AN7523

3-W BTL audio power amplifier

■ Overview

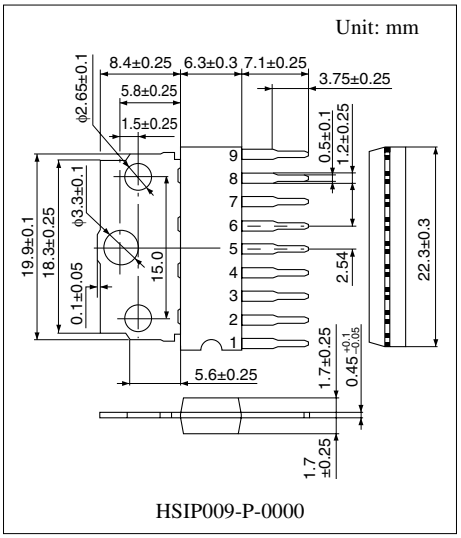
The AN7523 is an audio power amplifier IC of 1-ch. output. In the BTL (balanced transformerless) method, fewer external parts and easier design for applications are required.

■ Features

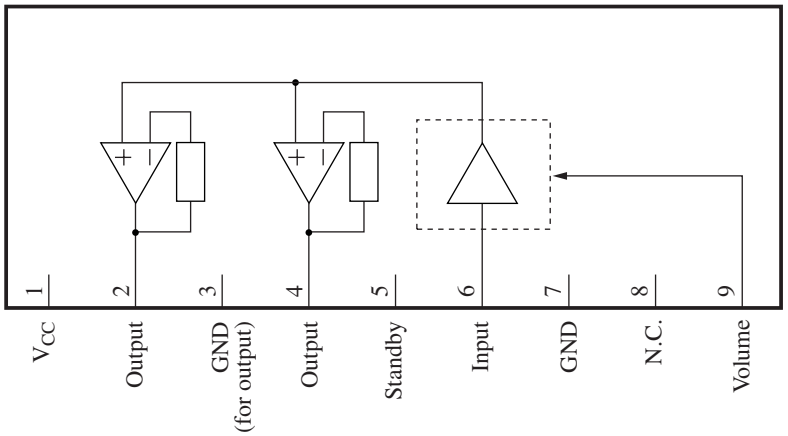
- 3-W output (8 Ω) with supply voltage of 8 V
- On-chip standby function
- On-chip volume function

■ Applications

- Televisions and audio equipment



■ Block Diagram



■ Pin Descriptions

Pin No.	Description
1	Supply voltage
2	Ch.1 + output
3	Ground (output ch.1)
4	Ch.1 − output
5	Standby (standby state if this pin is open.)
6	Ch.1 input
7	Ground
8	N.C.
9	Volume (max. volume if this pin is open.)

Note) Please do not apply voltage or current to the N.C. pin from outside.

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage *2	V_{CC}	14	V
Supply current	I_{CC}	1.0	A
Power dissipation *3	P_D	1.22	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

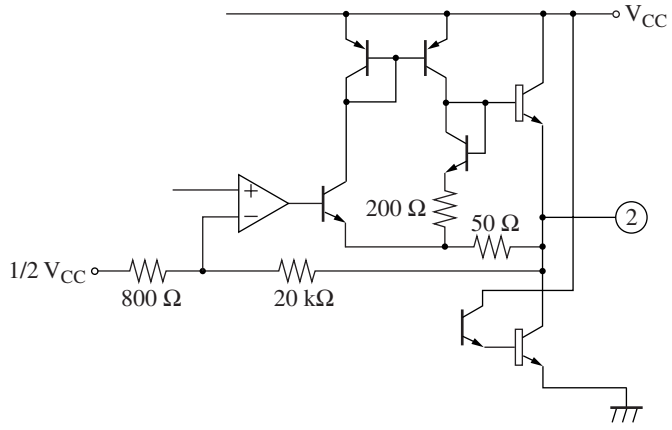
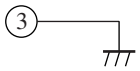
Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	3.5 to 13.5	V

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

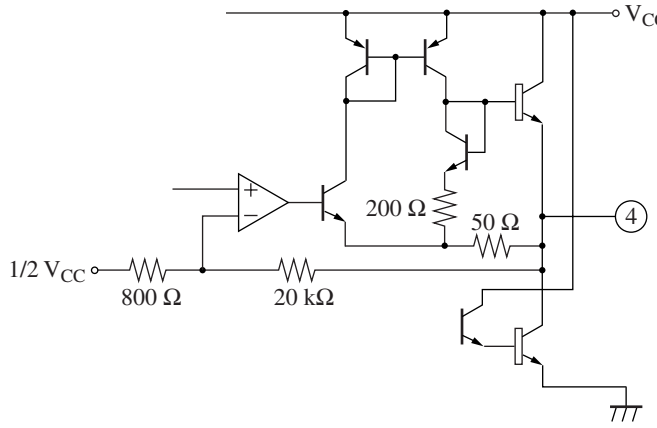
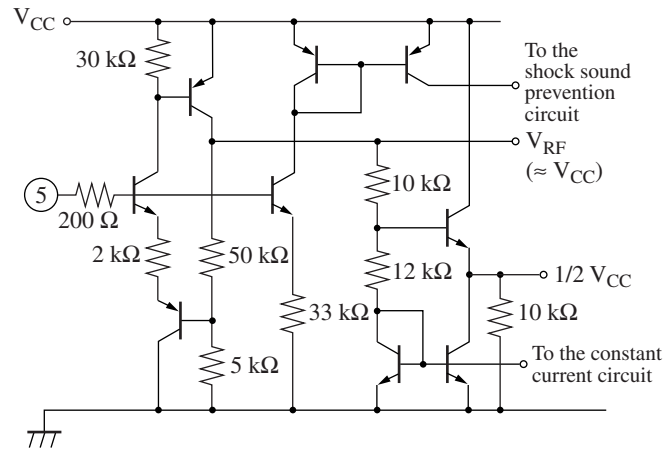
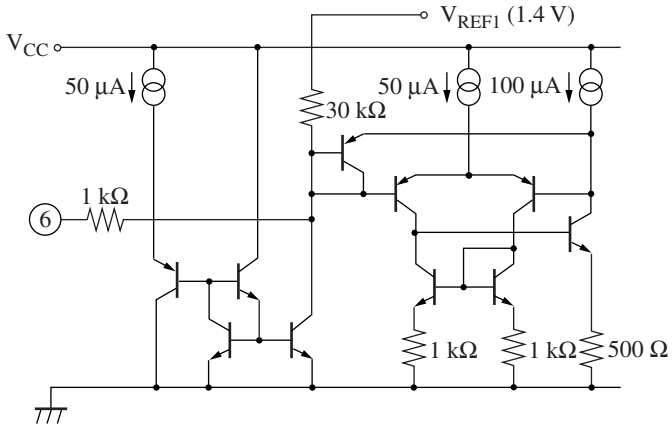
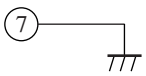
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent circuit current	I_{CQ}	V_{IN} = 0 mV, Vol. = 0 V	—	25	60	mA
Standby current	I_{STB}	V_{IN} = 0 mV, Vol. = 0 V	—	1	10	µA
Output noise voltage *	V_{NO}	R_g = 10 kΩ, Vol. = 0 V	—	0.10	0.4	mV[rms]
Voltage gain	G_V	P_O = 0.5 W, Vol. = 1.25 V	31	33	35	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 = 0.5 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
Intermediate voltage gain	G_{VM}	P_O = 0.5 W, Vol. = 0.6 V	20.5	23.5	26.5	dB
Standby pin current	I_{STB2}	V_{IN} = 0 mV, V_{STB} = 3 V	—	—	25	µA
Volume pin current	I_{VOL}	V_{IN} = 0 mV, Vol. = 0 V	−12	—	—	µA

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

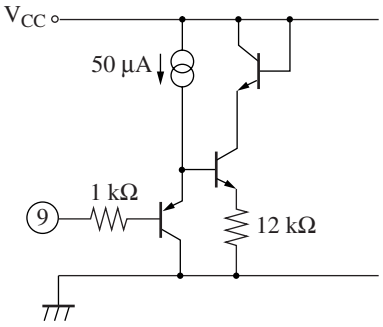
■ Terminal Equivalent Circuits

Pin No.	Pin name	Equivalent circuit	Voltage
1	V_{CC}	—	5.0 V
2	Ch.1 + output pin		2.15 V
3	GND		0 V

■ Terminal Equivalent Circuits (continued)

Pin No.	Pin name	Equivalent circuit	Voltage
4	Ch.1 – output pin		2.15 V
5	Standby pin		5 V
6	Ch.1 input pin		0 mV to 10 mV
7	GND		0 V
8	N.C.	Open	—

■ Terminal Equivalent Circuits (continued)

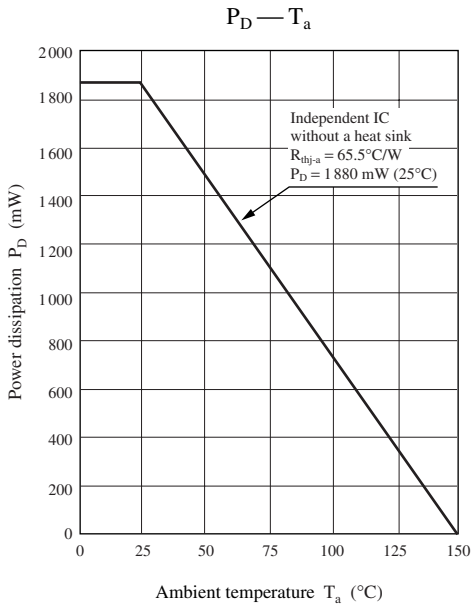
Pin No.	Pin name	Equivalent circuit	Voltage
9	Volume pin		—

■ 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 source with the signal GND of the amplifier in the previous stage.

■ Technical Data

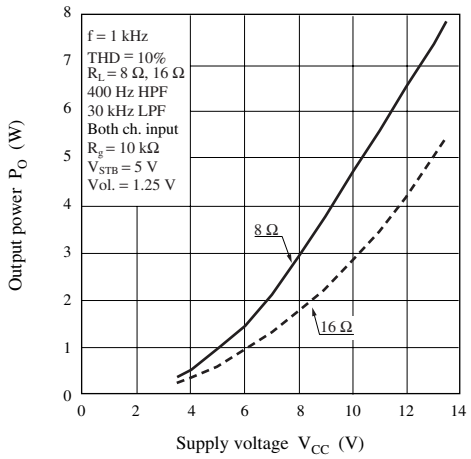
- P_D — T_a curve of HSIP009-P-0000



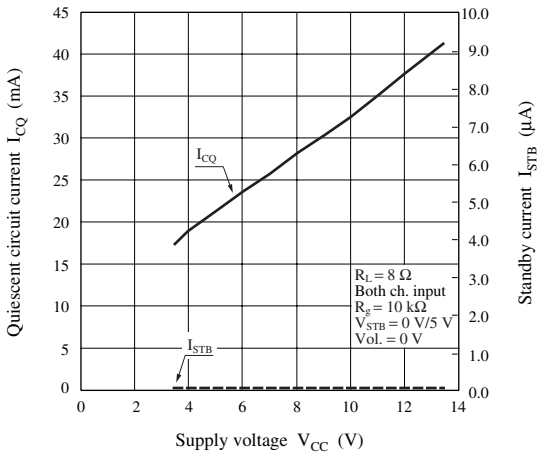
■ Technical Data (continued)

• Main characteristics

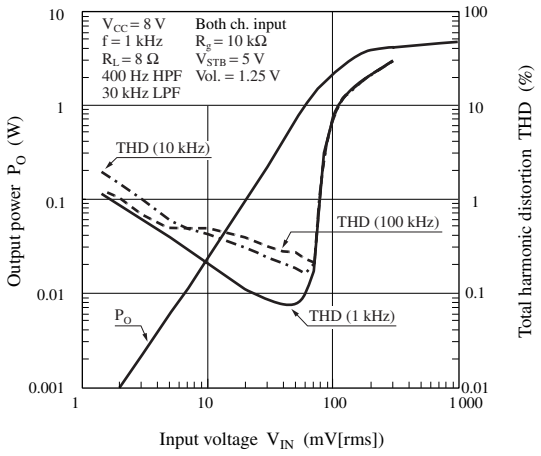
P_O — V_{CC}



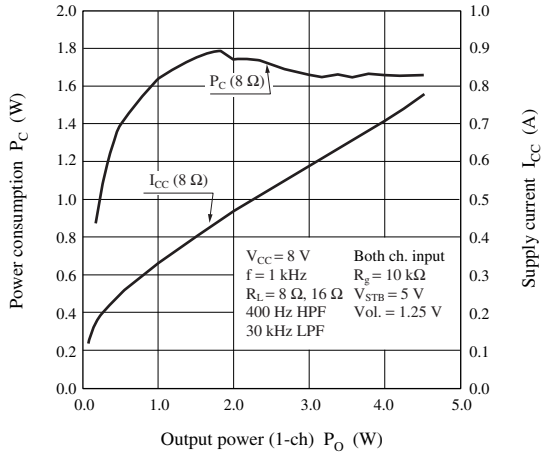
I_{CQ} , I_{STB} — V_{CC}



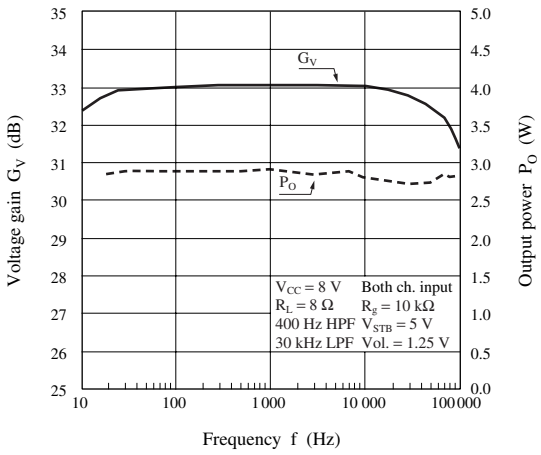
P_O , THD — V_{IN}



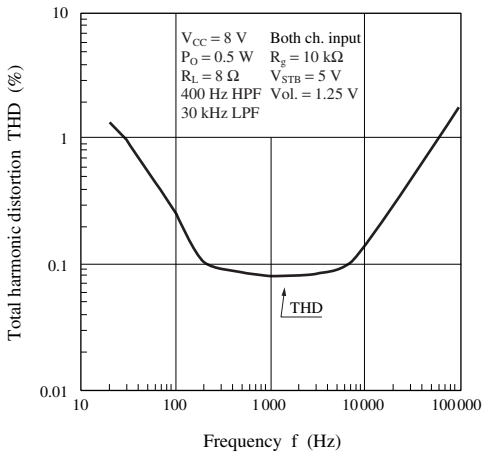
P_C , I_{CC} — P_O



G_V , P_O — f



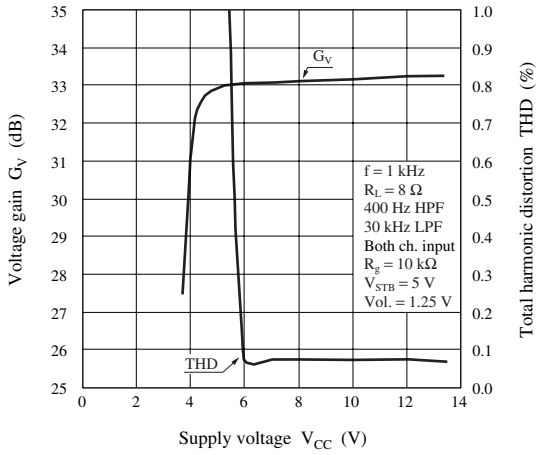
THD — f



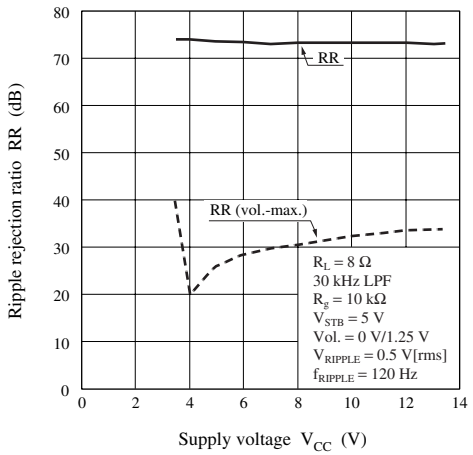
■ Technical Data (continued)

• Main characteristics (continued)

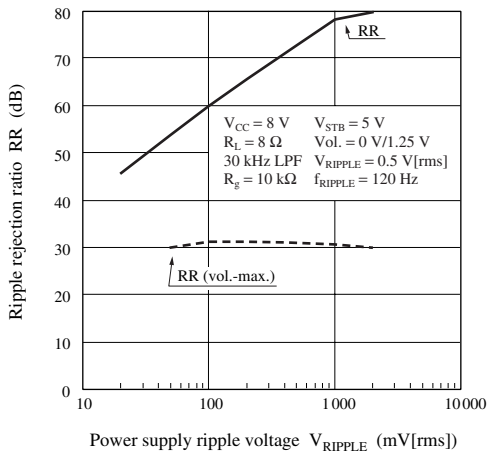
G_V , THD — V_{CC}



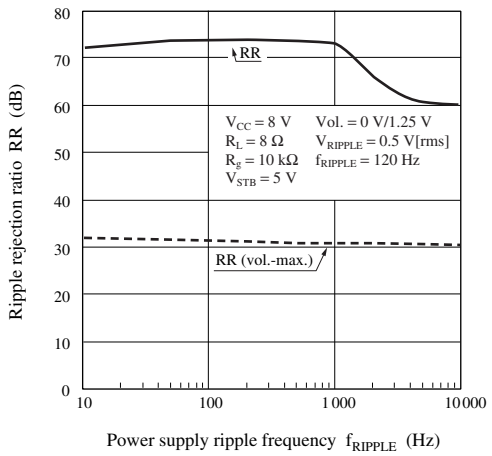
RR — V_{CC}



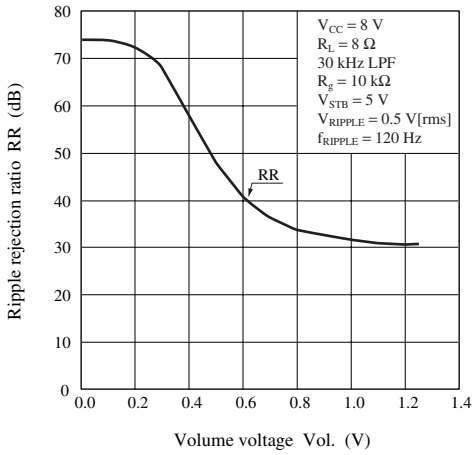
RR — V_{RIPPLE}



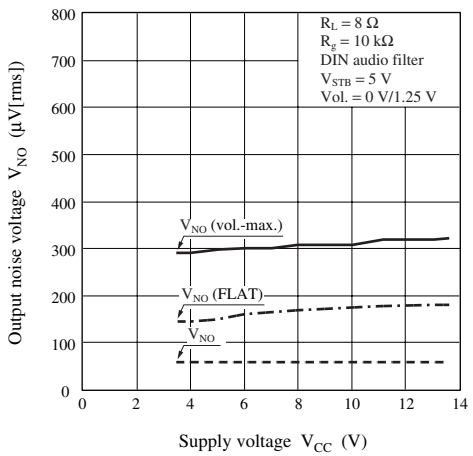
RR — f_{RIPPLE}



RR — Vol.



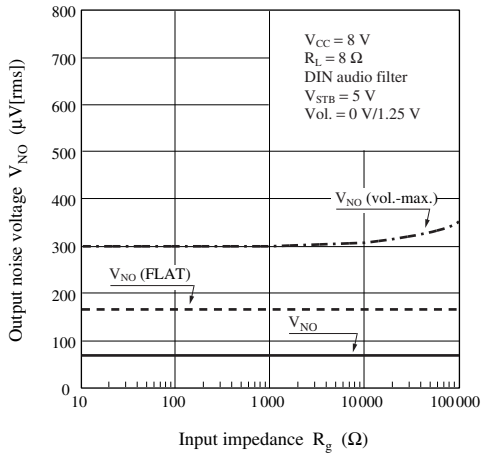
V_{IN} — V_{CC}



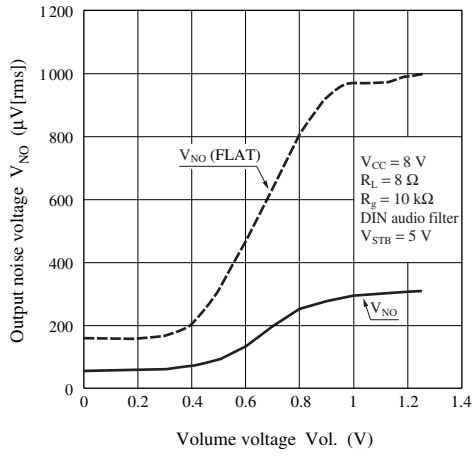
■ Technical Data (continued)

• Main characteristics (continued)

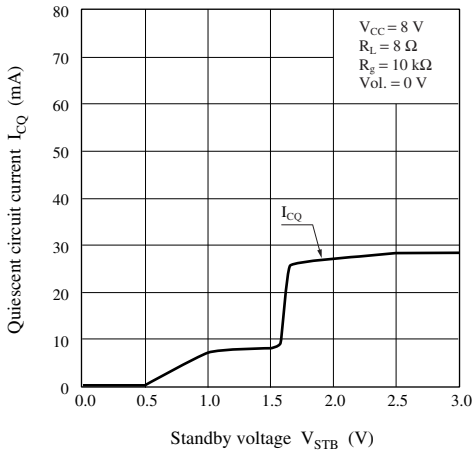
V_{NO} — R_g



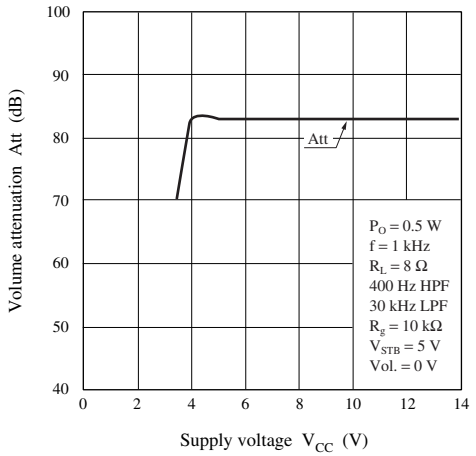
V_{NO} — Vol.



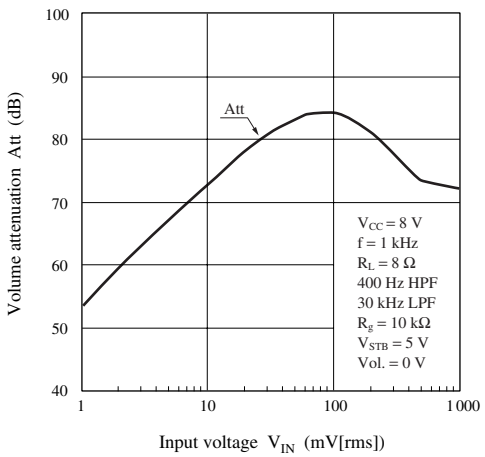
I_{CQ} — V_{STB}



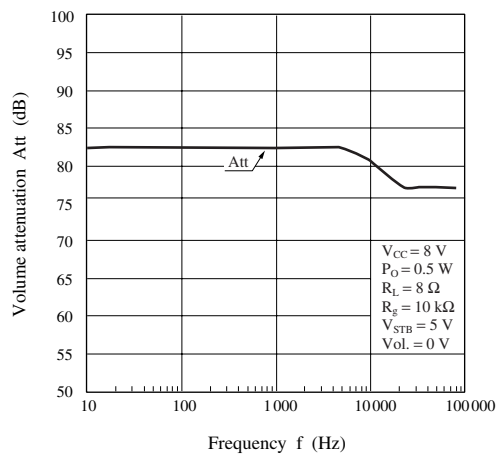
Att — V_{CC}



Att — V_{IN}



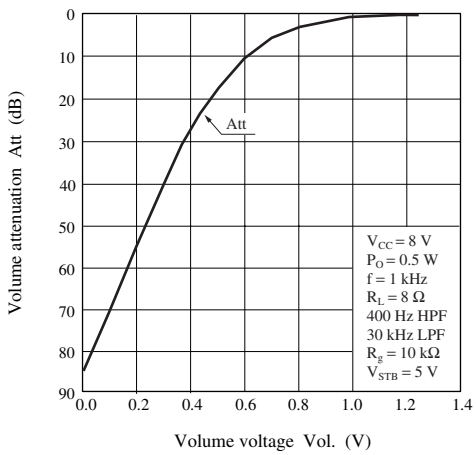
Att — f



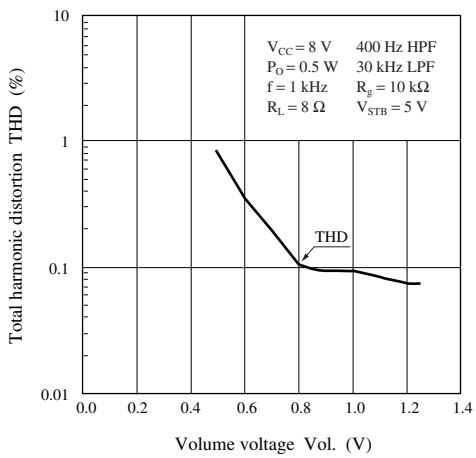
■ Technical Data (continued)

• Main characteristics (continued)

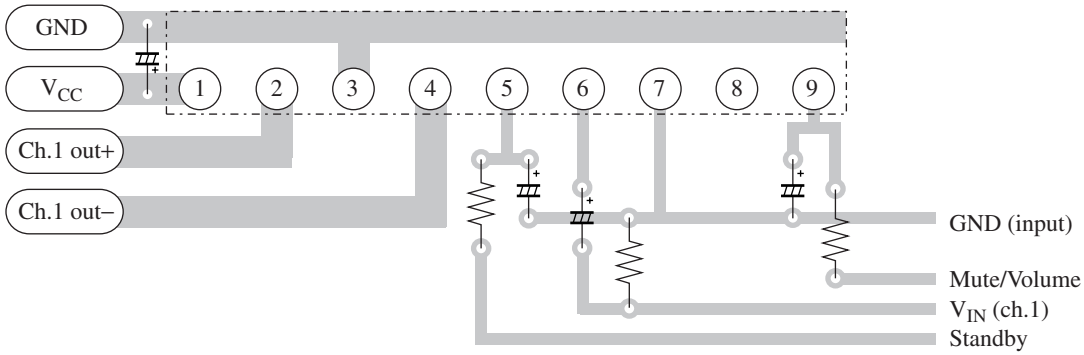
Att — Vol.



THD — Vol.



• Example of PCB pattern



■ Application Circuit Example