

Low Power Dual Operational Amplifier

Features

- Large DC Voltage Gain: 100dB
- Internal Frequency Compensation
- Operating Voltage: 15V(Max.)
- Low Input Bias Current: 500nA(Typ.)
- High Input Impedance: 5MΩ (Typ.)
- Unit Gain Bandwidth: 4.0MHz
- Low Input Offset Voltage and Current
- Suitable Pin Arrangement for Application

Applications

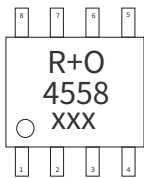
- Active Filter
- Compensation Amplifier
- Audio Preamplifier
- Electronic Instruments

General Description

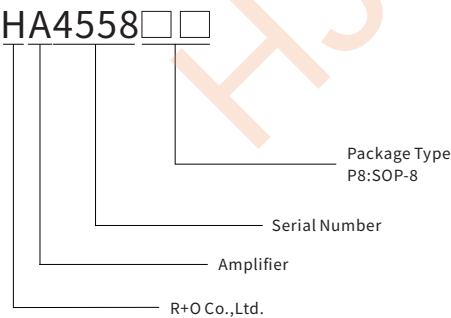
HA4558 is a low noise, high gain, dual channel operational amplifier, which is internally compensate and built on a single silicon chip by using advanced epitaxial technology. It is suitable for single power supply with wide power supply voltage range, and also suitable for dual power supply working mode. Under the recommended working conditions, the power supply current is independent of the power supply voltage.

The application range of HA4558 includes active filter, compensation amplifier, audio preamplifier, equalization amplifier, and various linear amplifiers in electronic instruments.

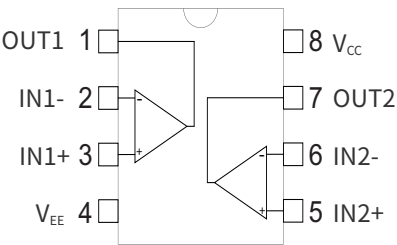
Reference News



Part Numbering



Pin Configuration



Ordering Information

Order Number	Package	Package Code	Unit Weight(g)	Reel(pcs)	Box(pcs)	Carton(pcs)	Delivery Mode	MSL
HA4558P8	SOP-8	R3	0.077	4000	8000	80000	13"	3

● Pin Description

Pin Number	Pin Name	Functional Description	Pin Number	Pin Name	Functional Description
1	OUT 1	Output of operational amplifier 1	5	IN 2+	Positive input of of operational amplifier 2
2	IN 1-	Negative input of of operational amplifier 1	6	IN 2-	Negative input of of operational amplifier 2
3	IN 1+	Positive input of of operational amplifier 1	7	OUT 2	Output of operational amplifier 2
4	V _{EE}	Negative power supply	8	V _{CC}	Positive power supply

● Functional Block Diagram

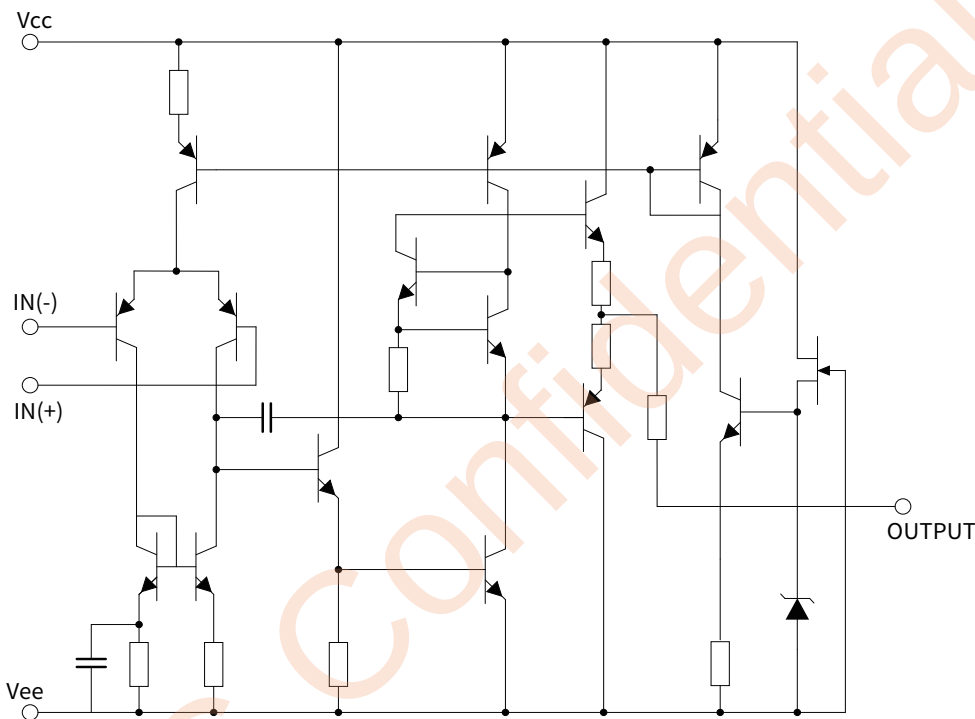


Figure 1.Internal Block Diagram

● Absolute Maximum Ratings (T_A=25°C Unless otherwise specified.)

Parameter	Symbol	Value	Unit
Supply Voltage	V _{CC} / V _{EE}	±16	V
Differential Input Voltage	V _{ID}	±30	V
Input Voltage	V _{IC}	±15	V
Power Dissipation	P _D	350	mW
Operating Temperature Range	T _{OPR}	-40 to 85	°C
Storage Temperature Range	T _{STG}	-65 to 150	°C

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime. Electrostatic discharge can also cause damage to chips, so it is suggested to take some preventive measures for integrated circuits. Failure to follow proper handling and installation can also cause damage. Precision HA4558 Series and other devices are more vulnerable to damage than ordinary devices in the case of tiny electrostatic, and small parameter changes may make the whole circuit performance substandard.

● **Electrical Characteristics** (Unless otherwise specified: $V_{CC} = 15V$, $V_{EE} = -15V$, $T_A = 25^\circ C$.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AC Characteristics						
Gain-Bandwidth Product	GBW	$V_i = 10mV$, $R_L = 2k\Omega$ $C_L = 100pF$, $f = 100kHz$	--	4.0	--	MHz
Slew Rate	SR	$V_{CC}/V_{EE} = \pm 10V$, $R_L = 2k\Omega$, $C_L = 100pF$	1.2	1.8	--	V/ μs
Input Voltage Noise	e_N	$R_S = 1k\Omega$, $f = 30kHz$ LPF	--	12	--	nV
Channel Separation	V_{o1}/V_{o2}	--	--	105	--	dB
DC Characteristics						
Supply Current	I_{CC}	$T_A = 25^\circ C$	--	3.5	5.6	mA
Input Offset Voltage	V_{OS}	$R_S < 10k\Omega$	--	2	6.0	mV
Input Bias Current	I_B	--	--	30	500	nA
Input Offset Current	I_{OS}	$I^+ - I^-$	--	5	200	nA
Large Signal Voltage Gain	A_V	$V_{OP-P} = \pm 10V$, $R_L < 2k\Omega$	80	100	--	dB
Power Supply Rejection Ratio	PSRR	$R_S \leq 10k\Omega$	76	90	--	dB
Input Characteristics						
Common-mode Input Voltage Range	V_{CMR}	--	± 12	± 13	--	V
Common Mode Rejection Ratio	CMRR	$R_S \leq 10k\Omega$	70	90	--	dB
Input Impedance	R_{IN}	--	0.3	5	--	M Ω
Input Capacitance	C_i	--	--	1.4	--	pF
Output Characteristics						
Output Impedance	R_O	--	--	75	--	Ω
Output Short Circuit to Ground	I_{SC} / I_{OS}	$V_{CC} = 16V$	20	40	--	mA
Output Voltage Swing	V_{OH}	$R_L > 10k\Omega$	± 12	± 14	--	V
	V_{OL}	$R_L > 2k\Omega$	± 10	± 13	--	V

● **Typical Performance Characteristics**(Unless otherwise specified: $T_A = 25^\circ\text{C}$.)

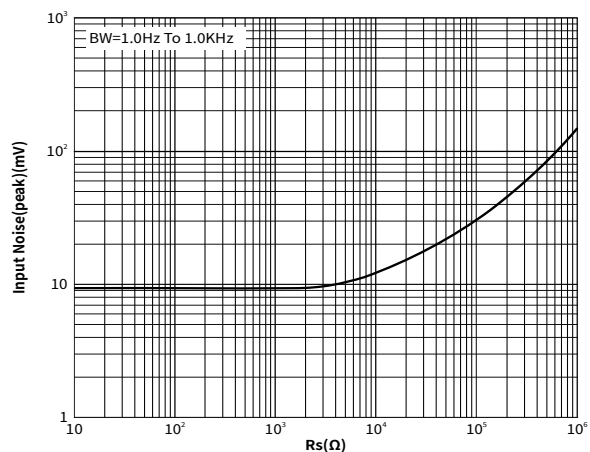
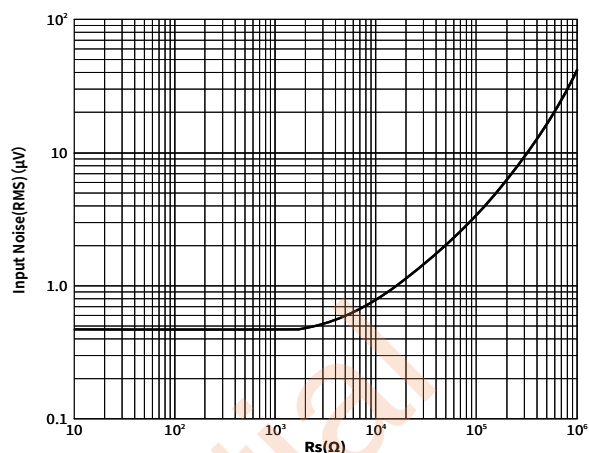
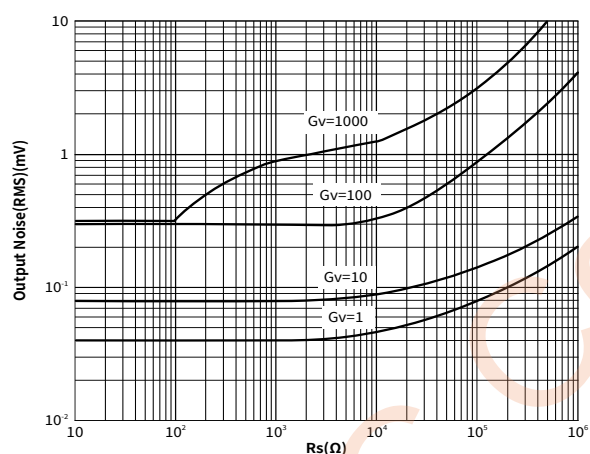
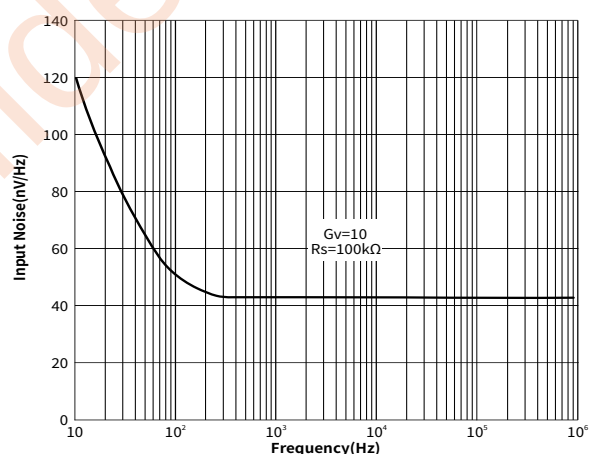
Fig.2 Burst Noise vs. R_s Fig.3 RMS Noise vs. R_s Fig.4 Output Noise vs. R_s 

Fig.5 Spectral Noise Density

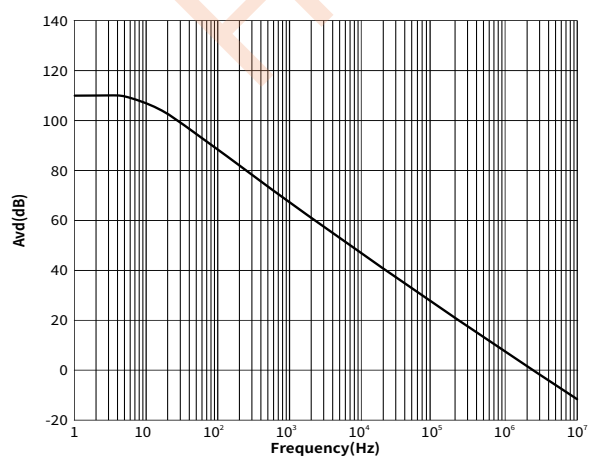


Fig.6 Open-Loop Frequency Response

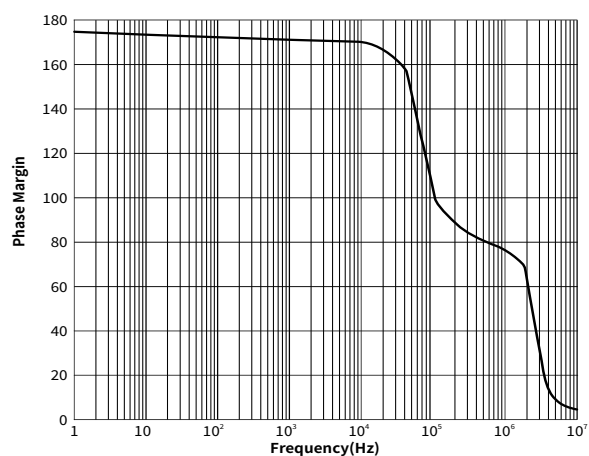
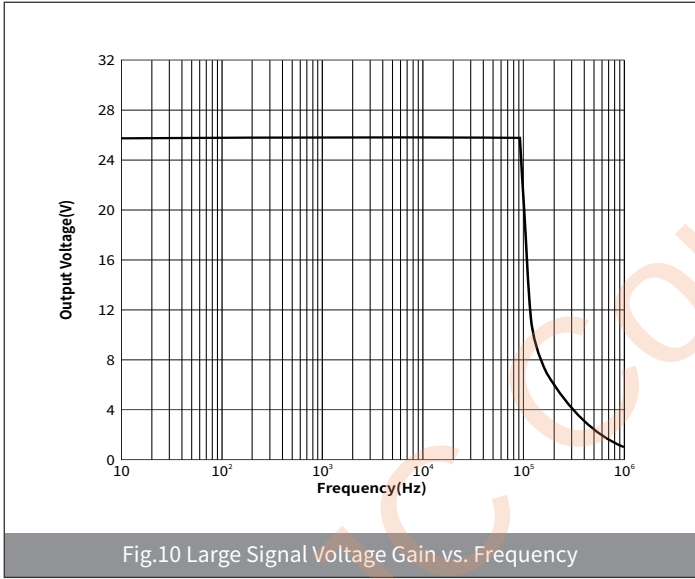
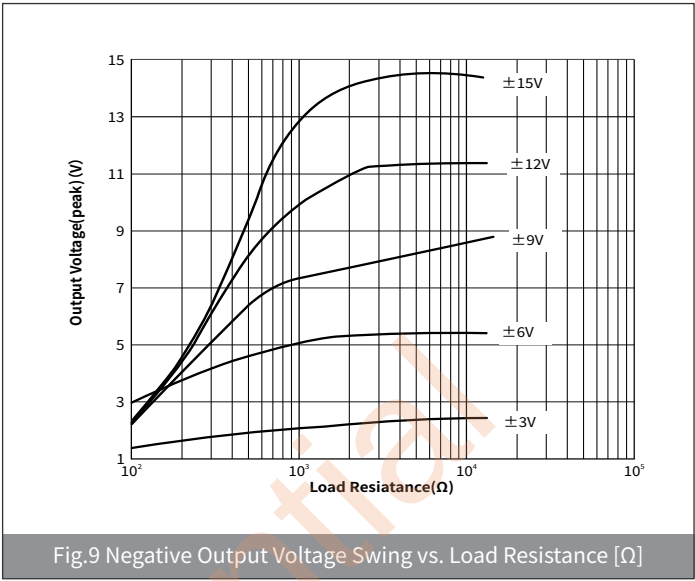
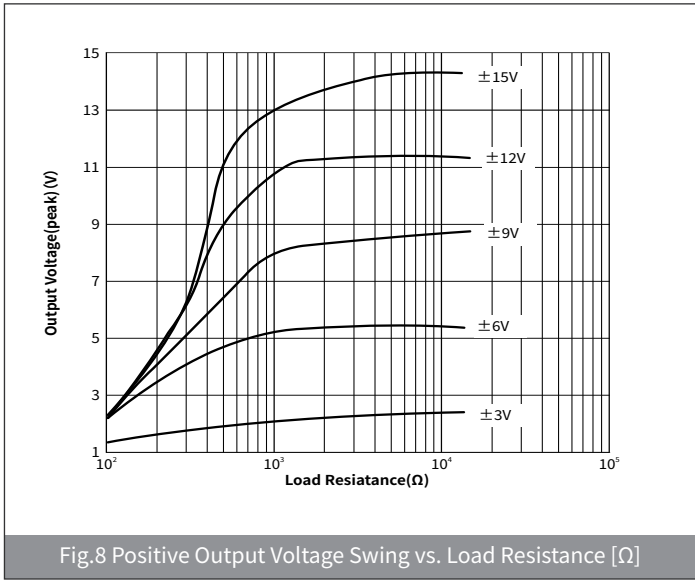
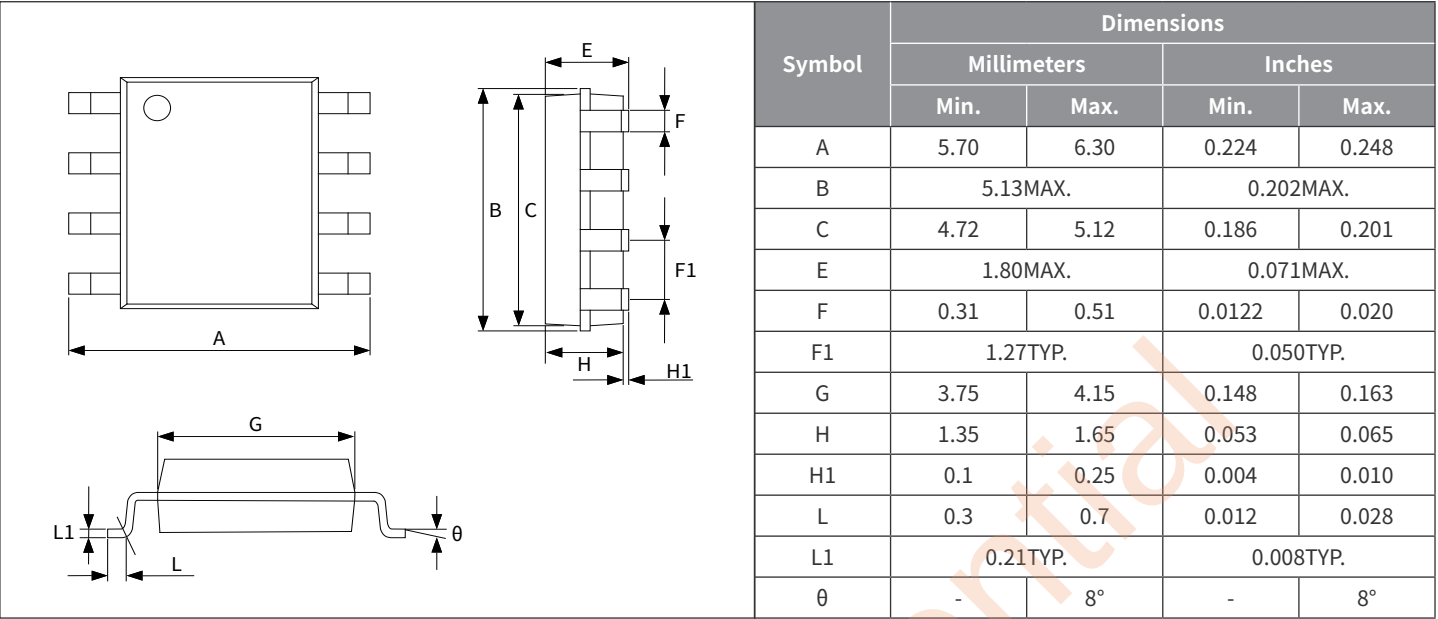


Fig.7 Phase Margin vs. Frequency

● Typical Performance Characteristics(Unless otherwise specified: $T_A=25^{\circ}\text{C}$.)



● Package Outline Dimensions (SOP-8)



● Suggested Pad Layout

