AN7522

Dual 3-W BTL audio power amplifier

■ Overview

AN7522 is an audio power amplifier IC for the stereo system. In the BTL (balanced transformerless) method, fewer external parts and easier design for applications are required.

■ Features

- 3-W output (8 Ω) with supply voltage of 8 V
- On-chip standby function
- On-chip volume function

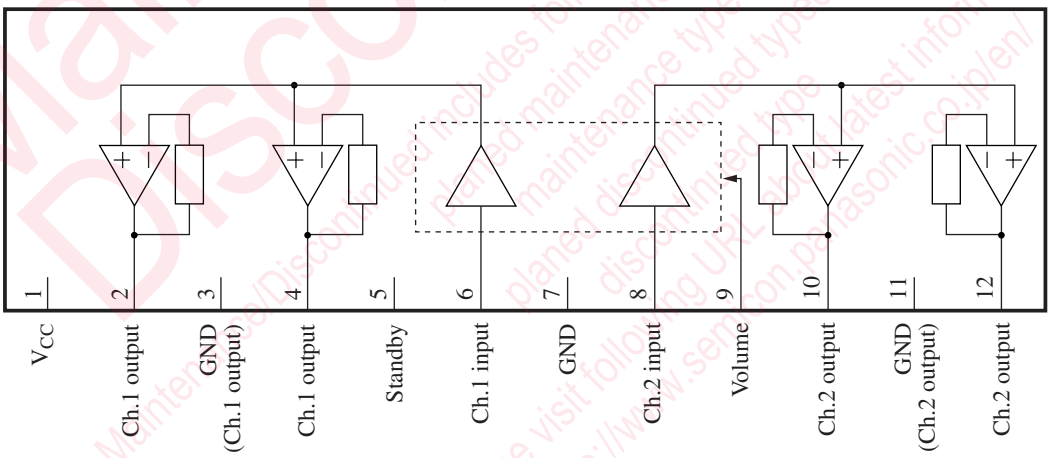
■ Applications

- Televisions, audio equipment, personal computers, and active speakers

■ Package

- HSIP012-P-0000E

■ Block Diagram



■ Pin Descriptions

Pin No.	Descriptions	Pin No.	Descriptions
1	Supply voltage	7	Ground (input)
2	Ch.1 + output	8	Ch.2 input
3	Ground (output ch.1)	9	Volume (max. volume if this pin is open.)
4	Ch.1 – output	10	Ch.2 – output
5	Standby (standby state if this pin is open.)	11	Ground (output ch.2)
6	Ch.1 input	12	Ch.2 + output

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage *2	V_{CC}	14	V
Supply current	I_{CC}	2.0	A
Power dissipation *3	P_D	1.92	W
Operating ambient temperature *1	T_{opr}	–25 to +70	°C
Storage temperature *1	T_{stg}	–55 to +150	°C

Note) ∗1: Except for the operating ambient temperature and storage temperature, all ratings are for T_a = 25°C.
∗2: At no signal.
∗3: The power dissipation shown is the value for T_a = 70°C.

■ Recommended Operating Range

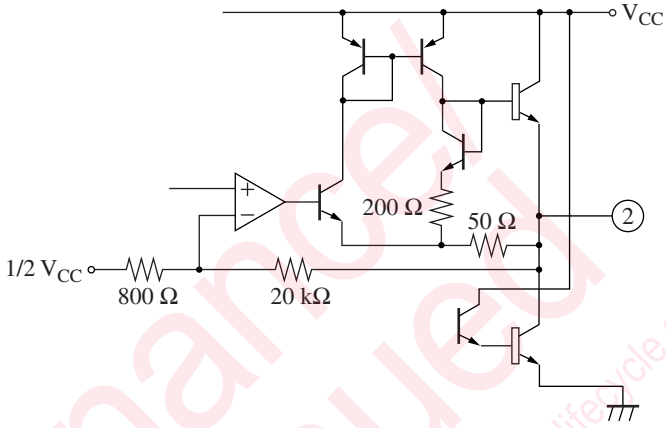
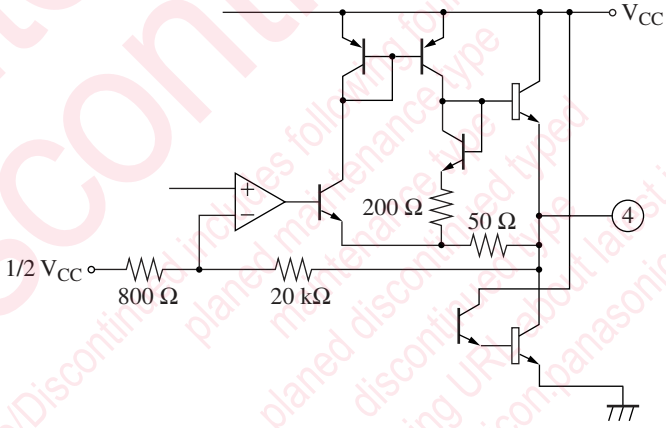
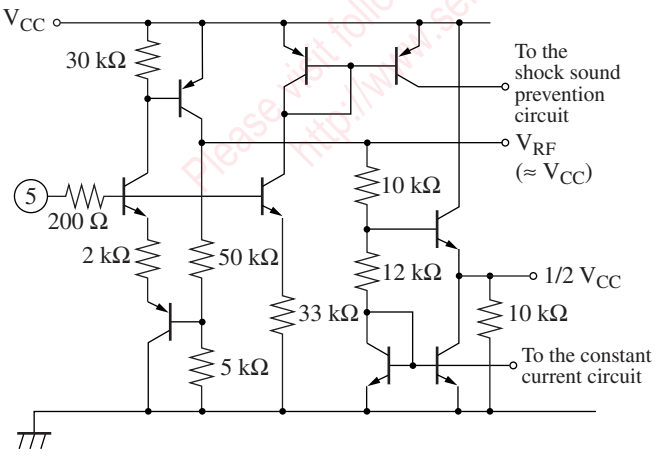
Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	3.5 to 13.5	V

■ Electrical Characteristics at V_{CC} = 8.0 V, R_L = 8 Ω, f = 1 kHz, T_a = 25°C ± 2°C

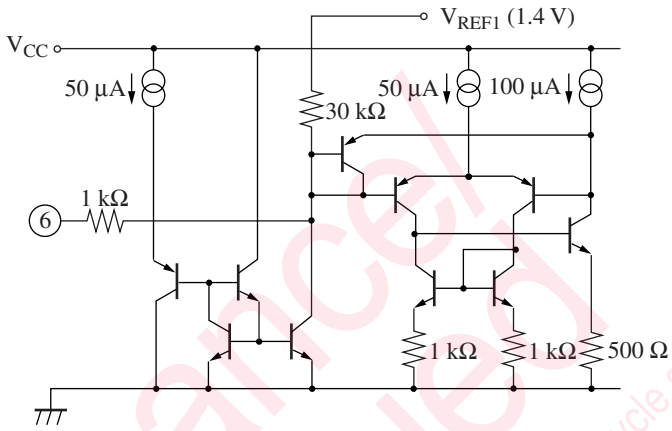
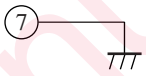
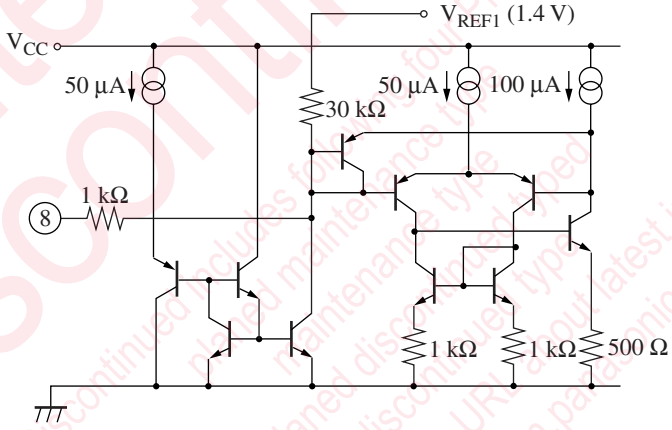
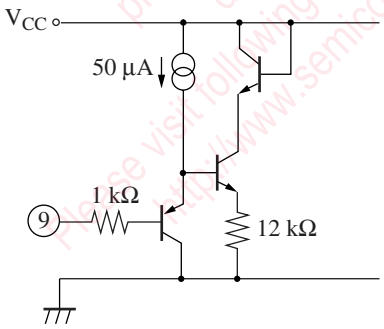
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent circuit current	I_{CQ}	V_{IN} = 0 mV, Vol. = 0 V	—	45	100	mA
Standby current	I_{STB}	V_{IN} = 0 mV, Vol. = 0 V	—	1	10	µA
Output noise voltage *	V_{NO}	R_g = 10 kΩ, Vol. = 0 V	—	0.10	0.4	mV[rms]
Voltage gain	G_V	P_O = 0.5 W, Vol. = 1.25 V	31	33	35	dB
Total harmonic distortion	THD	P_O = 0.5 W, Vol. = 1.25 V	—	0.10	0.5	%
Maximum output power	P_{O1}	THD = 10%, Vol. = 1.25 V	2.4	3.0	—	W
Ripple rejection ratio *	RR	R_g = 10 kΩ, Vol. = 0 V, V_R = 1 V[rms], f_R = 120 Hz	30	50	—	dB
Output offset voltage	V_{OFF}	R_g = 10 kΩ, Vol. = 0 V	–250	0	250	mV
Volume attenuation rate *	Att	P_O = 0.5 W, Vol. = 0 V	70	85	—	dB
Channel balance 1	CB1	P_O = 0.5 W, Vol. = 1.25 V	–1	0	1	dB
Channel balance 2	CB2	P_O = 0.5 W, Vol. = 0.6 V	–3	0	3	dB
Intermediate voltage gain	G_{VM}	P_O = 0.5 W, Vol. = 0.6 V	20.5	23.5	26.5	dB
Channel crosstalk	CT	P_O = 0.5 W, Vol. = 1.25 V	40	55	—	dB

Note) ∗: In measuring, the filter for the range of 15 Hz to 30 kHz (12 dB/OCT) is used.

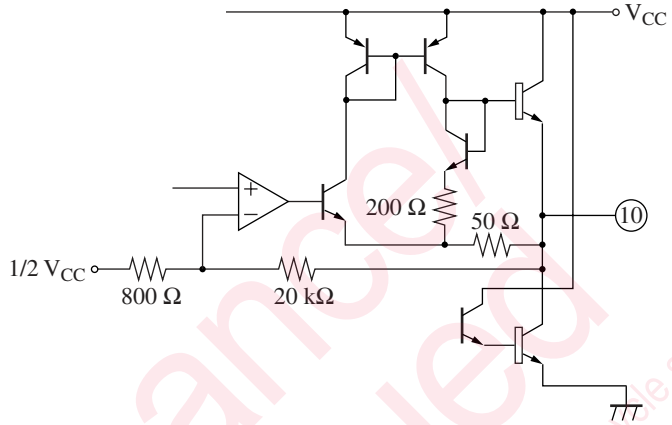
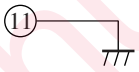
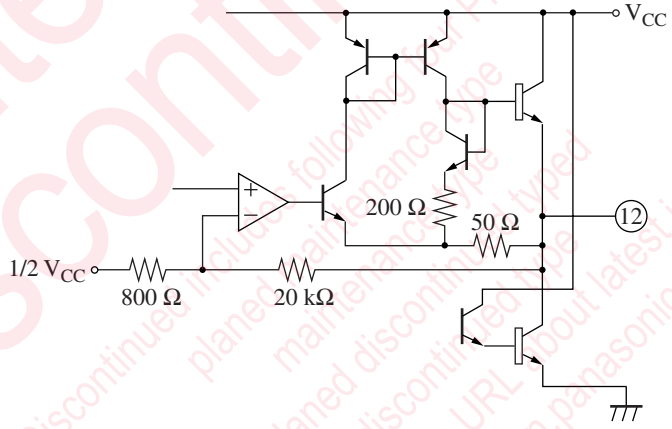
■ Terminal Equivalent Circuits at V_{CC} = 8 V

Pin No.	Pin name	Equivalent circuit	Voltage
1	V_{CC}	—	8 V
2	Ch.1 + output pin		3.6 V (at no signal)
3	GND		0 V
4	Ch.1 − output pin		3.6 V (at no signal)
5	Standby pin		0 V or 5 V (Standby off at supply 5 V. Standby at 0.4 V less or open.)

■ Terminal Equivalent Circuits at V_{CC} = 8 V (continued)

Pin No.	Pin name	Equivalent circuit	Voltage
6	Ch.1 input pin		1.4 V (Input circuit bias voltage is output.)
7	GND		0 V
8	Ch.2 input pin		1.4 V (Input circuit bias voltage is output.)
9	Volume pin		Supply to 0 V to 1.25 V

■ Terminal Equivalent Circuits at V_{CC} = 8 V (continued)

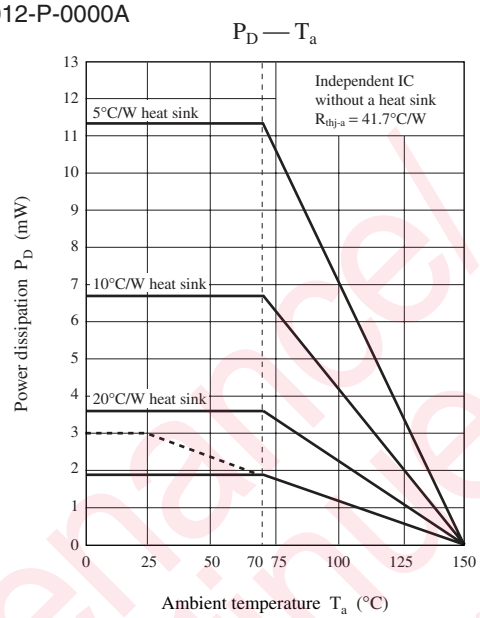
Pin No.	Pin name	Equivalent circuit	Voltage
10	Ch.2 – output pin		3.6 V (at no signal)
11	GND		0 V
12	Ch.2 + output pin		3.6 V (at no signal)

■ Usage Notes

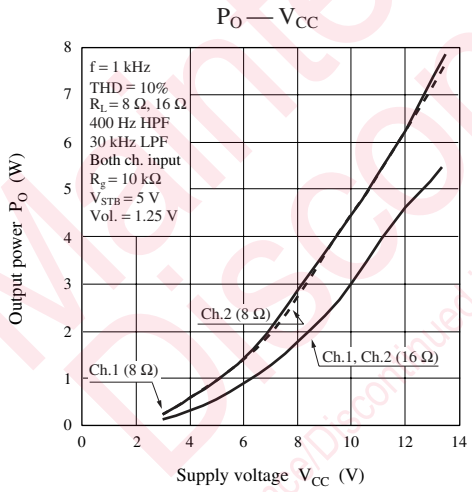
- Please avoid the short-circuits to V_{CC} , ground, or load short-circuit.
- Please connect the cooling fin with the GND potential.
- The thermal shutdown circuit operates at about T_j = 150°C. However, the thermal shutdown circuit is reset automatically if the temperature drops.
- Please carefully design the heat radiation especially when you take out high power at high V_{CC} .
- Please connect only the ground of signal with the signal GND of the amplifier in the previous stage.

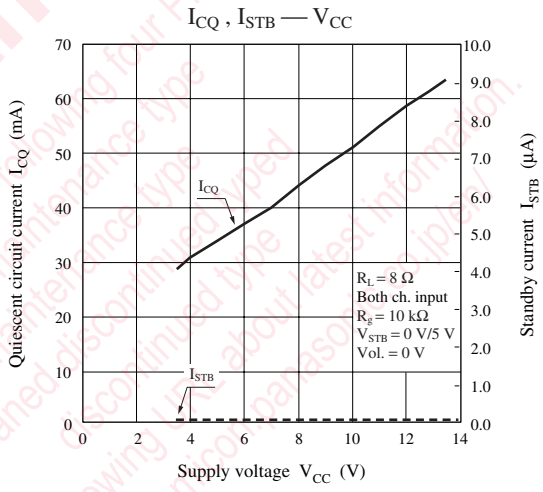
■ Technical Data

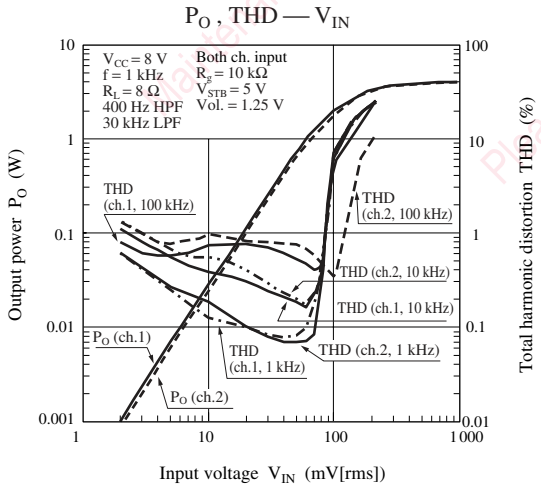
• P_D — T_a curves of HSIP012-P-0000A

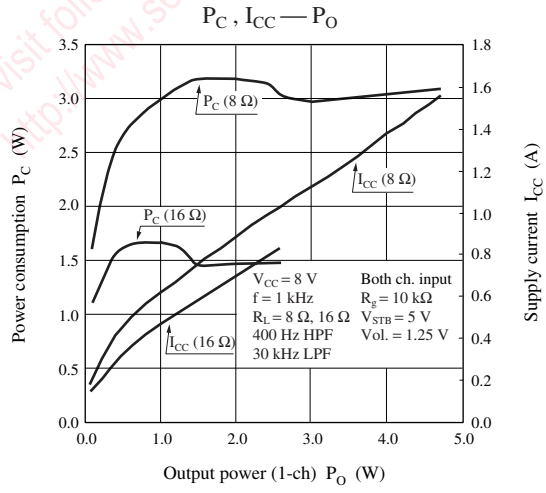


• Main characteristics





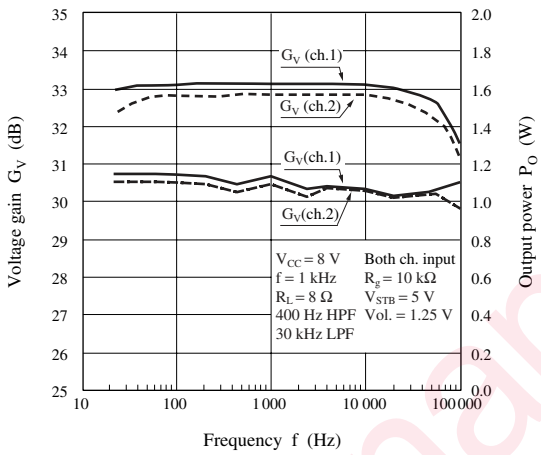




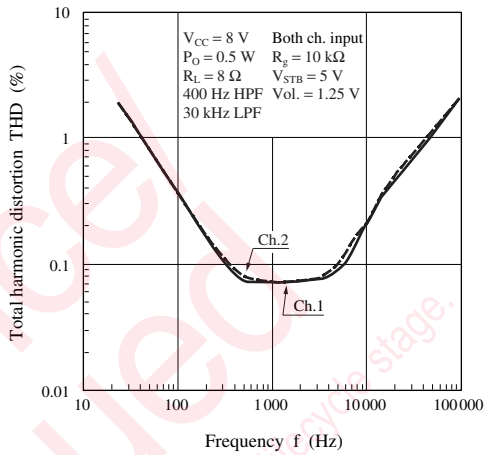
■ Technical Data (continued)

• Main characteristics (continued)

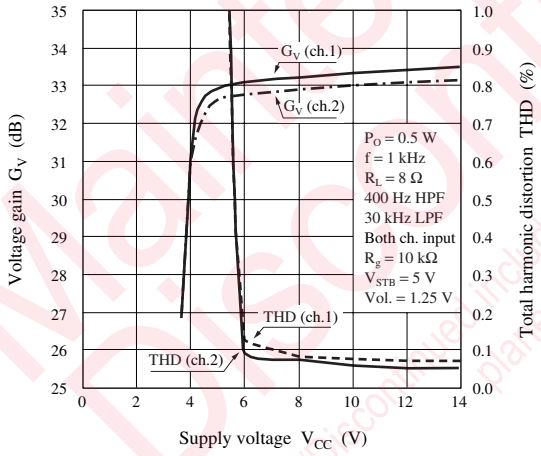
G_V , P_O — f



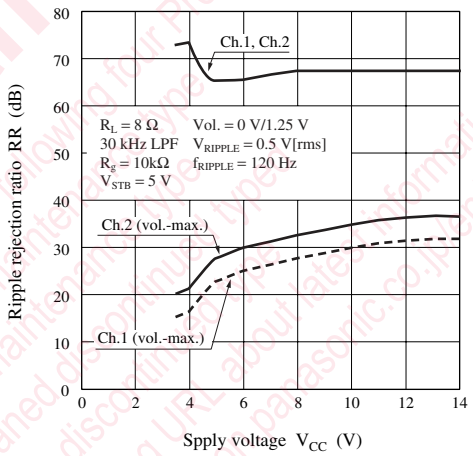
THD — f



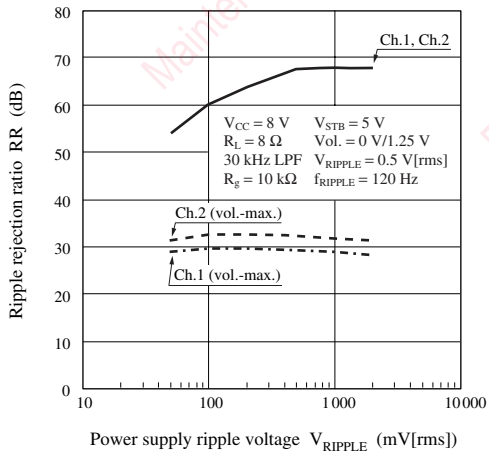
G_V , THD — V_{CC}



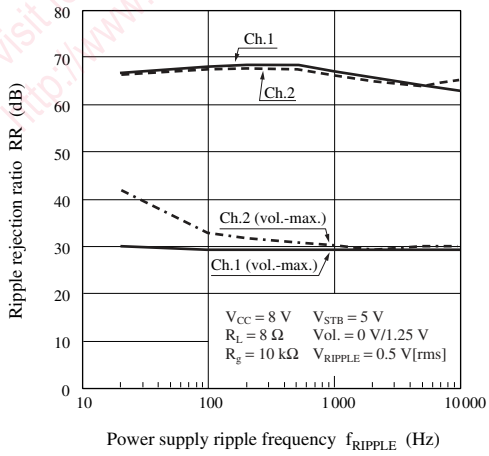
RR — V_{CC}



RR — V_{RIPPLE}



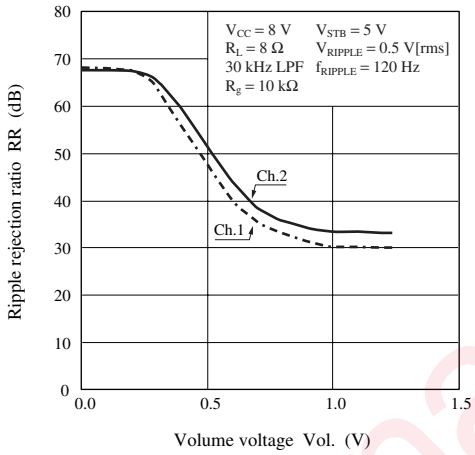
RR — f_{RIPPLE}



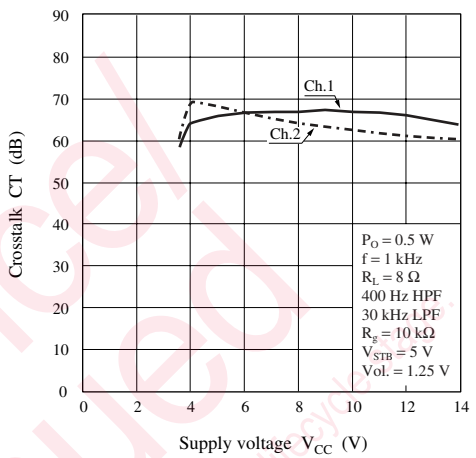
■ Technical Data (continued)

• Main characteristics (continued)

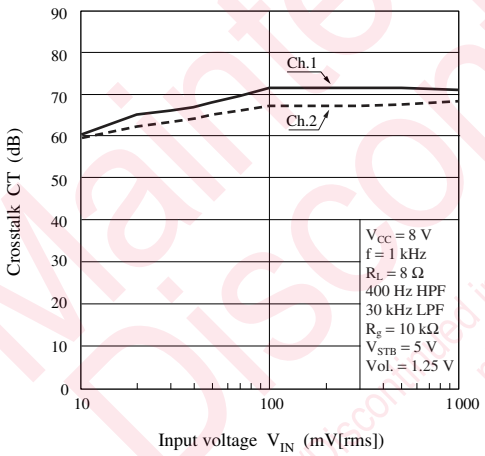
RR — Vol.



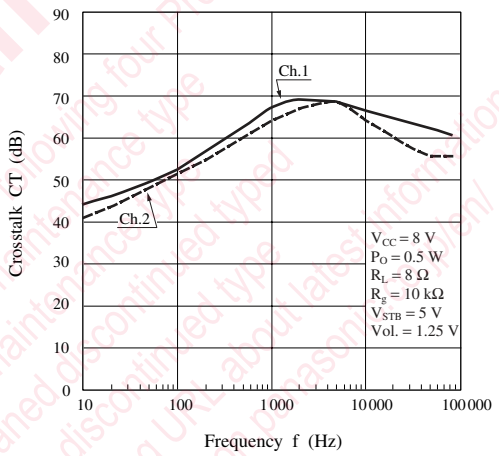
CT — V_{CC}



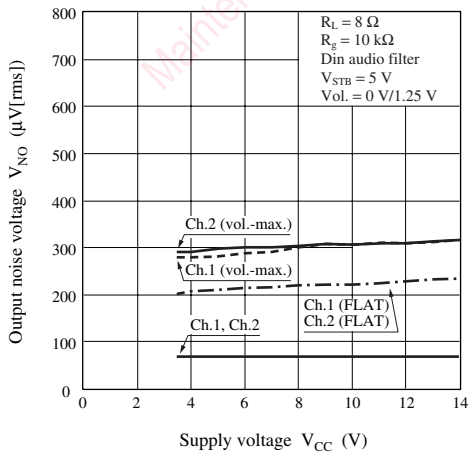
CT — V_{IN}



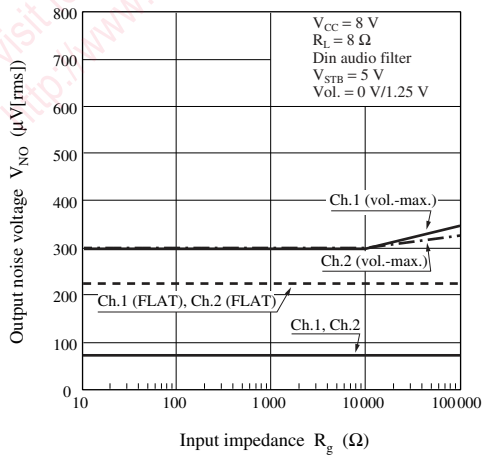
CT — f



V_{NO} — V_{CC}



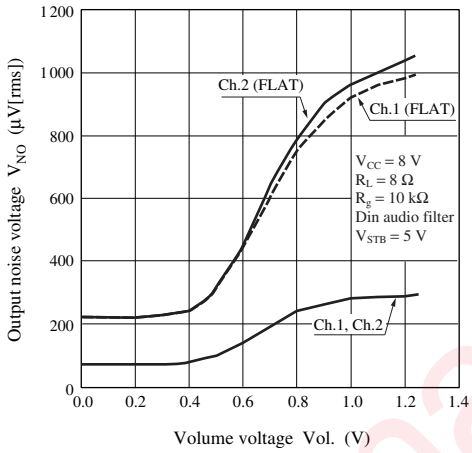
V_{NO} — R_g



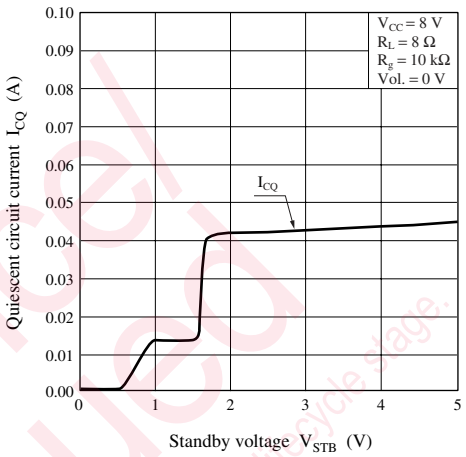
■ Technical Data (continued)

• Main characteristics (continued)

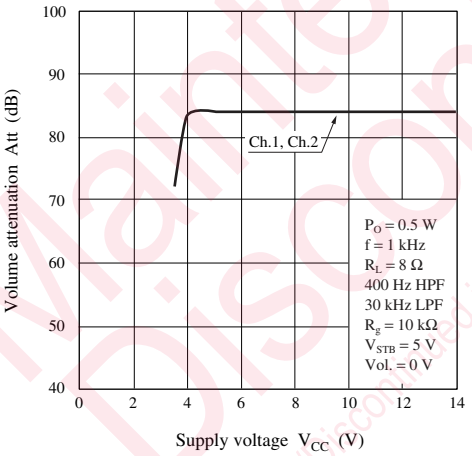
V_{NO} — Vol.



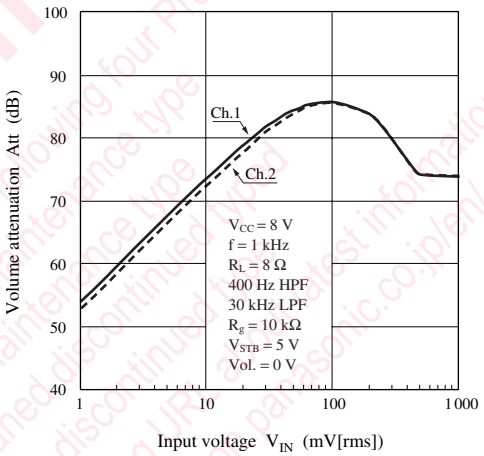
I_{CQ} — V_{STB}



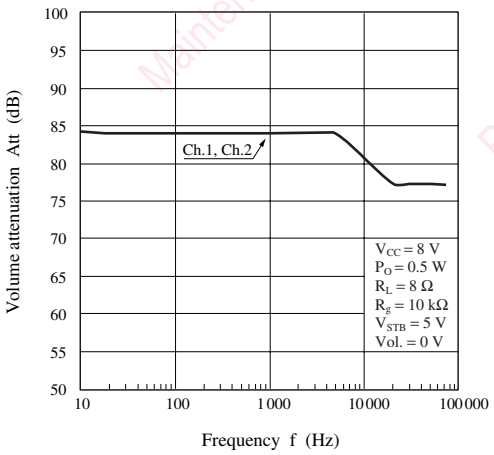
Att — V_{CC}



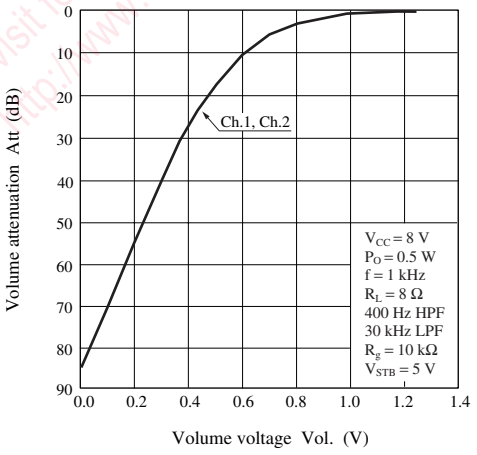
Att — V_{IN}



Att — f



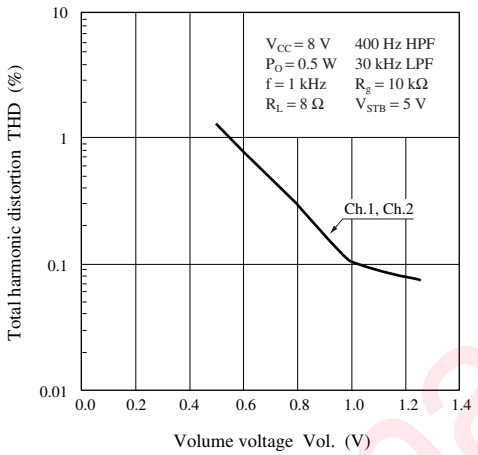
Att — Vol.



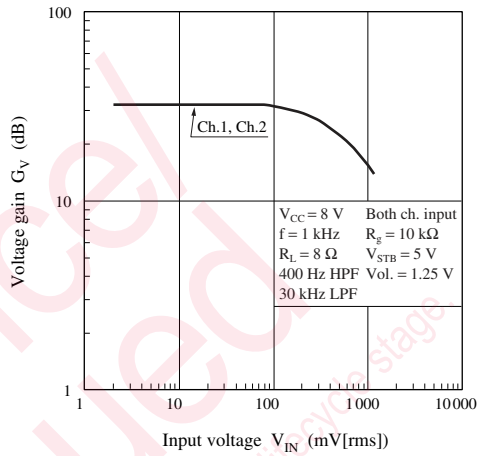
■ Technical Data (continued)

• Main characteristics (continued)

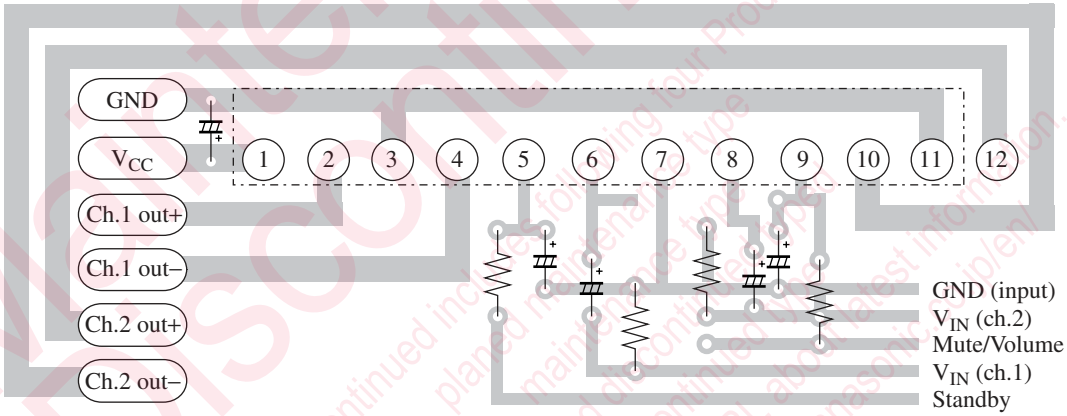
THD — Vol.



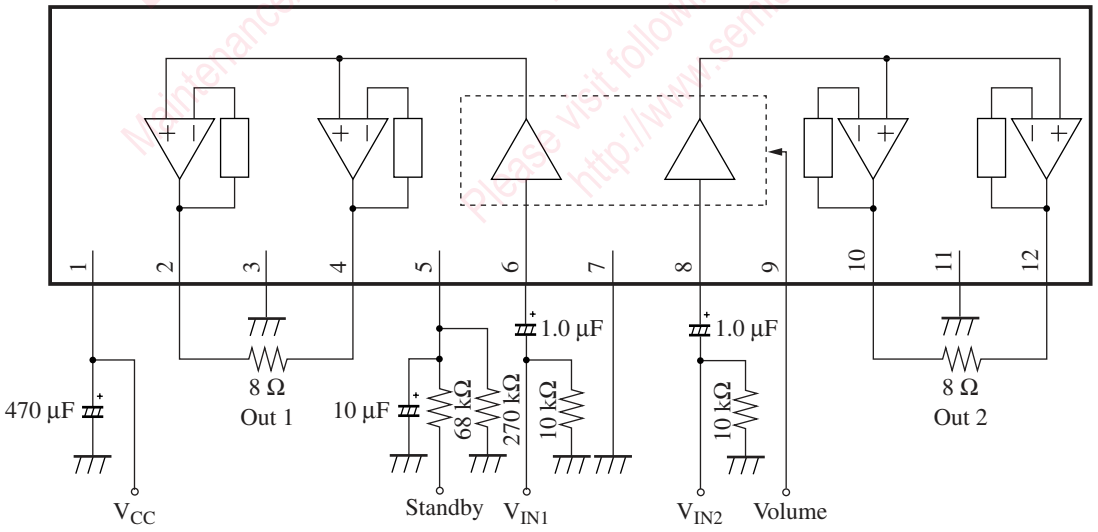
G_V — V_{IN}



• Example of PCB pattern



■ Application Circuit Example



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(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.