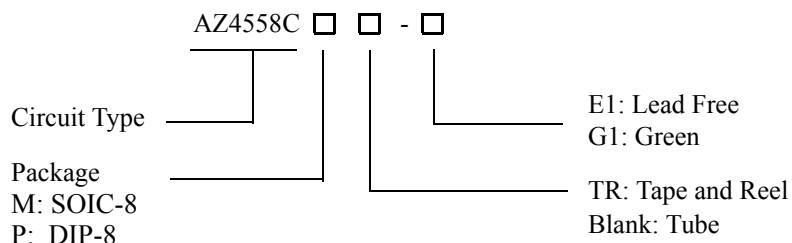
Figure 3. Functional Block Diagram of AZ4558C (Each Amplifier)



## DUAL BIPOLAR OPERATIONAL AMPLIFIERS

**AZ4558C**

### Ordering Information



| Package | Temperature Range | Part Number   |               | Marking ID  |             | Packing Type |
|---------|-------------------|---------------|---------------|-------------|-------------|--------------|
|         |                   | Lead Free     | Green         | Lead Free   | Green       |              |
| SOIC-8  | -40 to 85°C       | AZ4558CM-E1   | AZ4558CM-G1   | 4558CM-E1   | 4558CM-G1   | Tube         |
|         |                   | AZ4558CMTR-E1 | AZ4558CMTR-G1 | 4558CM-E1   | 4558CM-G1   | Tape & Reel  |
| DIP-8   | -40 to 85°C       | AZ4558CP-E1   | AZ4558CP-G1   | AZ4558CP-E1 | AZ4558CP-G1 | Tube         |

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green packages.

### Absolute Maximum Ratings (Note 1)

| Parameter                        | Symbol           | Value      |     | Unit |
|----------------------------------|------------------|------------|-----|------|
| Supply Voltage                   | V <sub>CC</sub>  | +20        |     | V    |
|                                  | V <sub>EE</sub>  | -20        |     |      |
| Input Voltage                    | V <sub>I</sub>   | ±15        |     | V    |
| Differential Input Voltage       | V <sub>ID</sub>  | ±30        |     | V    |
| Operating Junction Temperature   | T <sub>J</sub>   | 150        |     | °C   |
| Storage Temperature Range        | T <sub>STG</sub> | -65 to 150 |     | °C   |
| Lead Temperature (Soldering 10s) | T <sub>L</sub>   | 260        |     | °C   |
| Power Dissipation                | P <sub>D</sub>   | 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              | $\pm 2$ | $\pm 18$ | V    |
| Operating Temperature Range | -40     | 85       | °C   |



# DUAL BIPOLAR OPERATIONAL AMPLIFIERS

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        | $V_{ICM}$     |                                                            | $\pm 12$ |          |     | V                      |
| Common Mode Rejection Ratio            | CMRR          | $R_S \leq 10K\Omega$                                       | 70       | 95       |     | dB                     |
| Output Voltage Swing                   | $V_O$         | $R_L \geq 10K\Omega$                                       | $\pm 12$ | $\pm 14$ |     | V                      |
|                                        |               | $R_L \geq 2K\Omega$                                        | $\pm 10$ | $\pm 13$ |     |                        |
| Slew Rate                              | SR            | $V_I=\pm 10V$ , $R_L=2K\Omega$ , $C_L=100pF$ , unity gain  |          | 1.8      |     | V/ $\mu s$             |
| Rise Time                              | $T_R$         | $V_I=\pm 20mV$ , $R_L=2K\Omega$ , $C_L=100pF$ , unity gain |          | 0.3      |     | $\mu s$                |
| 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       |     | $\Omega$               |
| 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       |     |                        |
| Thermal Resistance (Junction to Case)  | $\theta_{JC}$ | DIP-8                                                      |          | 55       |     | $^{\circ}C/W$          |
|                                        |               | SOIC-8                                                     |          | 81       |     |                        |



## Typical Performance Characteristics

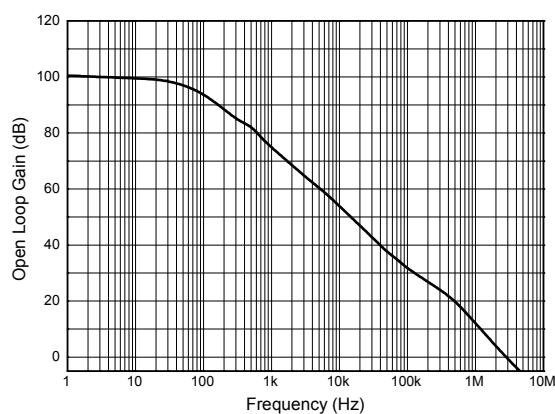


Figure 4. Open Loop Voltage Gain vs. Frequency

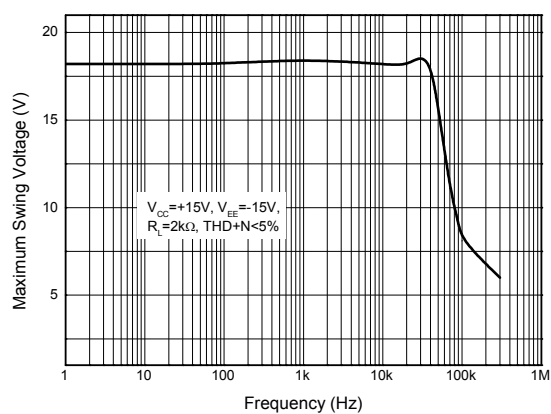


Figure 5. Maximum Output Voltage Swing vs. Frequency

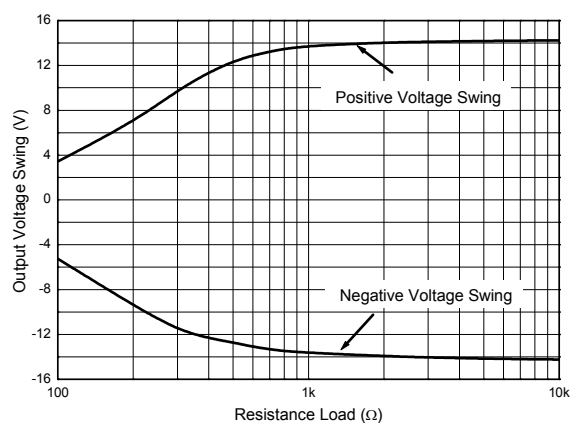


Figure 6. Maximum Output Voltage Swing vs. Load Resistance

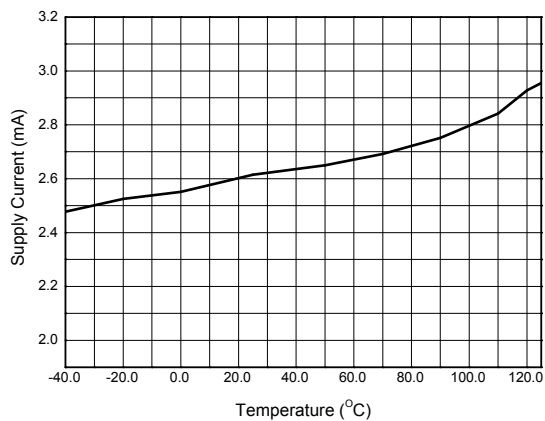


Figure 7. Supply Current vs. Temperature

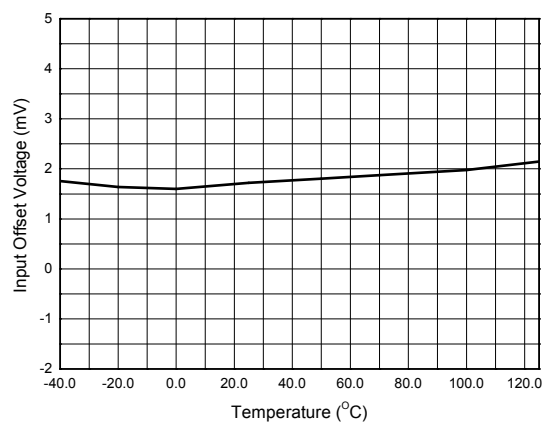
**DUAL BIPOLAR OPERATIONAL AMPLIFIERS****AZ4558C****Typical Performance Characteristics (Continued)**

Figure 8. Input Offset Voltage vs. Temperature

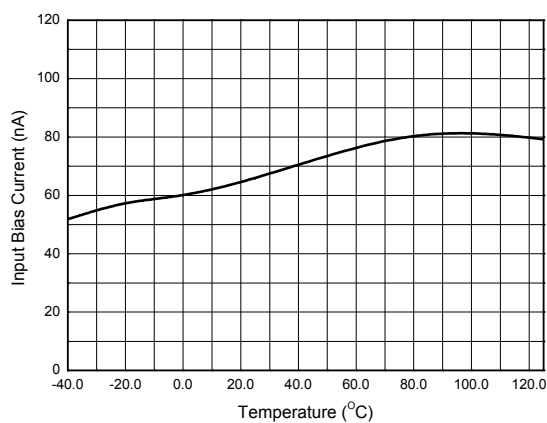


Figure 9. Input Bias Current vs. Temperature

### Typical Application

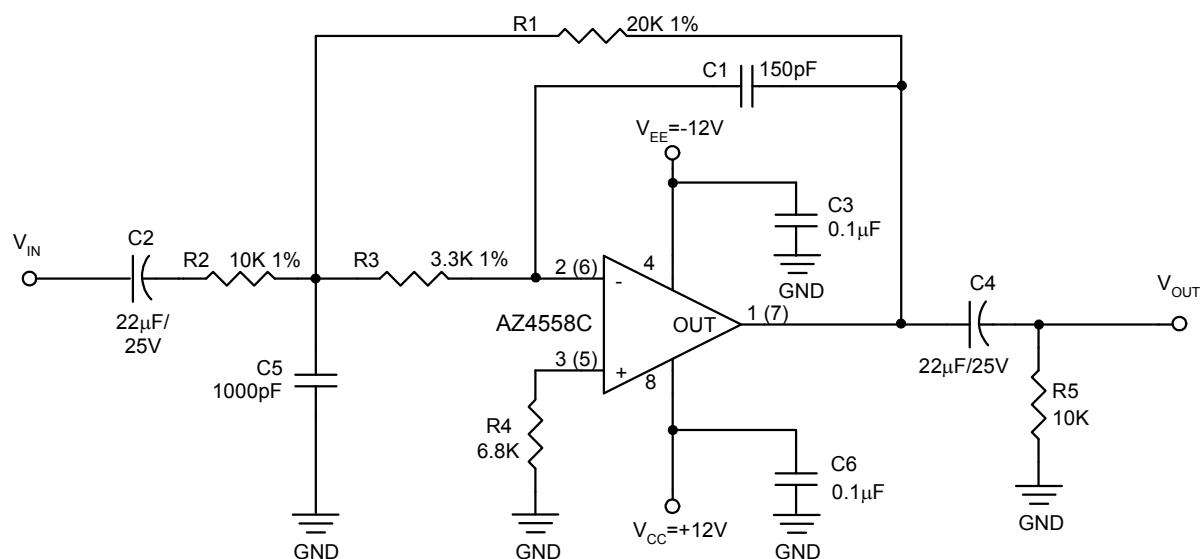
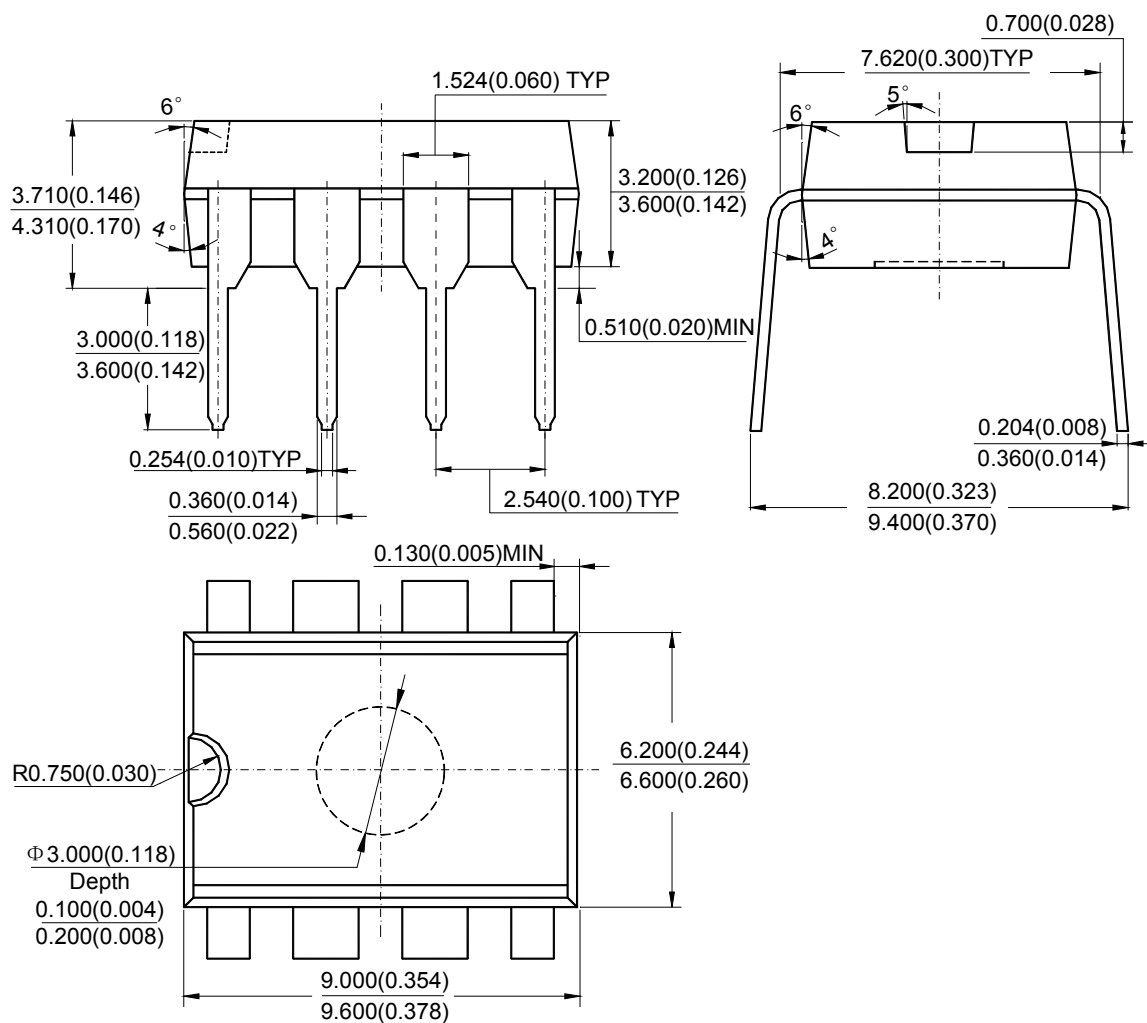
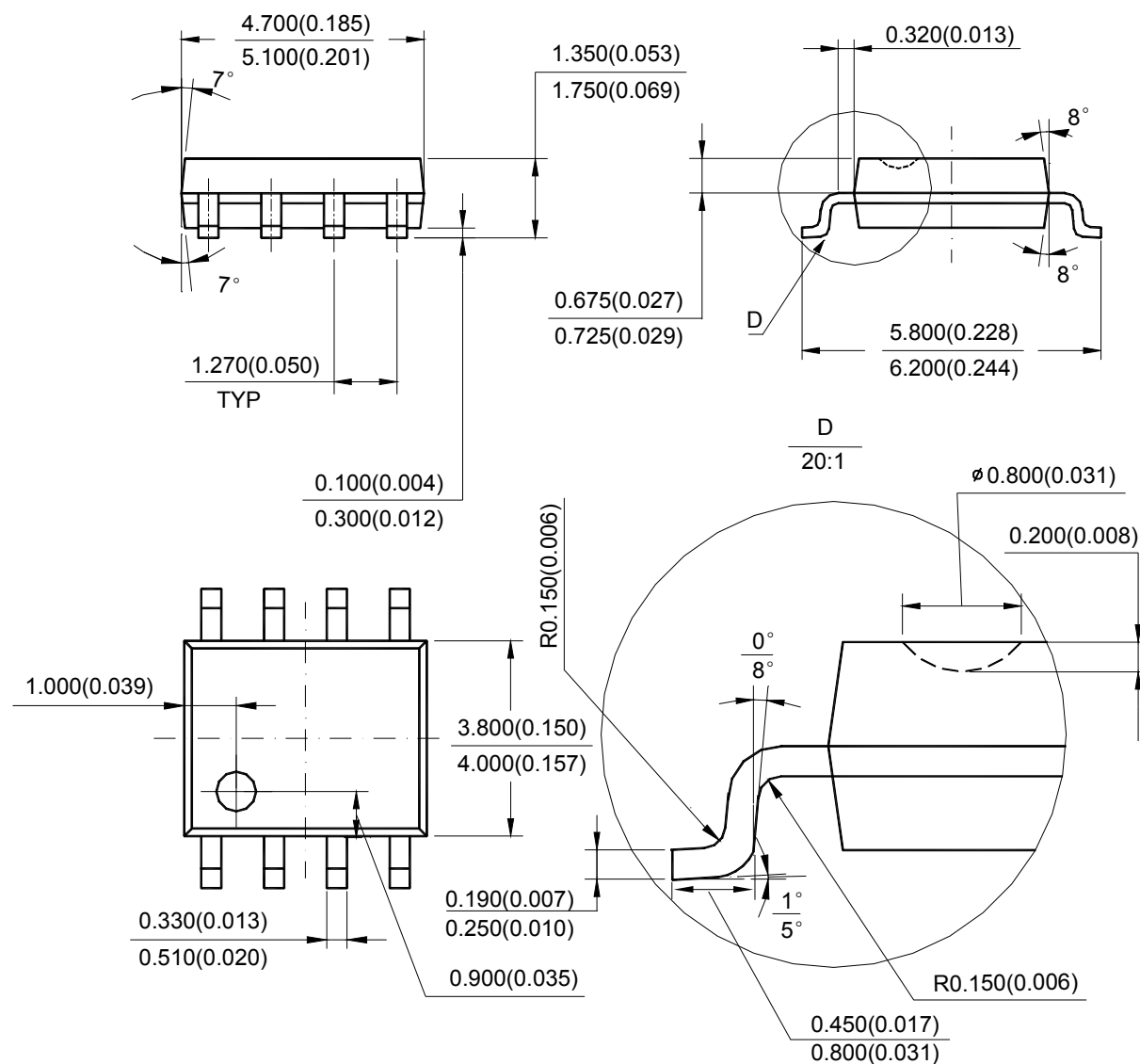


Figure 10. Typical Application of AZ4558C in Audio 2nd Order Low Pass Filter  
 ( $f_O=50.6$ kHz,  $Q=0.7015$ , Input impedance=10K, Gain=6dB, Group delay=4.48 $\mu$ s)

**DUAL BIPOLAR OPERATIONAL AMPLIFIERS****AZ4558C****Mechanical Dimensions****DIP-8****Unit: mm(inch)**

Note: Eject hole, oriented hole and mold mark is optional.

**DUAL BIPOLAR OPERATIONAL AMPLIFIERS****AZ4558C****Mechanical Dimensions (Continued)****SOIC-8****Unit: mm(inch)**

Note: Eject hole, oriented hole and mold mark is optional.



## **BCD Semiconductor Manufacturing Limited**

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