AN7512SH

Dual 1-W BTL audio power amplifier

■ Overview

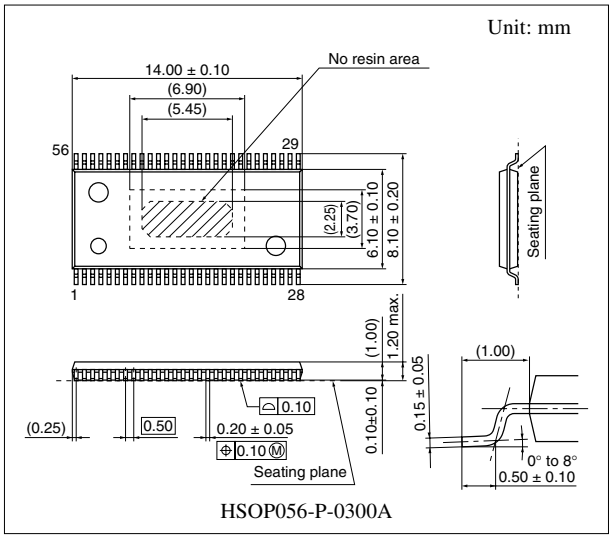
The AN7512SH is an audio power amplifier IC with surface mount package for stereo system. The BTL (Balanced Transformer-Less) method can provide fewer external parts and more easy design for applications.

■ Features

- 1-W output (8 Ω) with supply voltage of 5 V
- On-chip standby function
- On-chip volume function
- Small and thin surface mount package

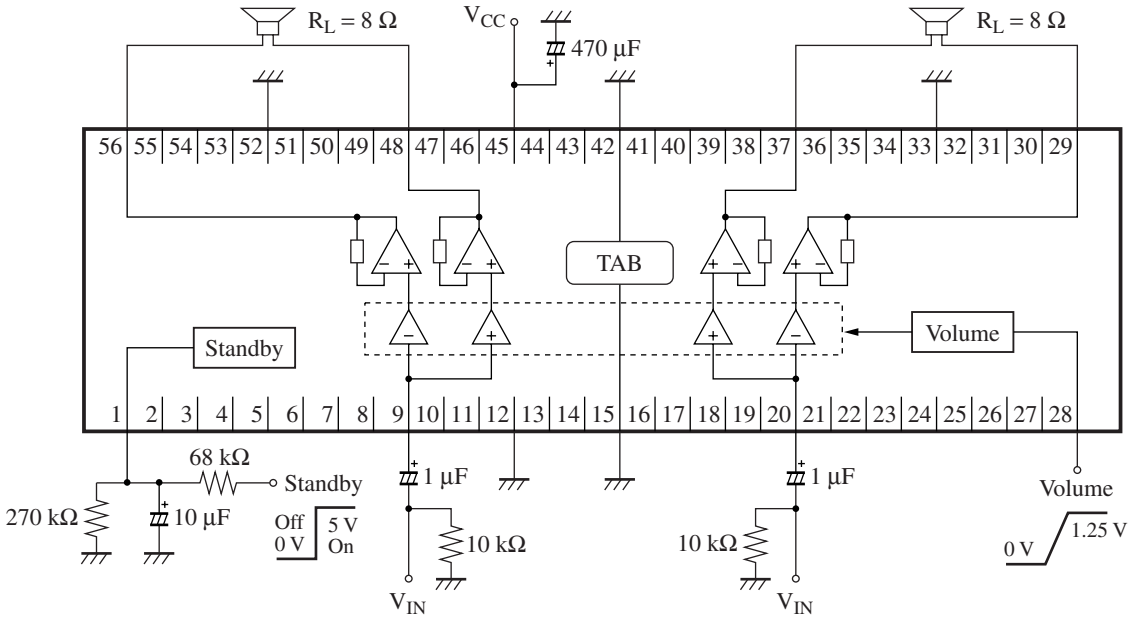
■ Applications

- LCD televisions, monitor with speaker for personal computers



HSOP056-P-0300A

■ Block Diagram



■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Standby (standby state if this pin is open.)	33	Ground (output ch.2)
9	Ch.1 input	37	Ch.2 + output
12	Ground (input)	42	TAB (tablet)
15	TAB (tablet)	45	Supply voltage
20	Ch.2 input	48	Ch.1 + output
28	Volume (muting off if this pin is open.)	52	Ground (output ch.1)
29	Ch.2 – output	56	Ch.1 – output

N.C. Pin No.	2, 3, 4, 5, 6, 7, 8, 10, 11, 13, 14, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 30, 31, 32, 34, 35, 36, 38, 39, 40, 41, 43, 44, 46, 47, 49, 50, 51, 53, 54, 55

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}	2.0	A
Power dissipation *3	P_D	690	mW
Operating ambient temperature *1	T_{opr}	−25 to +75	°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 the independent IC without a heat sink at T_a = 25°C.
Refer to P_D — T_a curves at mounted on standard board.

■ Recommended Operating Range

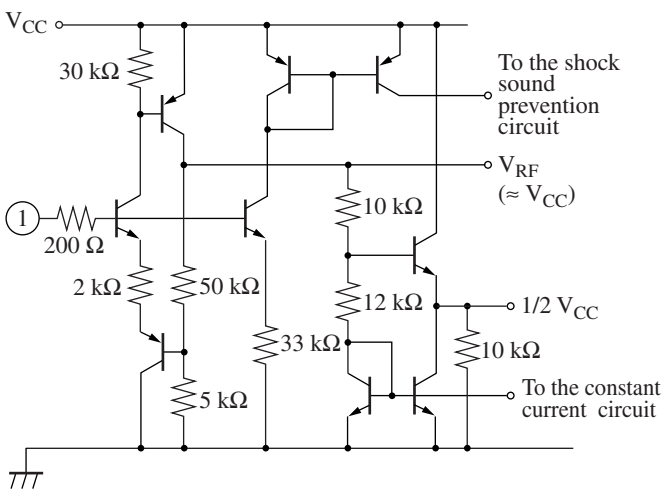
Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	3 to 8	V

■ Electrical Characteristics at V_{CC} = 5.0 V, R_L = 8 Ω, f = 1 kHz, T_a = 25°C ± 2°C

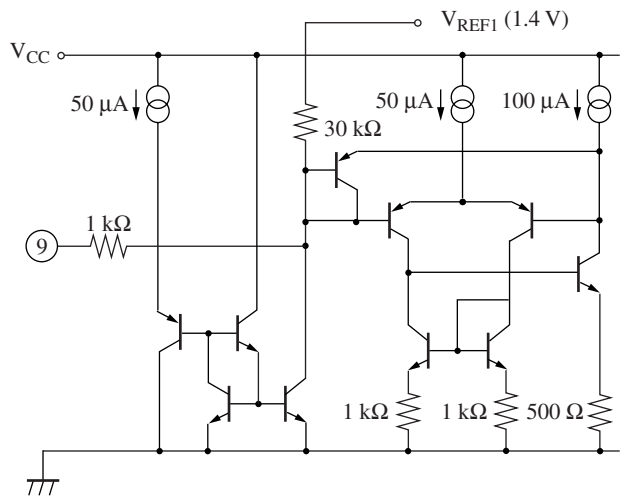
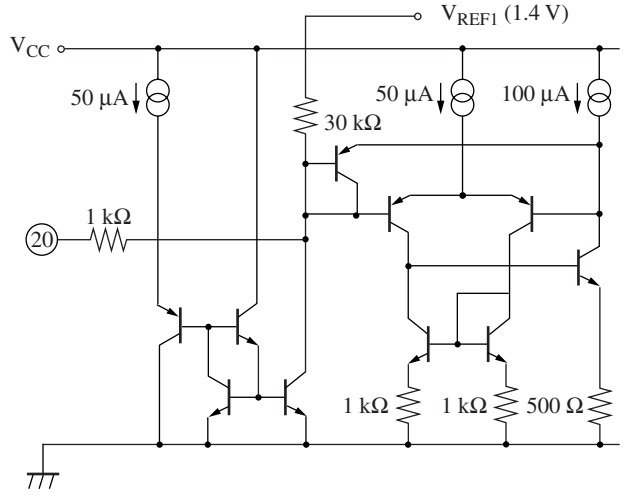
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent circuit current	I_{CQ}	V_{IN} = 0 mV, Vol. = 0 V	—	35	100	mA
Standby current	I_{STB}	V_{IN} = 0 mV, Vol. = 0 V	—	1	10	µA
Output noise voltage *	V_{NO}	R_g = 10 kΩ, Vol. = 0 V	—	0.10	0.4	mV[rms]
Voltage gain	G_V	P_O = 0.25 W, Vol. = 1.25 V	31	33	35	dB
Total harmonics distortion	THD	P_O = 0.25 W, Vol. = 1.25 V	—	0.10	0.5	%
Maximum output power	P_{O1}	THD = 10%, Vol. = 1.25 V	0.7	1.0	—	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 = 0.25 W, Vol. = 0 V	70	85	—	dB
Channel balance 1	CB1	P_O = 0.25 W, Vol. = 1.25 V	–1	0	1	dB
Channel balance 2	CB2	P_O = 0.25 W, Vol. = 0.6 V	–3	0	3	dB
Intermediate voltage gain	G_{VM}	P_O = 0.25 W, Vol. = 0.6 V	20.5	23.5	26.5	dB
Channel crosstalk	CT	P_O = 0.25 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.

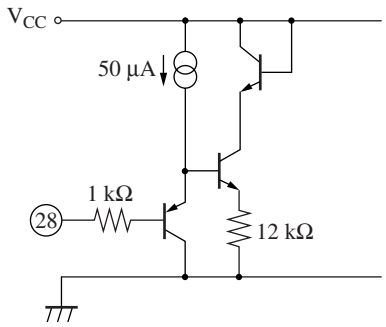
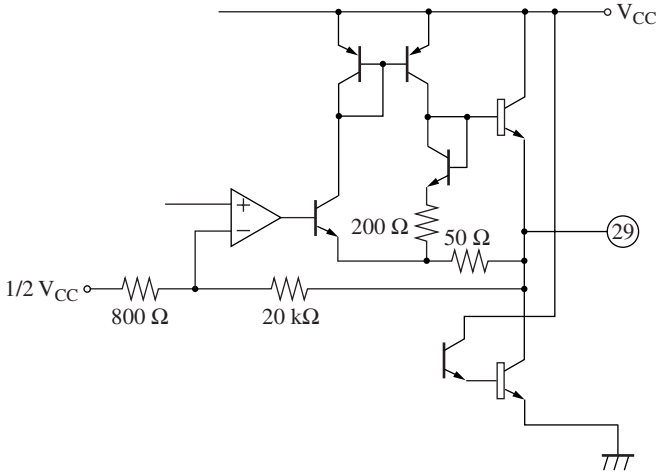
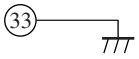
■ Terminal Equivalent Circuits

Pin No.	Pin name	Equivalent circuit	Voltage
1	Standby pin		Standby off at 5 V application.
2	N.C.	—	—
3	N.C.	—	—
4	N.C.	—	—
5	N.C.	—	—
6	N.C.	—	—
7	N.C.	—	—
8	N.C.	—	—

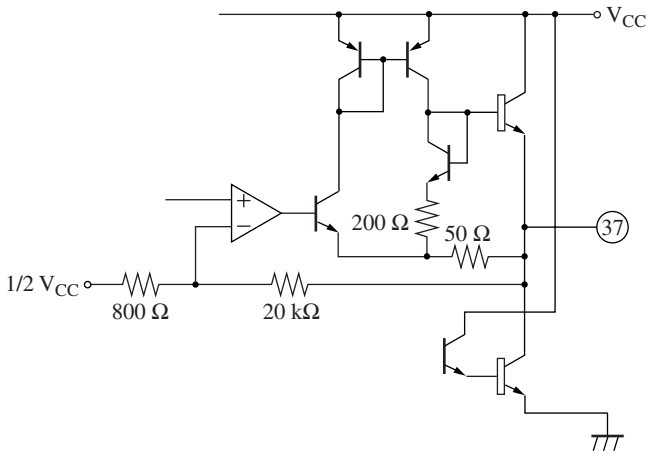
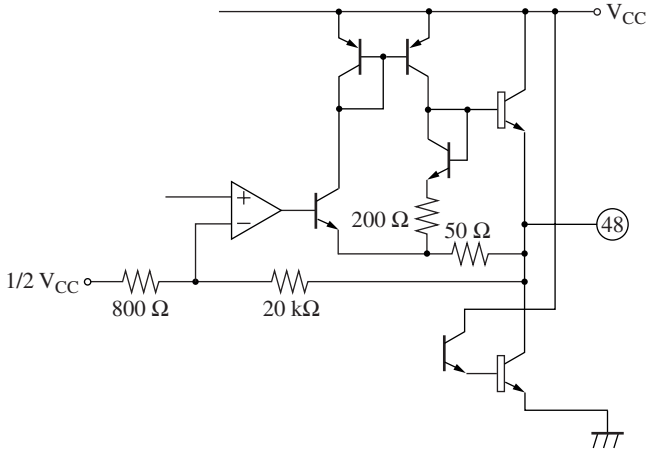
■ Terminal Equivalent Circuits (continued)

Pin No.	Pin name	Equivalent circuit	Voltage
9	Ch.1 input pin		1.4 V (Input circuit bias voltage is output.)
10	N.C.	—	—
11	N.C.	—	—
12	GND		0 V
13	N.C.	—	—
14	N.C.	—	—
15	GND	Connected to TAB	—
16	N.C.	—	—
17	N.C.	—	—
18	N.C.	—	—
19	N.C.	—	—
20	Ch.2 input pin		1.4 V (Input circuit bias voltage is output.)

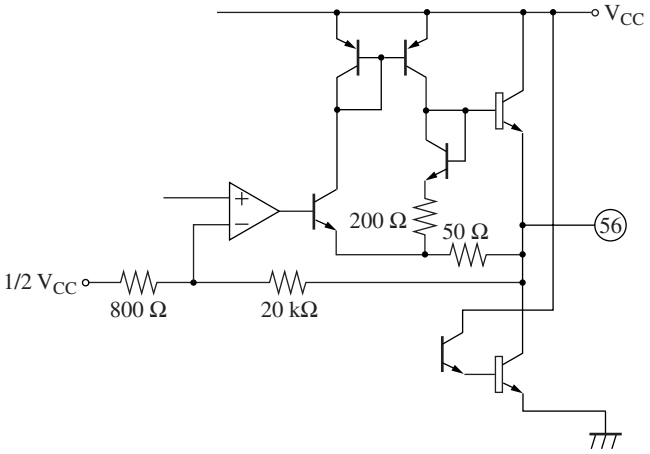
■ Terminal Equivalent Circuits (continued)

Pin No.	Pin name	Equivalent circuit	Voltage
21	N.C.	—	—
22	N.C.	—	—
23	N.C.	—	—
24	N.C.	—	—
25	N.C.	—	—
26	N.C.	—	—
27	N.C.	—	—
28	Volume pin		Supplied with 0 V to 1.25 V
29	Ch.2 – output pin		2.15 V (at no signal)
30	N.C.	—	—
31	N.C.	—	—
32	N.C.	—	—
33	GND		0 V
34	N.C.	—	—
35	N.C.	—	—
36	N.C.	—	—

■ Terminal Equivalent Circuits (continued)

Pin No.	Pin name	Equivalent circuit	Voltage
37	Ch.2 + output pin		2.15 V (at no signal)
38	N.C.	—	—
39	N.C.	—	—
40	N.C.	—	—
41	N.C.	—	—
42	GND	Connected to TAB	0 V
43	N.C.	—	—
44	N.C.	—	—
45	V_{CC}	—	5.0 V
46	N.C.	—	—
47	N.C.	—	—
48	Ch.1 + output pin		2.15 V (at no signal)
49	N.C.	—	—
50	N.C.	—	—
51	N.C.	—	—

■ Terminal Equivalent Circuits (continued)

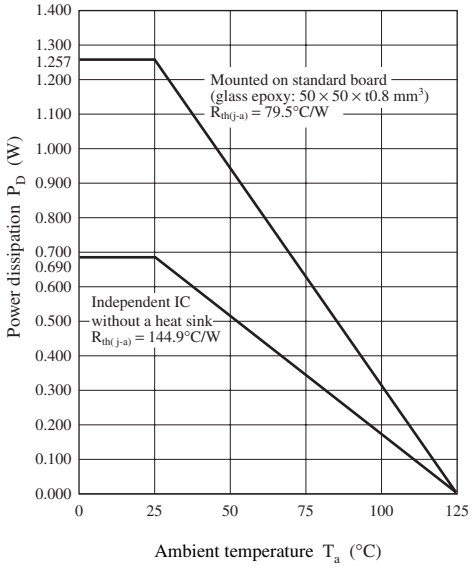
Pin No.	Pin name	Equivalent circuit	Voltage
52	GND		0 V
53	N.C.	—	—
54	N.C.	—	—
55	N.C.	—	—
56	Ch.1 – output pin		2.15 V (at no signal)

■ Usage Notes

- Please avoid the short circuit 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 for the signal input with the signal GND of the amplifier in the previous stage.
- Take notice that the ripple rejection ratio is poor in case of headphone use.
- Take notice that as to following pins, electric surge voltage is low.
  At 200 pF, Pin1 = +140 V, Pin9 = +140 V, Pin20 = +130 V, Pin28 = +150 V.
- Use a speaker with 8 Ω or more impedance.

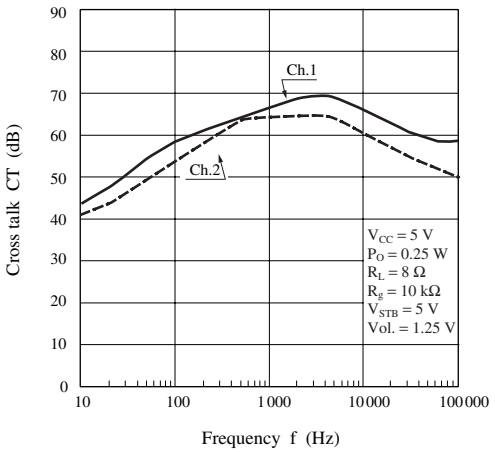
■ Technical Data

• P_D — T_a curve of HSOP056-P-0300A

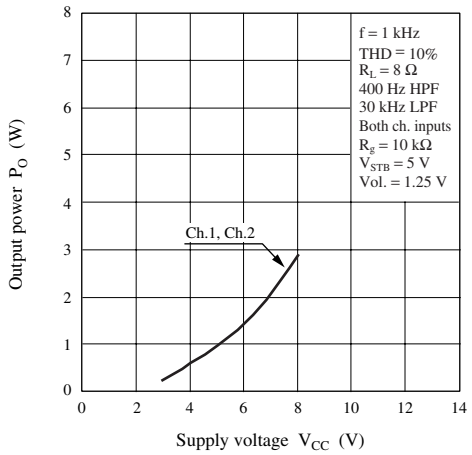


• Main characteristics

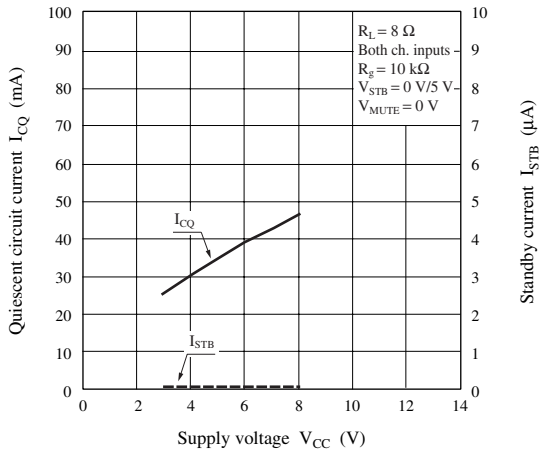
CT — f



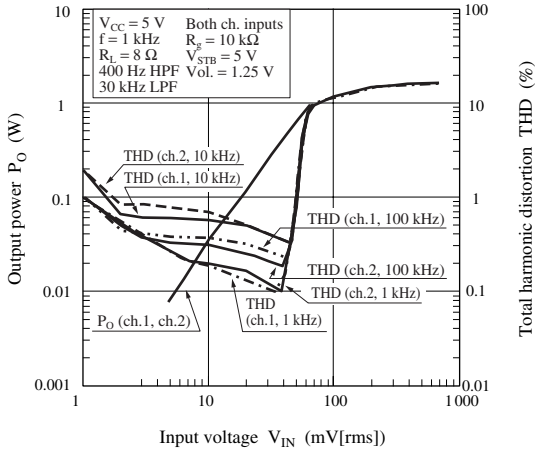
P_O — V_{CC}



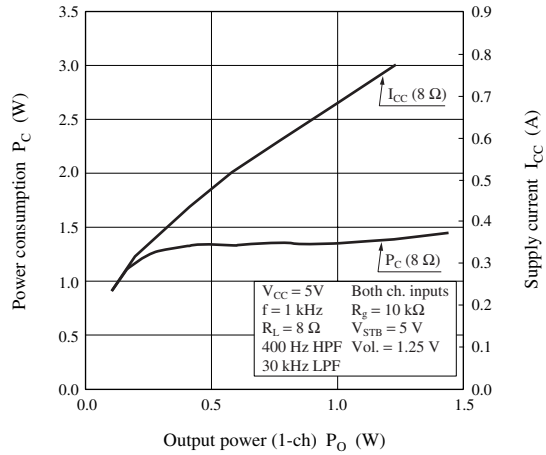
I_{CQ} , I_{STB} — V_{CC}



P_O , THD — V_{IN}



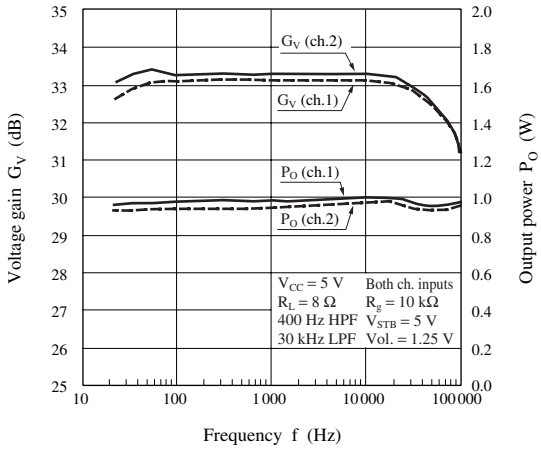
P_C , I_{CC} — P_O



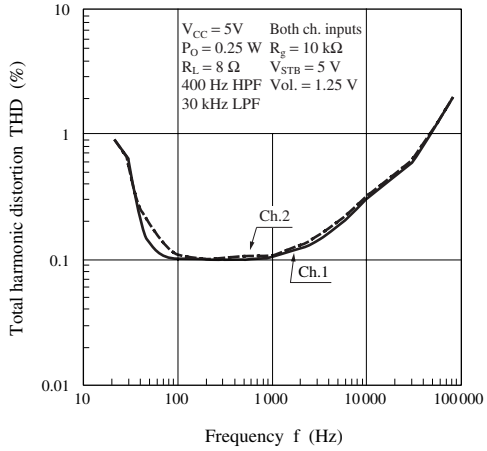
■ Technical Data (continued)

• Main characteristics (continued)

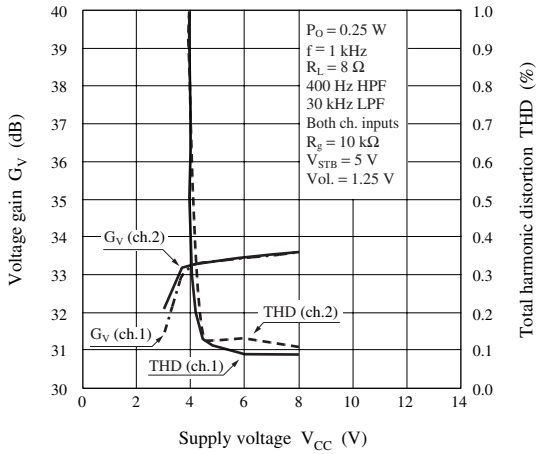
G_V , P_O — f



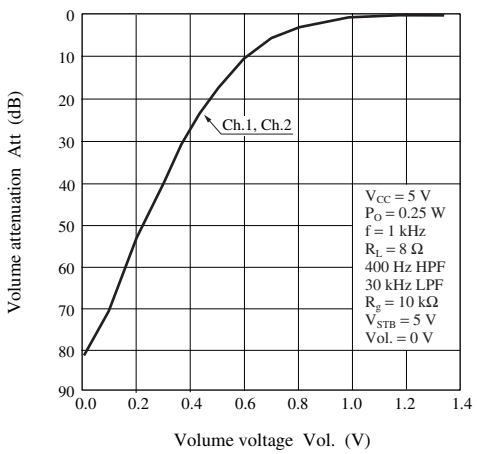
THD — f



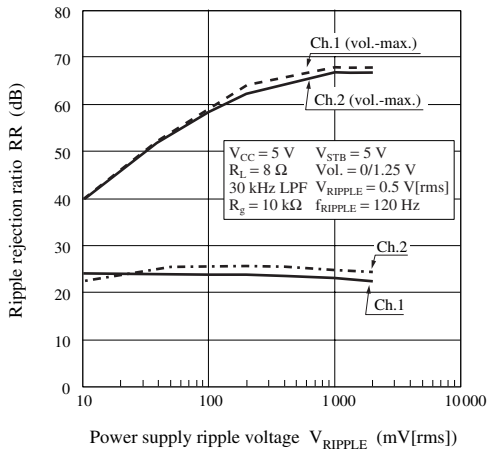
G_V , THD — V_{CC}



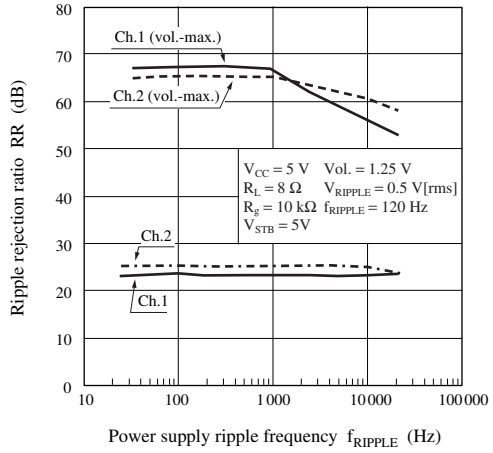
Att — Vol.



RR — V_{RIPPLE}



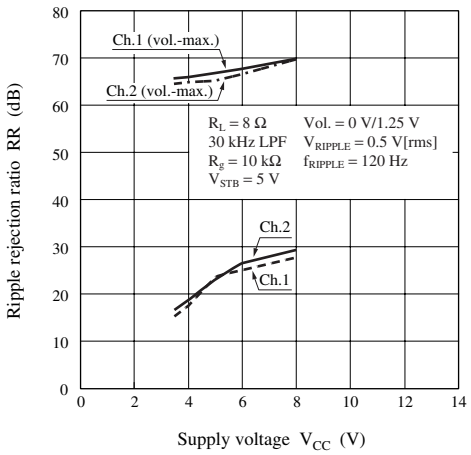
RR — f_{RIPPLE}



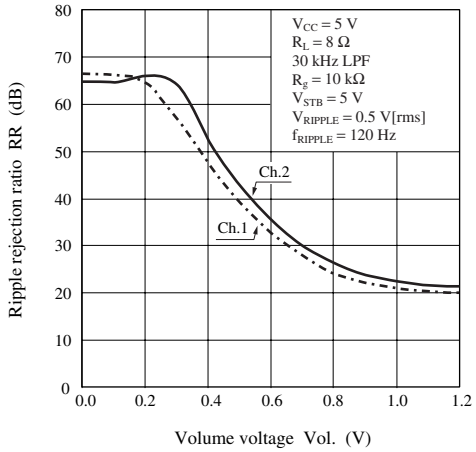
■ Technical Data (continued)

• Main characteristics (continued)

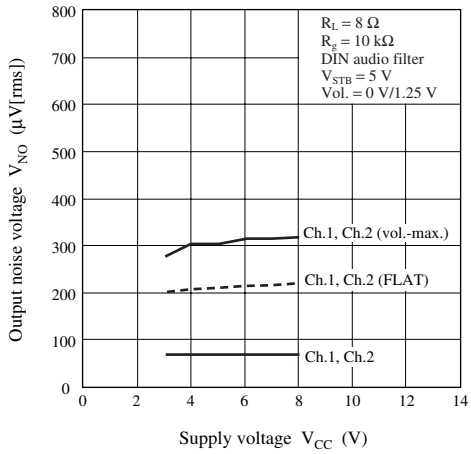
RR — V_{CC}



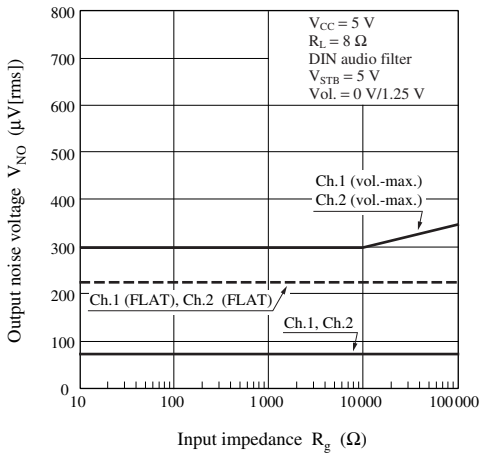
RR — Vol.



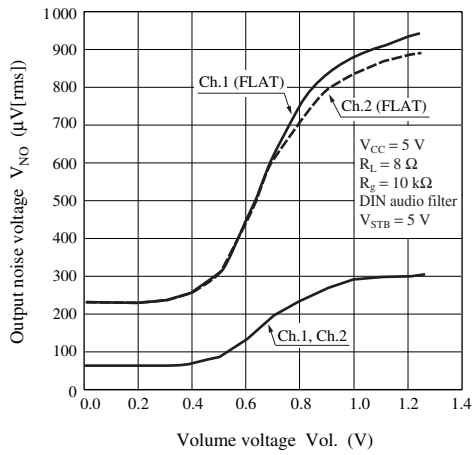
V_{NO} — V_{CC}



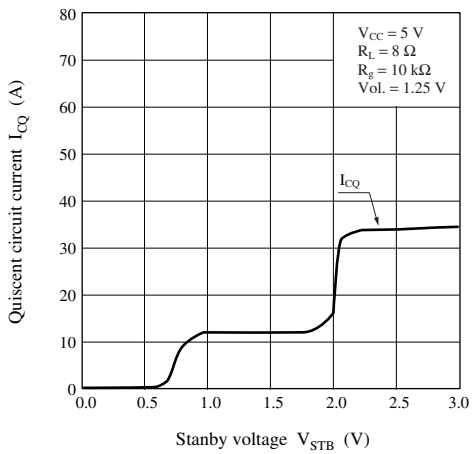
V_{NO} — R_g



V_{NO} — Vol.



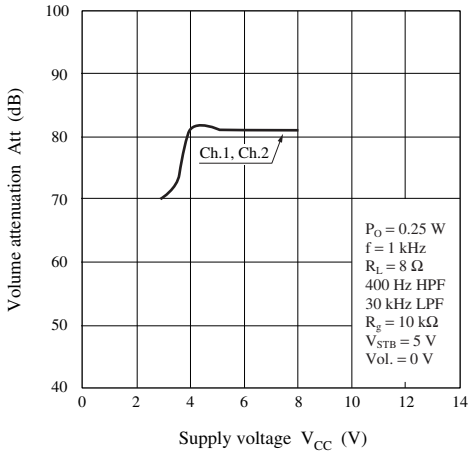
I_{CQ} — V_{STB}



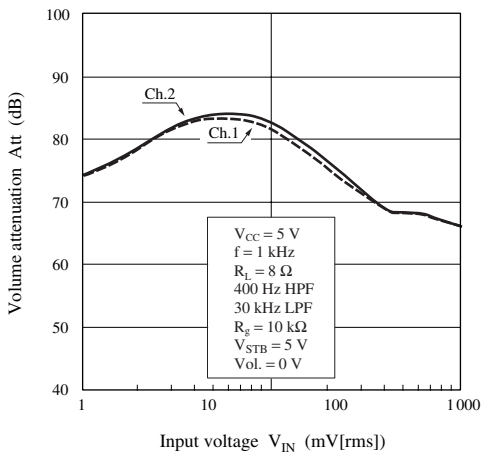
■ Technical Data (continued)

• Main characteristics (continued)

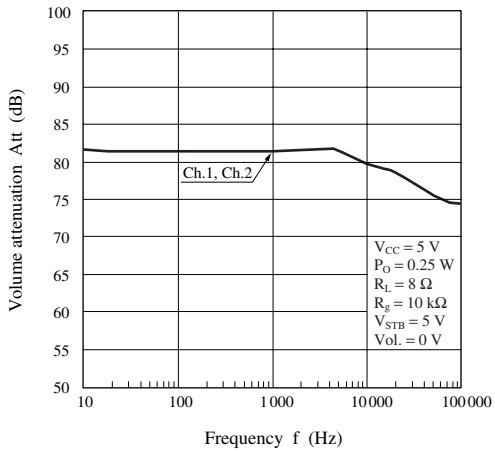
Att — V_{CC}



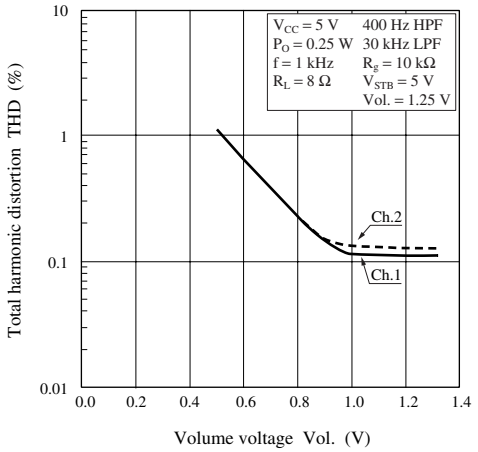
Att — V_{IN}



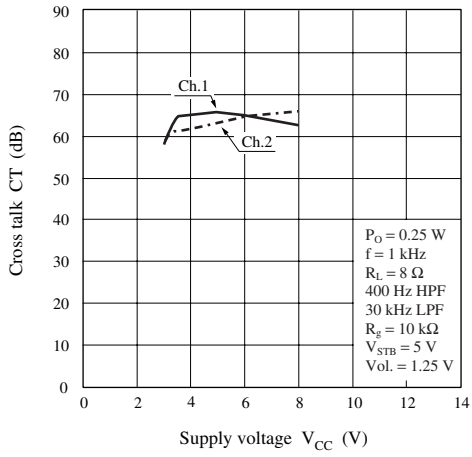
Att — f



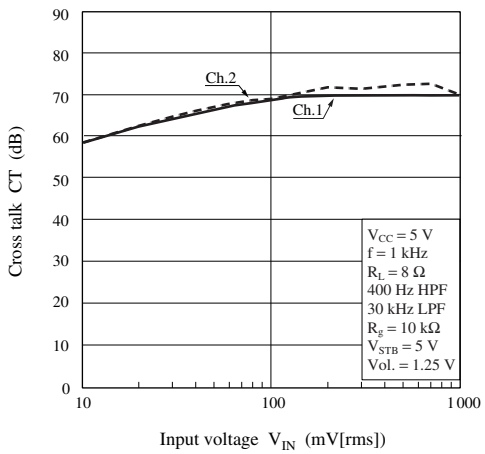
THD — Vol.



CT — V_{CC}



CT — V_{IN}



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