

# AN5272

## 4.0 W × 2 (18 V, 8 Ω) Power Amplifier with Variable Audio Output and Volume Control

### ■ Overview

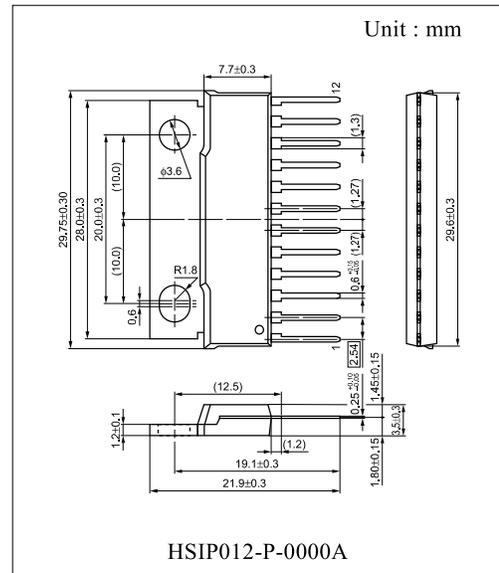
The AN5272 is a monolithic integrated circuit designed for 4.0 W (18 V, 8 Ω) output audio power amplifier. It is a dual channel SEPP IC suitable for stereo operation in TV application.

### ■ Features

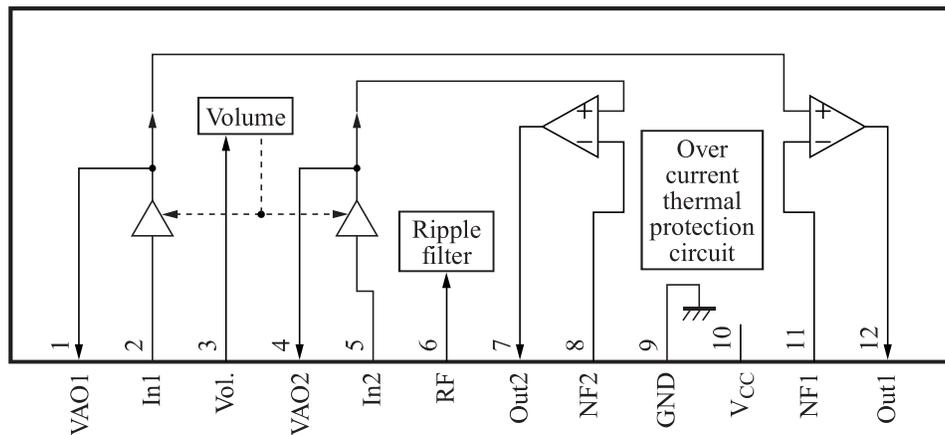
- Built-in DC volume control
- Built-in thermal protection circuit
- Built-in over current protection circuit
- 2 Variable Audio Output (VAO)
- V<sub>CC</sub> operating range : 12.2 V to 27.5 V

### ■ Applications

- TV



### ■ Block Diagram



### ■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Variable audio output 1	7	Ch.2 output
2	Ch.1 input	8	Negative feedback ch.2
3	Volume control	9	GND
4	Variable audio output 2	10	V <sub>CC</sub>
5	Ch.2 input	11	Negative feedback ch.1
6	Ripple filter	12	Ch.1 output

### ■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	30	V
Supply current	I <sub>CC</sub>	3.5	A
Power dissipation *2	P <sub>D</sub>	37.5	W
Operating ambient temperature *1	T <sub>opr</sub>	-25 to +75	°C
Storage temperature *1	T <sub>stg</sub>	-55 to +150	°C

Note) \*1 : T<sub>a</sub> = 25 °C except power dissipation, operating ambient temperature and storage temperature.

\*2 : Power dissipation of the package at T<sub>a</sub> = 75 °C.

### ■ Recommended Operating Range

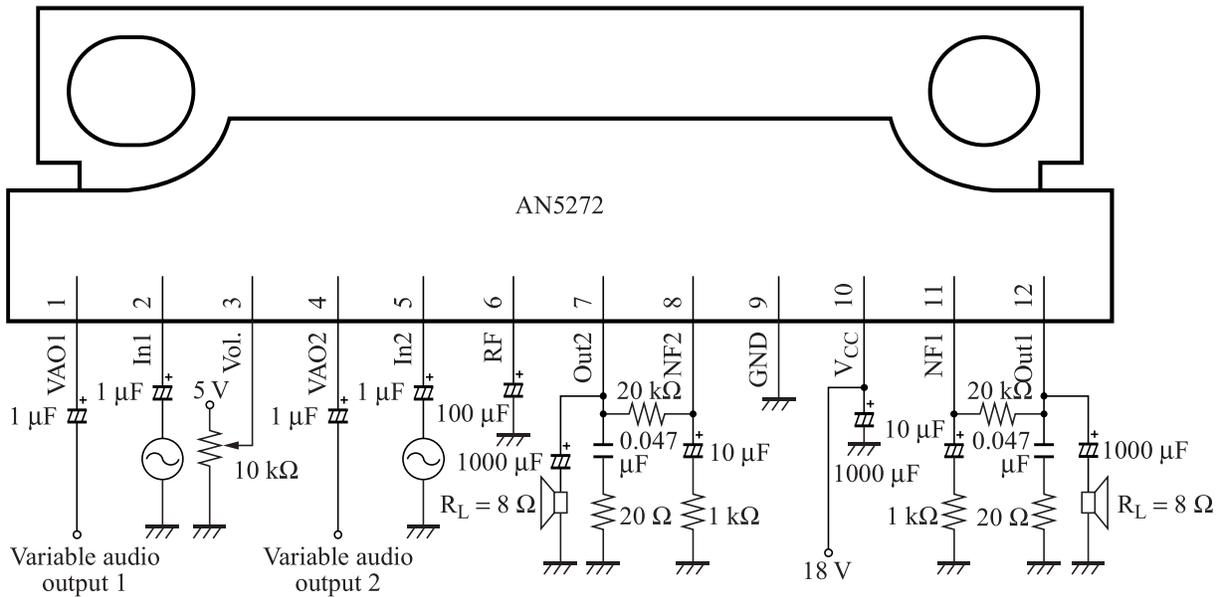
Parameter	Symbol	Range	Unit
Supply voltage	V <sub>CC</sub>	12.2 to 27.5	V

### ■ Electrical Characteristics at V<sub>CC</sub> = 18 V, f = 1 kHz, R<sub>L</sub> = 8 Ω, T<sub>a</sub> = 25 °C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent current	I <sub>CQ</sub>	No input signal	17	25	33	mA
Voltage gain	G <sub>V</sub>	V <sub>IN</sub> = 90 mV	28	30	32	dB
Total harmonic distortion *1	THD	V <sub>IN</sub> = 90 mV		0.3	1.0	%
Output power *1	P <sub>O</sub>	THD = 10 %	3.6	4.1		W
Channel balance	CB	V <sub>IN</sub> = 90 mV	-1	0	1	dB
Max. volume attenuation *1	Att	V <sub>IN</sub> = 90 mV		-70	-64	dB
VAO voltage gain	G <sub>VAO</sub>	V <sub>IN</sub> = 90 mV	10	12	14	dB
Output noise voltage *1	V <sub>NO</sub>	R <sub>g</sub> = 10 kΩ, Din-Audio Filter		0.6	1.0	mV[rms]

Note) \*1 : With a filter band from 20 Hz to 20 kHz used.

■ Application Circuit Example

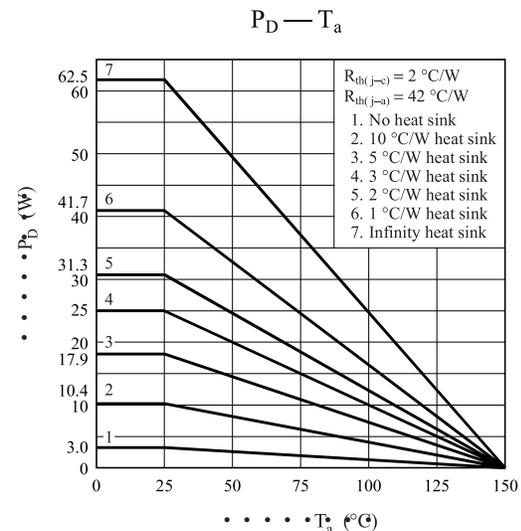
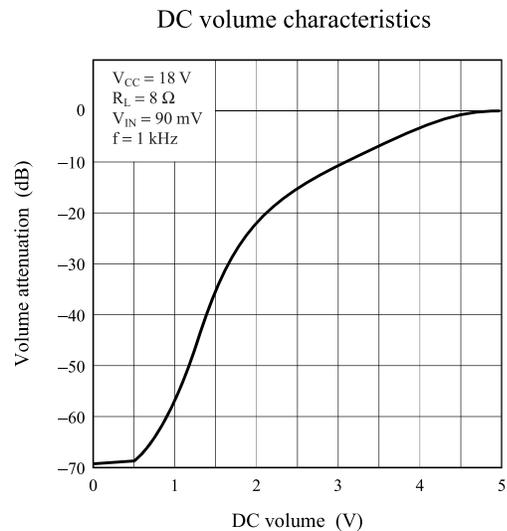
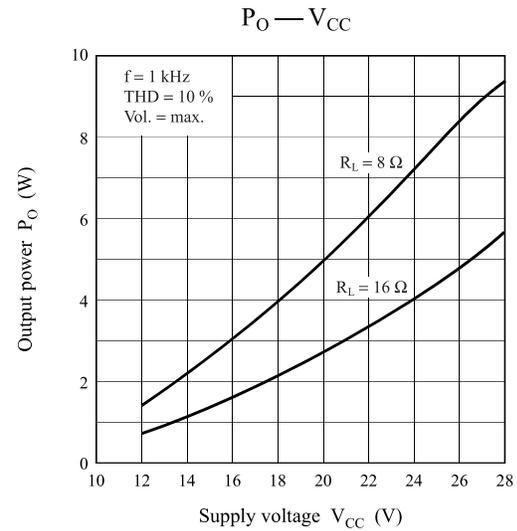
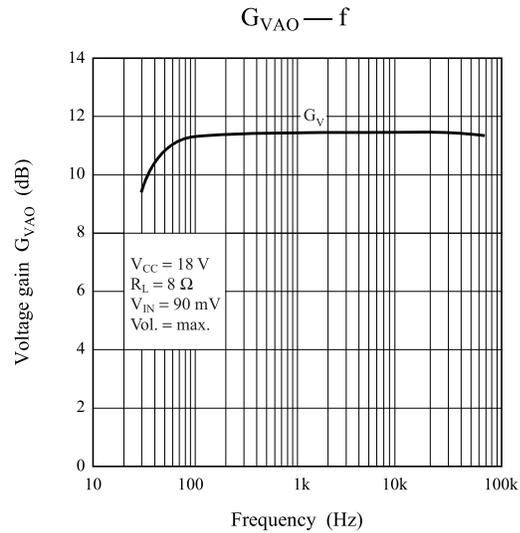
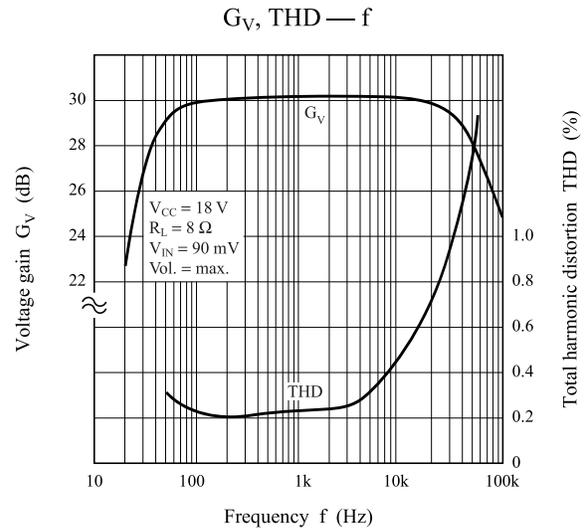
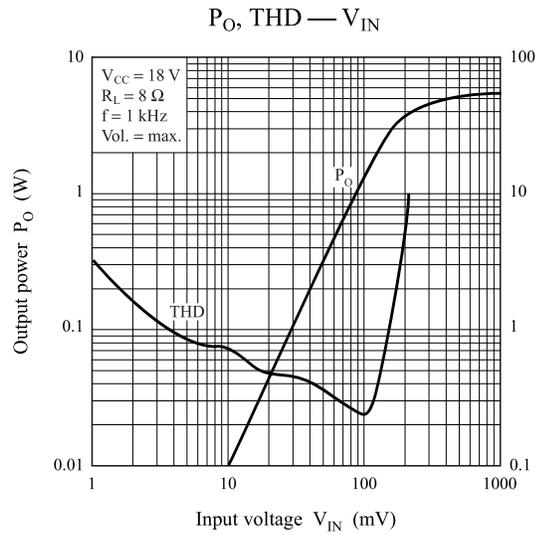


■ Usage Notes

- 1) Depending on the maximum application output power, external heatsink may be needed.  
External heatsink should be fixed to the chassis.
- 2) Fin of the IC can be connected to GND.
- 3) Please prevent output to  $V_{CC}$  short and output to GND short.
- 4) The temperature protection circuit will operate at  $T_j$  around 150 °C. However, if the temperature decreases, the protection circuit would automatically be deactivated and resume normal operation.

■ Technical Information

1.Characteristic Curve Chart

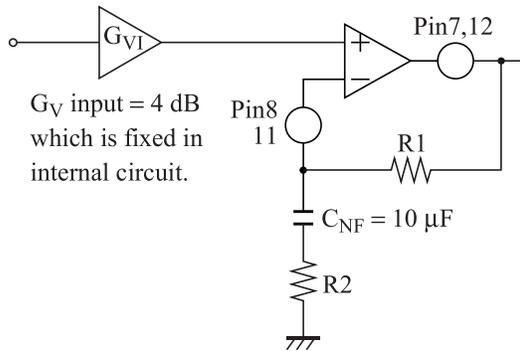


■ Technical Information (continued)

2. Application Note

1) Voltage gain

The voltage gain of the AN5272 can be varied by changing the resistor R2 as shown below :



R1 is always fixed at 20 kΩ.

R2 is variable.

$$G_{VO} = 20 \log (R_1/R_2)$$

Typical values are : R<sub>1</sub> = 20 kΩ, R<sub>2</sub> = 1 kΩ

$$G_{VO} = 20 \log (20 \text{ k}/1 \text{ k}) = 26 \text{ dB}$$

$$G_{VTOTAL} = G_{V1} + G_{VO} = 4 \text{ dB} + 26 \text{ dB} = 30 \text{ dB}$$

2) DC volume control

The DC volume control range is 0 V to 5 V. This range is used in order to be easily controlled by micro-computer using PWM output. The recommended circuit and volume attenuation characteristic are shown below :

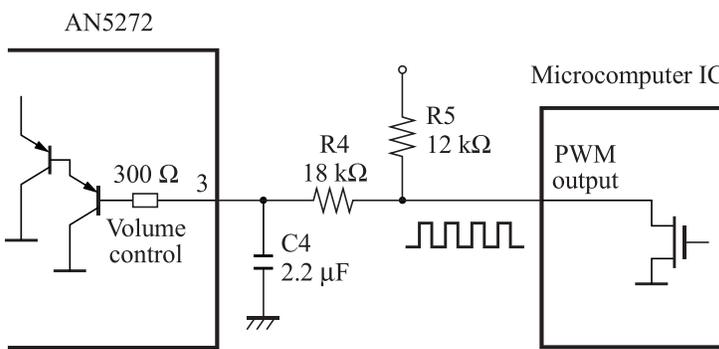


Fig. Volume control interface circuit for AN5272

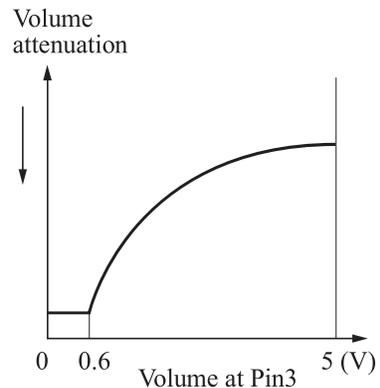
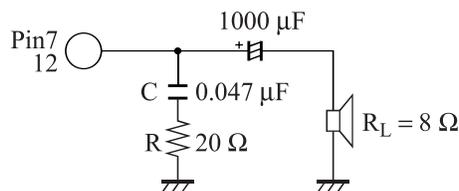


Fig. Volume characteristic of AN5272

3) Oscillation

To prevent oscillation, it is advisable to use RC (Zobel network) at output. C of polyester film capacitor has smaller characteristic fluctuation with temperature and frequency. The resistor R connected in series with C is effective for phase correction at high frequency, and as a result, it improves the oscillation allowance.

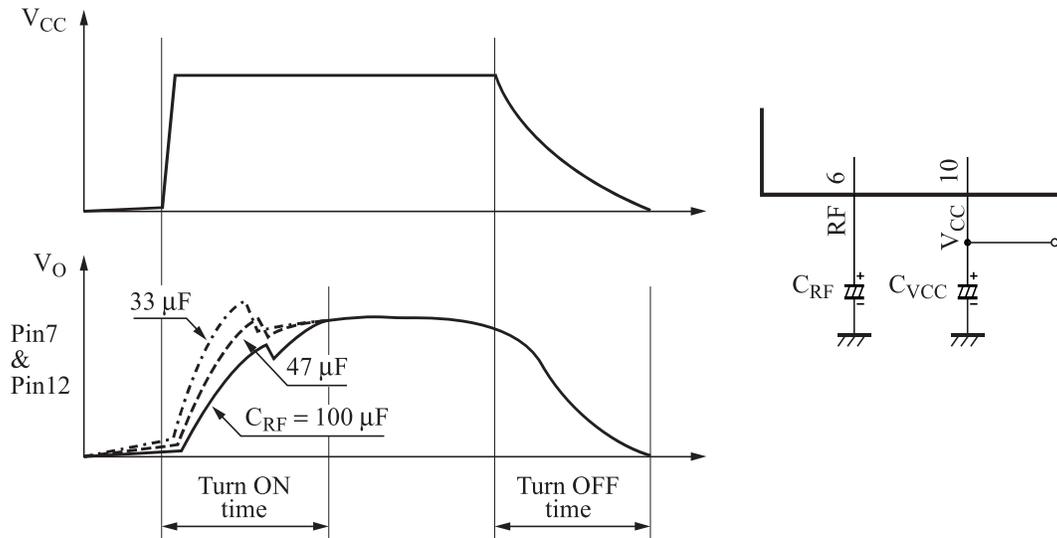


■ Technical Information (continued)

2. Application Note (continued)

4) Power-ON/OFF pop-noise elimination

The output pins 7, 12 and  $V_O$ , during power turn ON and OFF are shown below :



The turn ON time in the AN5272 is determined by the capacitance value of  $C_{RF}$ . If value of the  $C_{RF}$  is smaller,  $V_O$  would turn ON faster.

The turn OFF time is dependent on the capacitance value of  $C_{VCC}$ . Pop-noise would occur when  $V_{CC}$  voltage declines faster than  $RF$  voltage. To solve this, increase the discharge time of  $V_{CC}$  by increasing the capacitance values of  $C_{VCC}$ .

The recommended values of capacitance for  $C_{VCC}$  and  $C_{RF}$  are shown below :

No.	$C_{RF}$	$C_{VCC}$	Recommended Operating $V_{CC}$ Range	Unit
1	33 $\mu F$	470 $\mu F$	14.5 to 27.5	V
2	47 $\mu F$	470 $\mu F$	12.2 to 27.5	V
3	100 $\mu F$	1000 $\mu F$	12.2 to 27.5	V

5) Stand-by circuit

Stand-by function can be implemented in the AN5272 by external solution. It is realised by pulling the  $RF$  voltage to low and output voltage would follow  $RF$  as shown in the diagram.

