



GW2308

Dual Class AB Audio Power Amplifier

Product Specification

Specification Revision History:

Version	Date	Description
2013-11-A1	2013-11	New
2019-04-A2	2019-04	Replace the new template
2022-01-A3	2022-01	Modify Ordering Information
2023-12-A4	2023-12	Modify Ordering Information



1、General Description

GW2308 is a Class AB stereo headphone driver chip utilizing CMOS Technology specially designed for portable digital audio applications. It has lower power consumption and lower harmonic distortion. Under a 8 ohm load, when THD = 10%, the single channel can provide 300mW of output power, it mainly used in the Walkman, portable audio, HI-FI sound system, CD-ROM.

Features:

- Wide temperature range
- Excellent power supply ripple rejection
- Low static operating current
- Low harmonic distortion, THD=0.03%
- High output gain
- Package form: SOP8

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
GW2308SA8.TB	SOP8	GW2308	100 PCS/tube	100 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 1.27mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
GW2308SA8.TR	SOP8	GW2308	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 1.27mm

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.



2、Block Diagram And Pin Description

2.1、Block Diagram

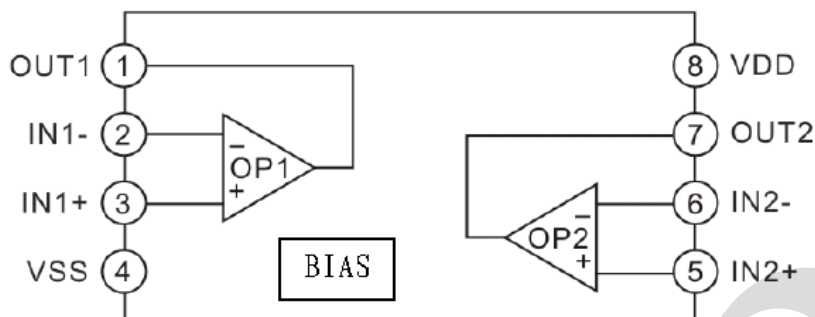


Figure1

2.2、Pin Configurations

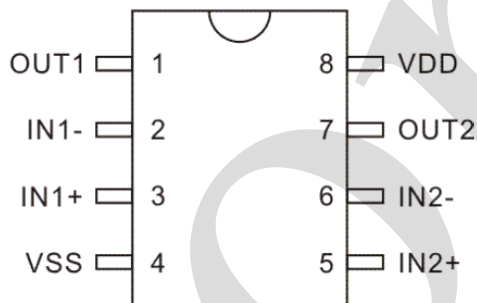


Figure2

2.3、Pin Description

Pin No.	Pin Name	Description
1	OUT1	Output 1
2	IN1-	Inverting input 1
3	IN1+	Non-inverting input 1
4	VSS	Negative power supply
5	IN2+	Non-inverting input 2
6	IN2-	Inverting input 2
7	OUT2	Output 2
8	VDD	Positive power supply



3、Electrical Parameter

3.1、Absolute Maximum Ratings (Tamb=25°C, All voltage referenced to V_{SS}, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Power Supply Voltage	V _{DD}	8.0	V
Operating Temperature	T _{opr}	-40~85	°C
Storage Temperature	T _{stg}	-65~150	°C

3.2、Electrical Characteristics

3.2.1 DC Characteristics 1

(Tamb=25°C, V_{DD}=5V, V_{SS}=0V, fin=1 KHz, R_L=8Ω, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage	V _{DD}	-	2.7	5	5.5	V
Supply current	I _{DD}	No load	-	3	4	mA
Input offset voltage	V _{I(OS)}	-	-	5	50	mV
Total harmonic distortion	THD+N	P _O =200mW, R _L =8Ω, f=1KHz	-	0.04	0.1	%
		P _O =120mW, R _L =16Ω, f=1KHz	-	0.03	0.06	
Maximum output power	P _O	THD=0.2%, f=1KHz, R _L =8Ω	200	250	-	mW
		THD=0.2%, f=1KHz, R _L =16Ω	100	130	-	
		THD=10%, f=1KHz, R _L =8Ω	250	300	-	
		THD=10%, f=1KHz, R _L =16Ω	160	190	-	
Output noise	V _N	-	-	20	50	μV

3.2.2 DC Characteristics 2

(Tamb=25°C, V_{DD}=3V, V_{SS}=0V, fin=1 KHz, R_L=8Ω, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply current	I _{DD}	-	-	2	3	mA
Input offset voltage	V _{I(OS)}	-	-	5	50	mV
Total harmonic distortion	THD+N	P _O =200mW, R _L =8Ω, f=1KHz	-	0.02	0.05	%
		P _O =120mW, R _L =16Ω, f=1KHz	-	0.02	0.05	
Maximum output power	P _O	THD=0.2%, f=1KHz, R _L =8Ω	60	80	-	mW
		THD=0.2%, f=1KHz, R _L =16Ω	40	50	-	
		THD=10%, f=1KHz, R _L =8Ω	70	100	-	
		THD=10%, f=1KHz, R _L =16Ω	55	70	-	
Output noise	V _N	-	-	20	50	μV



4、Function Description

The GW2308 is a low voltage amplifier with working voltage of 5V, it is always used by a headset and a low power speaker with a load of 8 ohm. It's circuit mechanism is very similar to the typical OPAMP. (The following diagram shows the basic application circuit as a reverse amplifier).

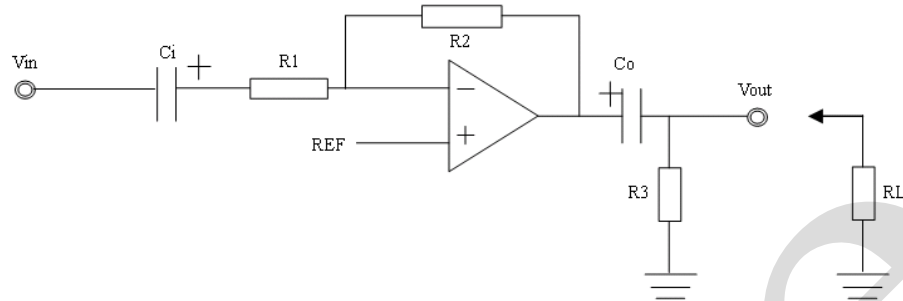


Figure3

4.1、Gain Setting

The magnification of the reverse amplifier is $R2 / R1$. Take care that the GW2308 has a maximum operating voltage of 5V and the voltage gain setting needs to be based on the magnitude of the input stage. Excessive voltage gain can cause output clipping.

4.2、VREF

For GW2308 handles a single signal, in order to achieve the best performance for the output, it is recommended that $VREF = 1 / 2VDD$.

4.3、Input coupling capacitor Ci

In a typical application circuit, this coupling capacitor Ci is used to transfer the input signal to the GW2308, which prevents the DC bias of the GW2308 from following the input signal, thus, user should pay attention to the voltage difference and polarity.

In the typical application diagram, Ci and R1 constitute a high-pass filter, minimum cutoff frequency was decided by

$$f_c(\text{highpass}) = 1 / 2\pi R1 C_i$$

The following figure shows the input frequency response graph when Ci is different:

$$C_i = 10\mu F / 1\mu F / 0.47\mu F / 0.22\mu F / 0.1\mu F$$

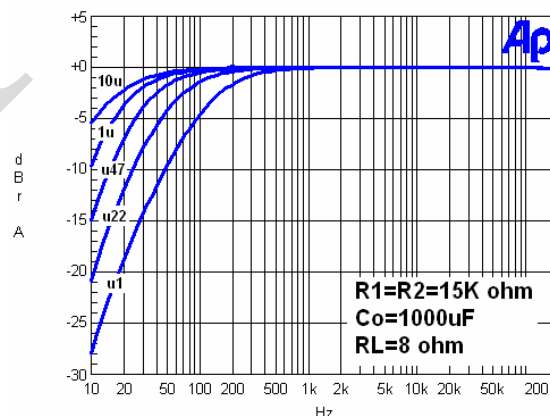


Figure4



4.4、 Output coupling capacitor Co

The single-input single-output structure generates a DC bias at the output of the amplifier, so an output coupling capacitor must be supplied at the output to avoid DC bias transmission to the load and the RL of the signal terminal. The minimum cutoff frequency needs to be adjusted according to the different load (speaker or headset). And the input coupling capacitor is similar to the output coupling capacitor and load impedance to form a high-pass filter, minimum cutoff frequency was decided by

$$f_c(\text{highpass}) = 1/2\pi R L C_o$$

The following figure shows the output frequency response when Co is different:

$$C_o = 1000\mu\text{F}/470\mu\text{F}/220\mu\text{F}/100\mu\text{F}$$

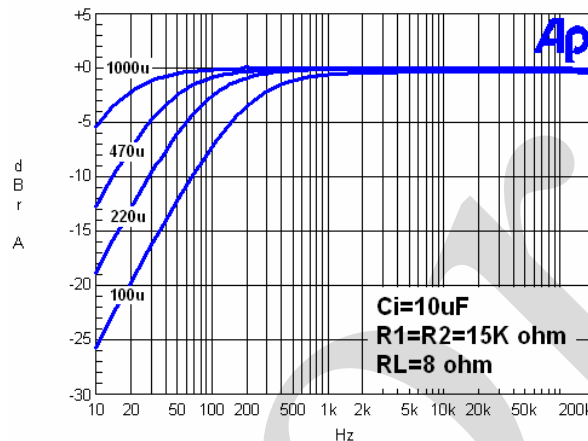


Figure5

4.5、 Discharge resistance R3

When the circuit is powered up, the output coupling capacitor C_o will charge, when V_{out} is not connected to the load, the output is a DC level, this time, if an input connected to the output (commonly used circuit is usually a speaker or headset) Capacitor C_o will discharge to the load, which will cause a lot of POP sound, so it is recommended to connect R_3 to adjust C_o discharge.

C_o 's charging time is $T = C_o R_3$.

In order to suppress the POP sound, it is recommended that the resistance value of R_3 is $1\text{K}\Omega \sim 10\text{K}\Omega$. R_3 can be ignored unless the load (eg speaker) is permanently connected to the load side.



5、Typical Application Circuit

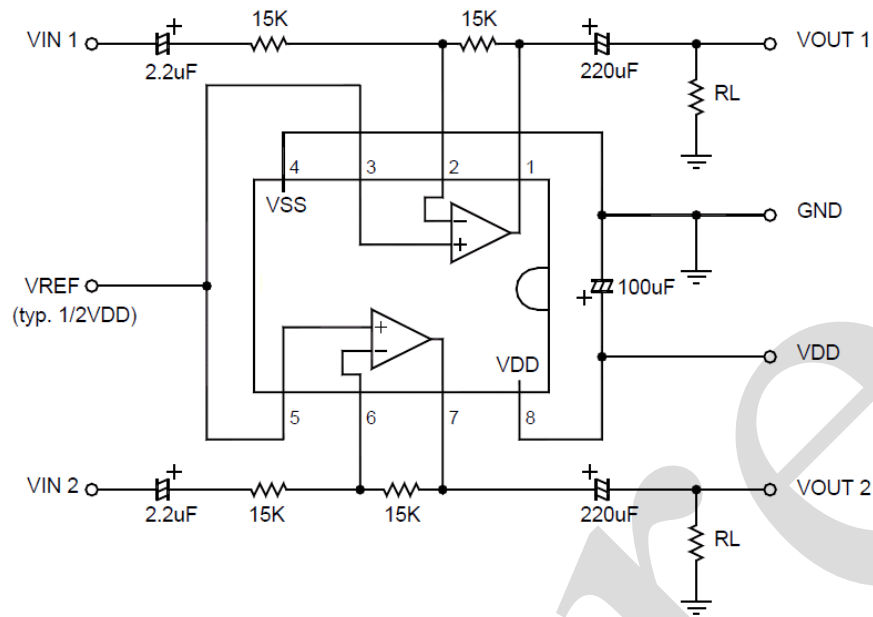
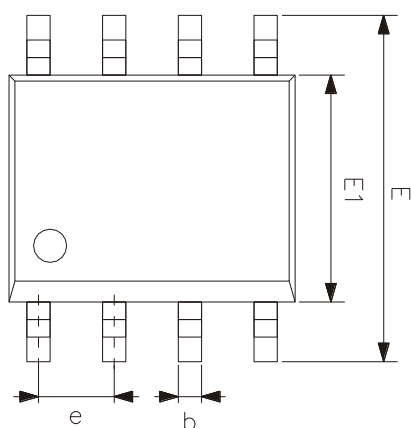
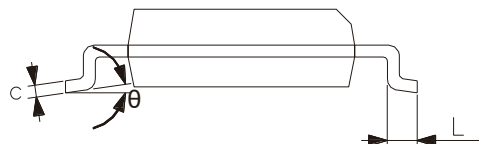
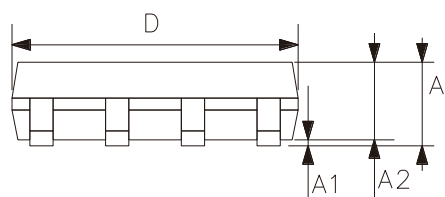


Figure6



6、Package Information

6.1、SOP8



Symbol	Dimensions (mm)	
	Min.	Max.
A	1.35	1.80
A1	0.05	0.25
A2	1.25	1.55
D	4.70	5.10
E	5.80	6.30
E1	3.70	4.10
b	0.306	0.51
c	0.19	0.25
e	1.27	
L	0.40	0.89
θ	0 °	8 °



7、Statements And Notes:

7.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

7.2、Notion:

Recommended carefully reading this information before the use of this product;

The information in this document are subject to change without notice;

This information is using to the reference only, the company is not responsible for any loss;

The company is not responsible for the any infringement of the third party patents or other rights of the responsibility.



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