

## 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

## General Description

The GS4558 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 GS4558 is available in DIP-8 and SOP-8 packages.

## Applications

- Audio AC-3 Decoder System
- Audio Amplifier

## Pin Configuration

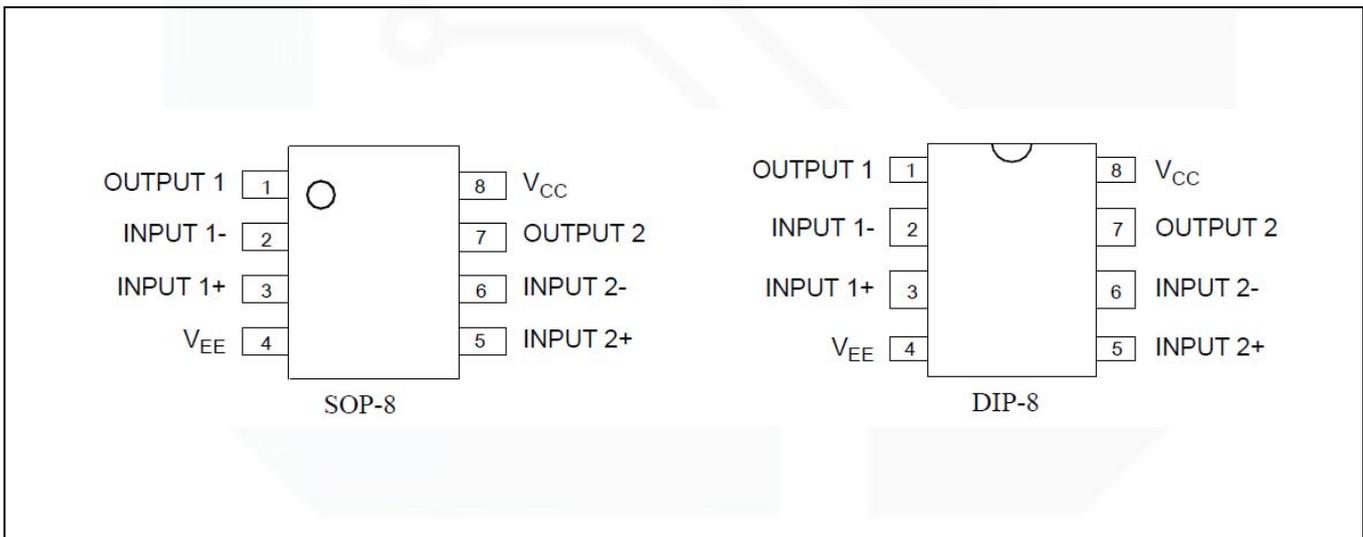


Figure 1. Pin Configuration of GS4558

Functional Block Diagram

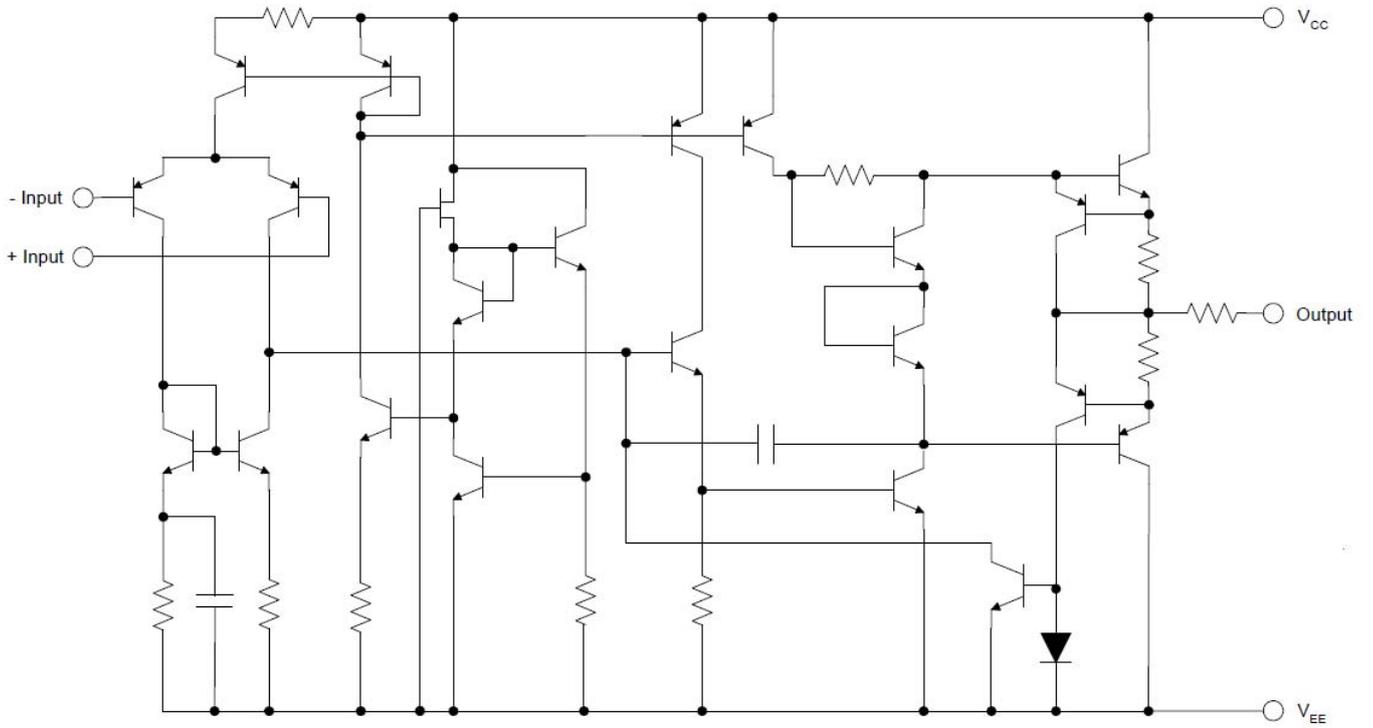


Figure 2. Representative Schematic Diagram of GS4558 (Each Amplifier)

**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
		SOP	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

**Package/Ordering Information**

MODEL	CHANNEL	ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	MARKING INFORMATION
GS4558	dual	GS4558-SR	SOP-8	Tape and Reel,4000	GS4558
		GS4558-DR	DIP8	20Tube(1000pcs)	GS4558

## 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		$^{\circ}C/W$
		SOP-8		81		

Typical Performance characteristics

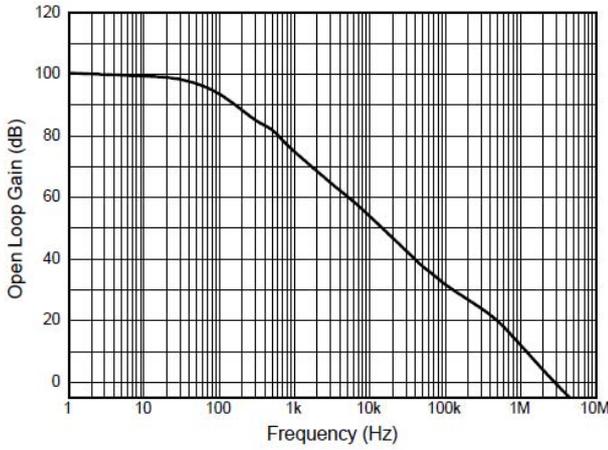


Figure 3. Open Loop Voltage Gain vs. Frequency

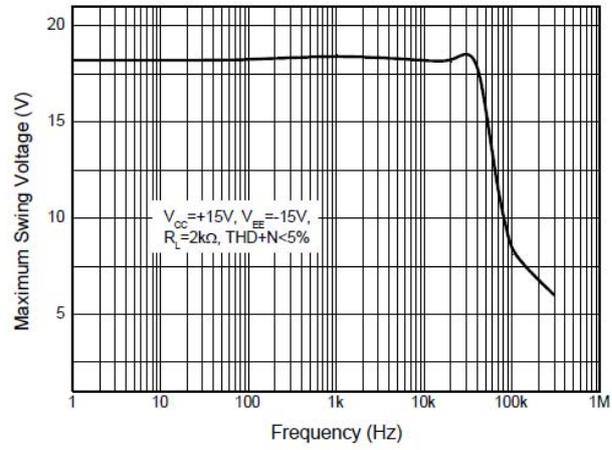


Figure 4. Maximum Output Voltage Swing vs. Frequency

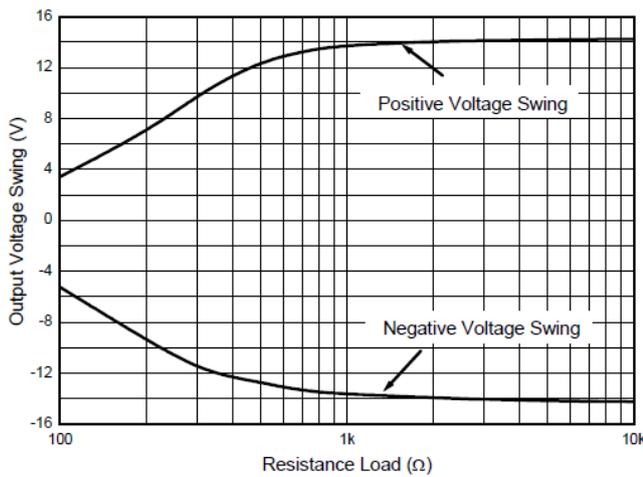


Figure 5. Maximum Output Voltage Swing vs. Load Resistance

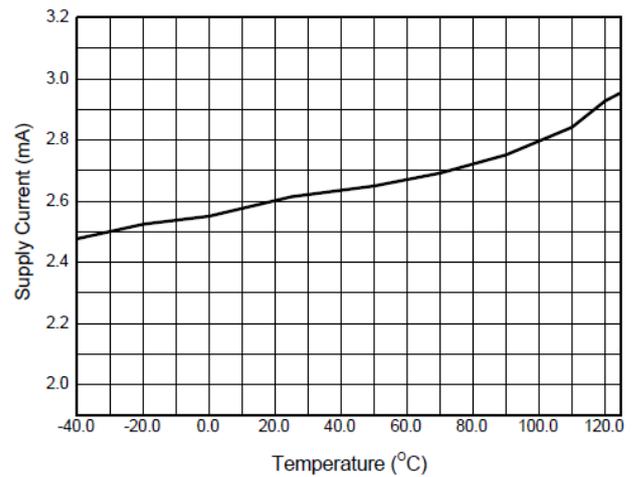


Figure 6. Supply Current vs. Temperature

Typical Performance Characteristics (Continued)

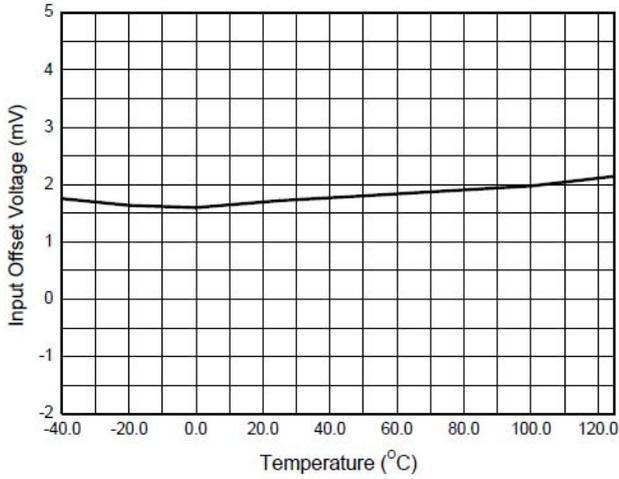


Figure 7. Input Offset Voltage vs. Temperature

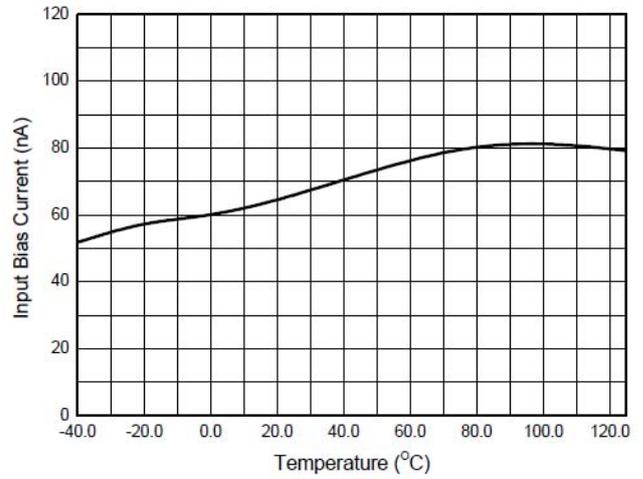


Figure 8. Input Bias Current vs. Temperature

Typical Applications

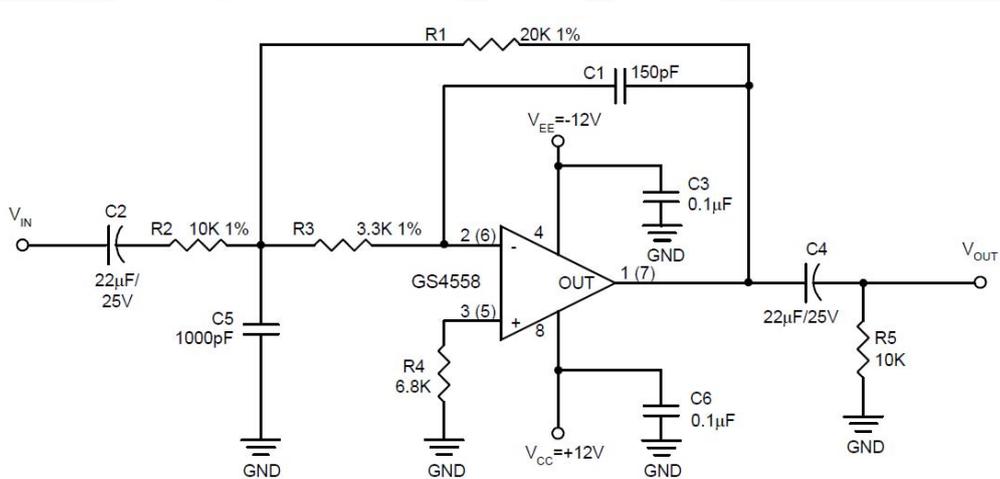
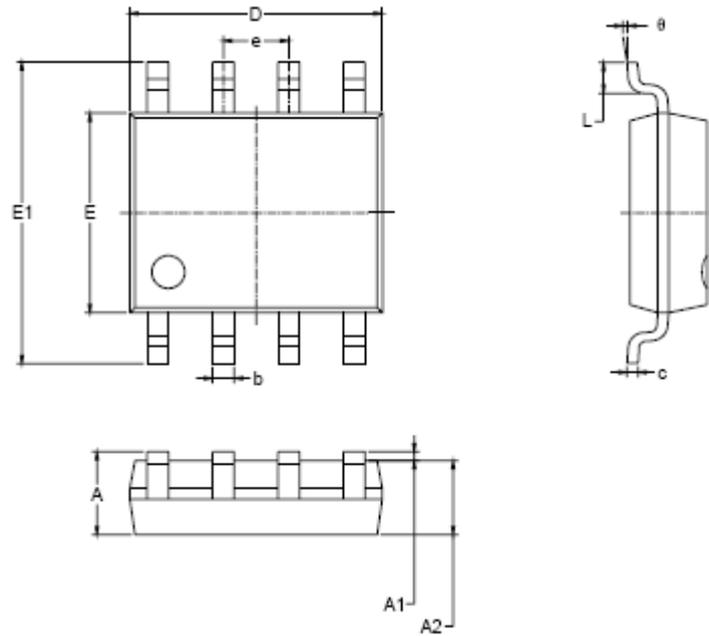


Figure 9. Typical Application of GS4558 in Audio 2nd Order Low Pass Filter  
( $f_o=50.6\text{kHz}$ ,  $Q=0.7015$ , Input impedance=10K, Gain=6dB, Group delay=4.48µs)

Package Information

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

