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AN7510

Dual 1-W BTL audio power amplifier

■ Overview

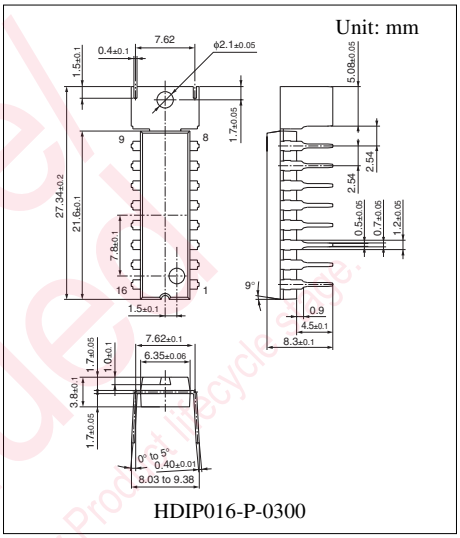
The AN7510 is an audio power amplifier IC for stereo system. The BTL (Balanced Transformer-Less) method can provide fewer external parts and more easy design for applications.

■ Features

- 1-W output (8 Ω) with supply voltage of 5 V
- On-chip standby function
- On-chip volume function

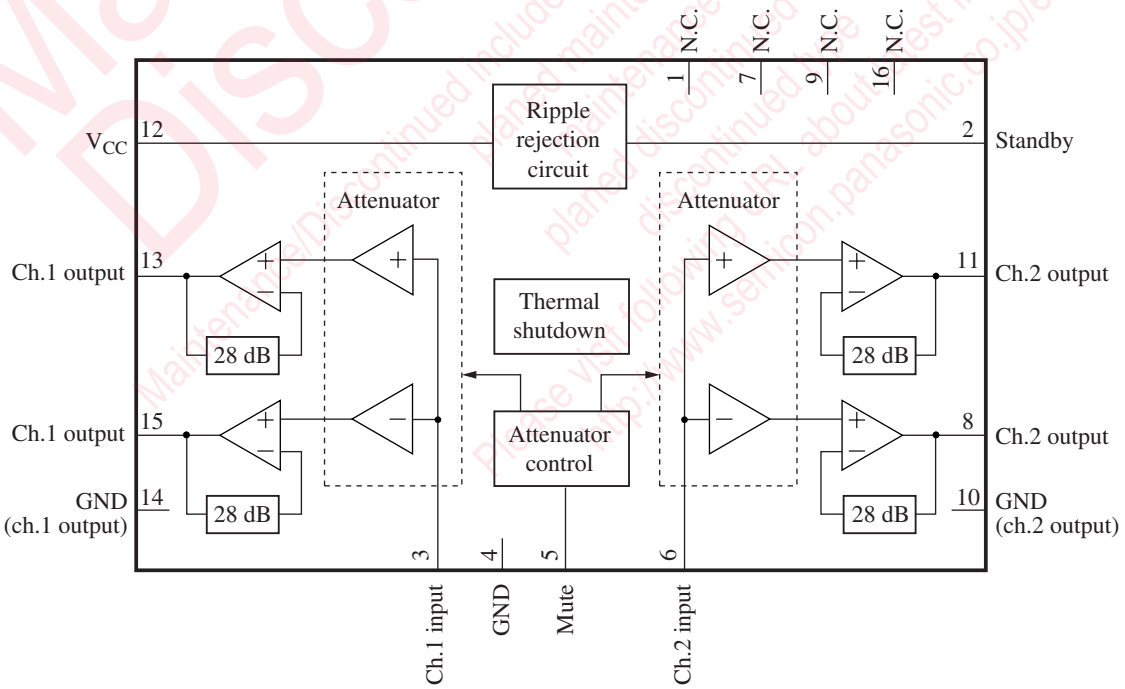
■ Applications

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



Note) The package of this product will be changed to lead-free type (HDIP016-P-0300A). See the new package dimensions section later of this datasheet.

■ Block Diagram



■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	N.C.	9	N.C.
2	Standby (standby state if this pin is open.)	10	Ground (output ch.2)
3	Ch.1 input	11	Ch.2 + output
4	Ground (input)	12	Power voltage
5	Muting (muting off if this pin is open.)	13	Ch.1 + output
6	Ch.2 input	14	Ground (output ch.1)
7	N.C.	15	Ch.1 − output
8	Ch.2 − output	16	N.C.

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	1 127	mW
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

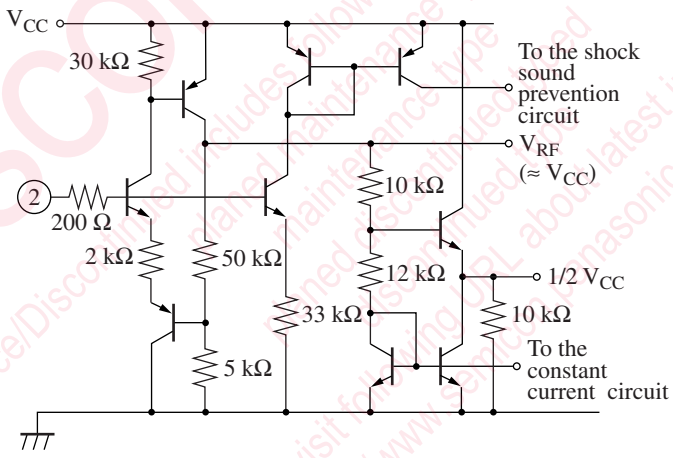
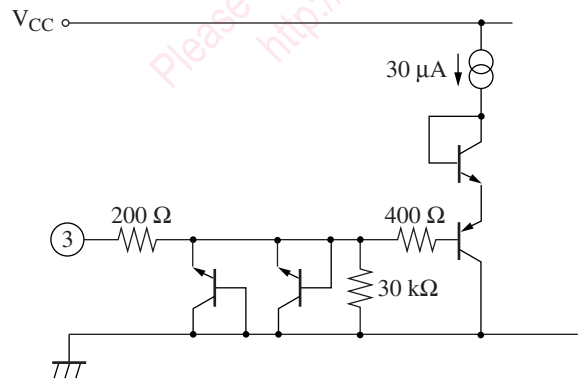
Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	3.5 to 13.5	V

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

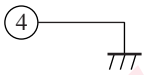
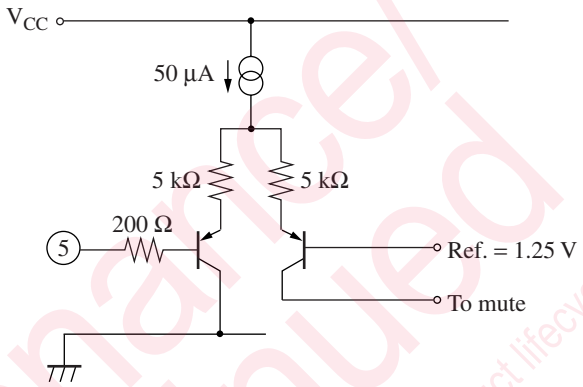
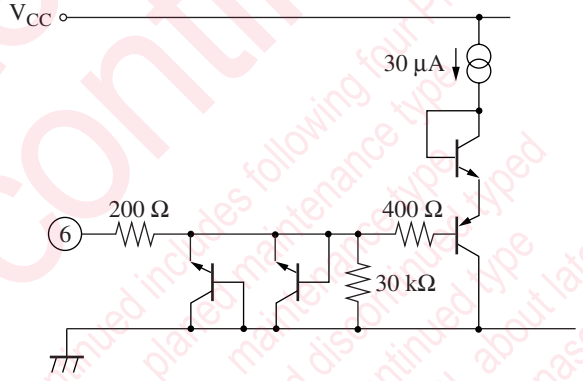
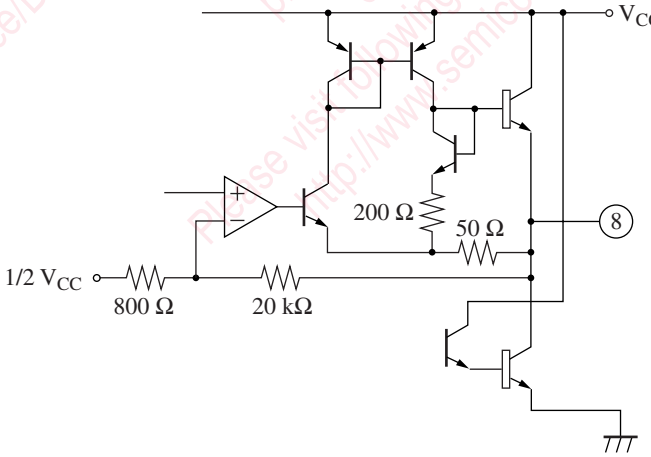
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent circuit current	I_{CQ}	V_{IN} = 0 mV	—	50	100	mA
Standby current	I_{STB}	V_{IN} = 0 mV	—	1	10	µA
Output noise voltage *	V_{NO}	R_g = 10 kΩ	—	0.14	0.4	mV[rms]
Voltage gain	G_V	P_O = 0.25 W	32	34	36	dB
Total harmonic distortion	THD	P_O = 0.25 W	—	0.05	0.5	%
Maximum output power	P_{O1}	THD = 10%	0.8	1.1	—	W
Ripple rejection ratio *	RR	R_g = 10 kΩ, V_R = 0.5 V[rms], f_R = 120 Hz	30	50	—	dB
Output offset voltage	V_{OFF}	R_g = 10 kΩ	−300	0	300	mV
Muting effect *	MT	P_O = 0.25 W	70	86	—	dB
Channel balance	CB	P_O = 0.25 W	−1	0	1	dB
Channel crosstalk	CT	P_O = 0.25 W	55	65	—	dB

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

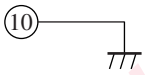
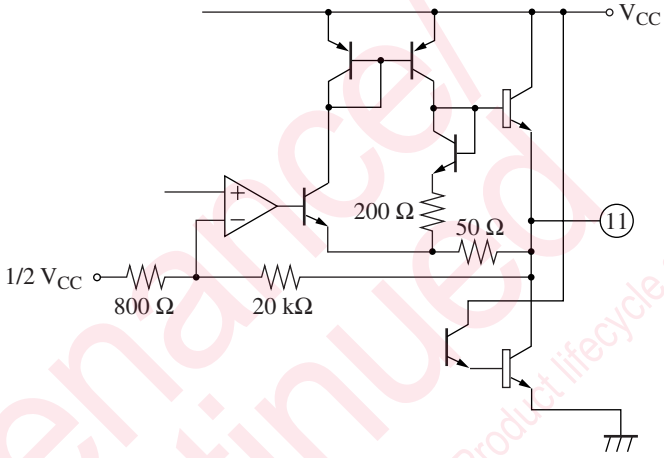
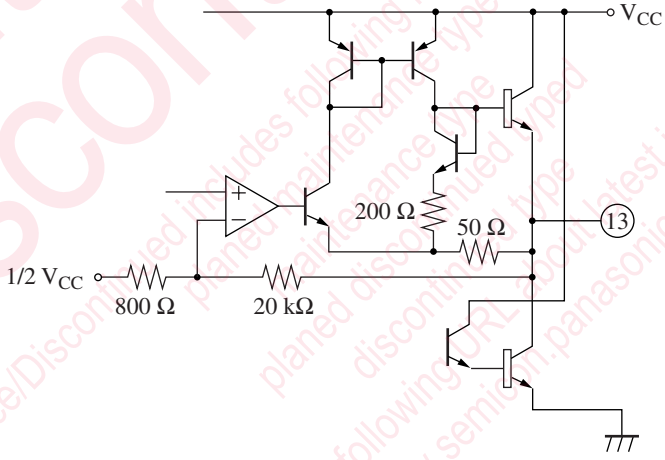
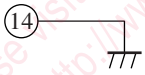
■ Terminal Equivalent Circuits

Pin No.	Pin name	Equivalent circuit	Voltage
1	N.C.	Open	—
2	Standby pin		5 V
3	Ch.1 input pin		—

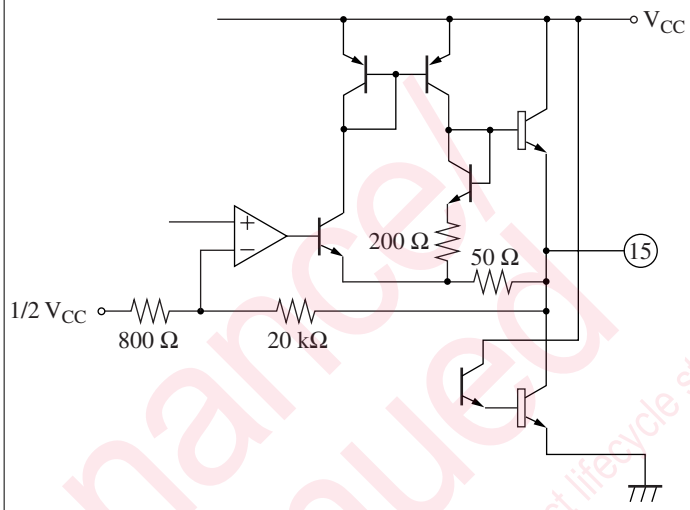
■ Terminal Equivalent Circuits (continued)

Pin No.	Pin name	Equivalent circuit	Voltage
4	GND		0 V
5	Muting pin		—
6	Ch.1 input pin		—
7	N.C.	Open	—
8	Ch.2 – output pin		2.15 V
9	N.C.	Open	—

■ Terminal Equivalent Circuits (continued)

Pin No.	Pin name	Equivalent circuit	Voltage
10	GND		0 V
11	Ch.2 + output pin		2.15 V
12	V_{CC}	—	5.0 V
13	Ch.1 + output pin		2.15 V
14	GND		0 V

■ Terminal Equivalent Circuits (continued)

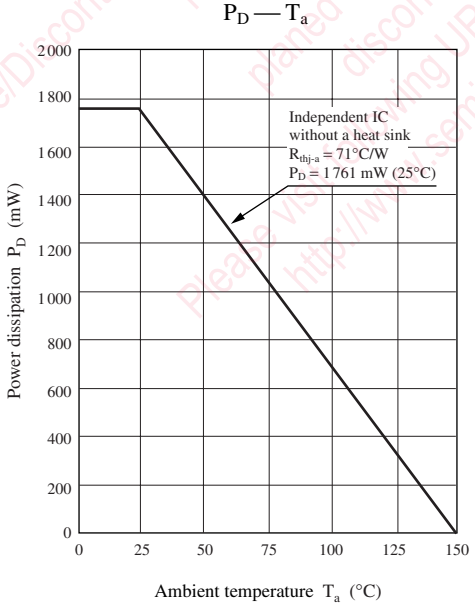
Pin No.	Pin name	Equivalent circuit	Voltage
15	Ch.1 – output pin		2.15 V
16	N.C.	Open	—

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

■ Technical Data

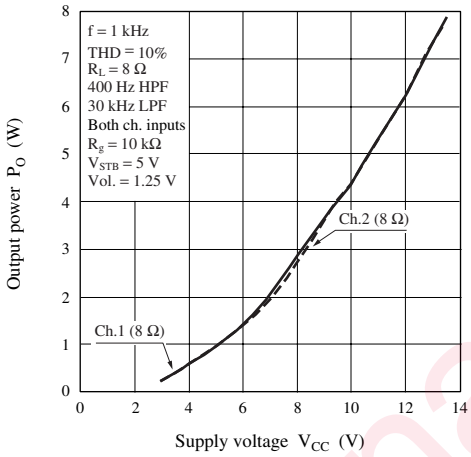
- P_D — T_a curve of HDIP016-P-0300



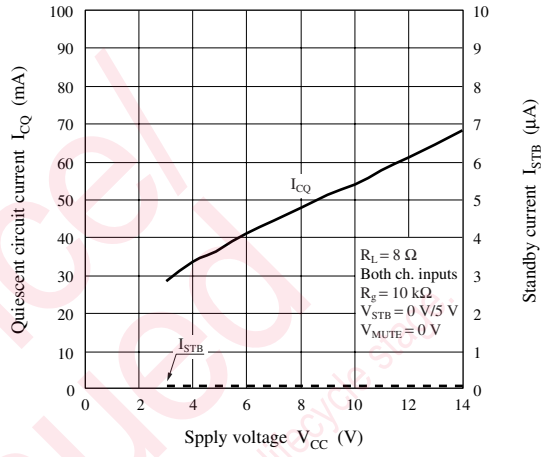
■ Technical Data (continued)

• Main characteristics

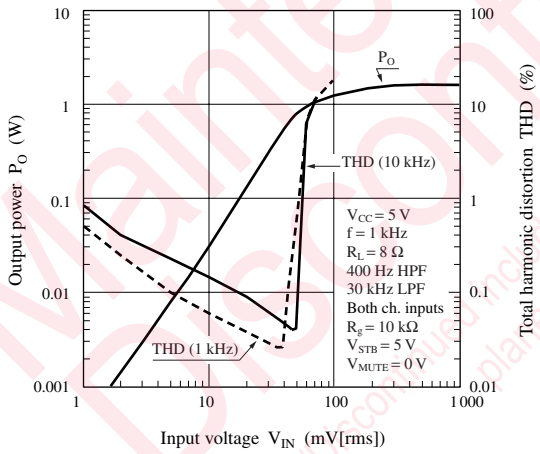
P_O — V_{CC}



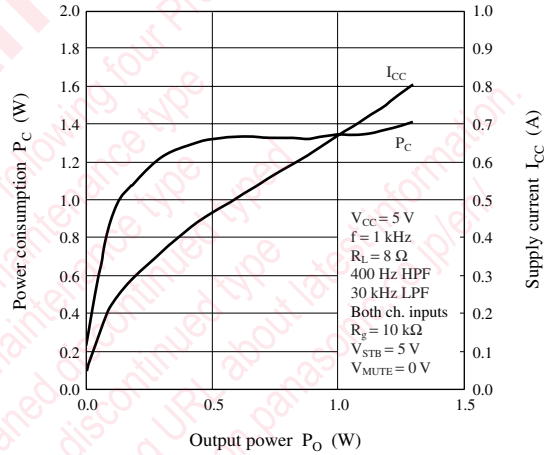
I_{CQ} , I_{STB} — V_{CC}



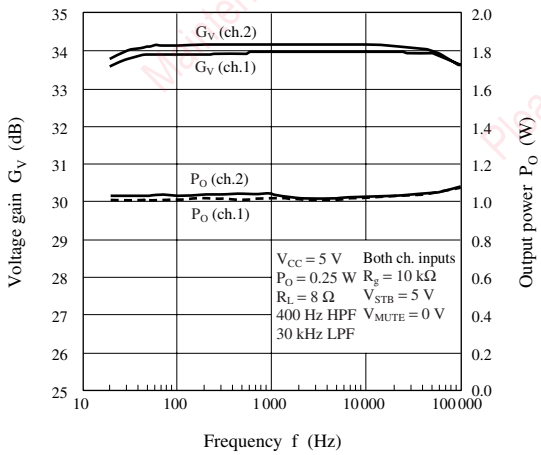
P_O , THD — V_{IN}



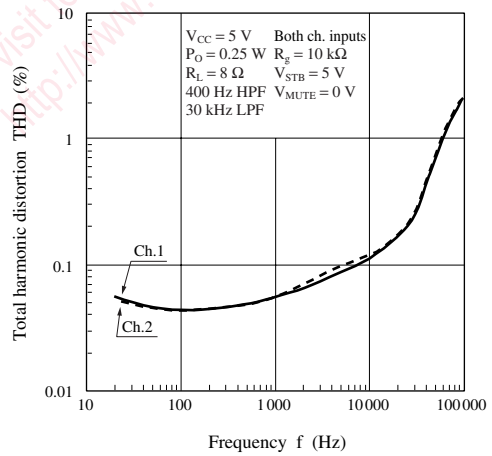
P_C , I_{CC} — P_O



G_V , P_O — f



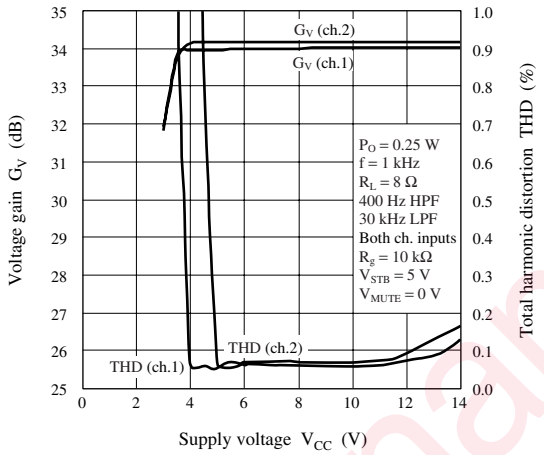
THD — f



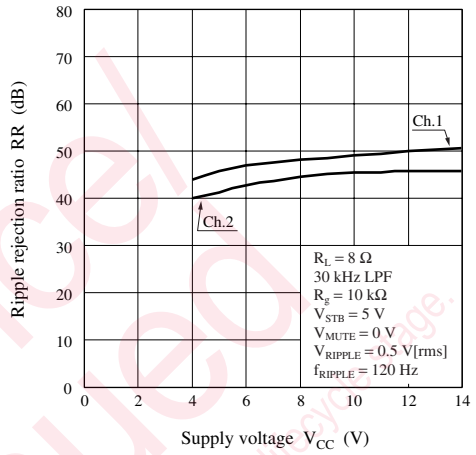
■ Technical Data (continued)

• Main characteristics (continued)

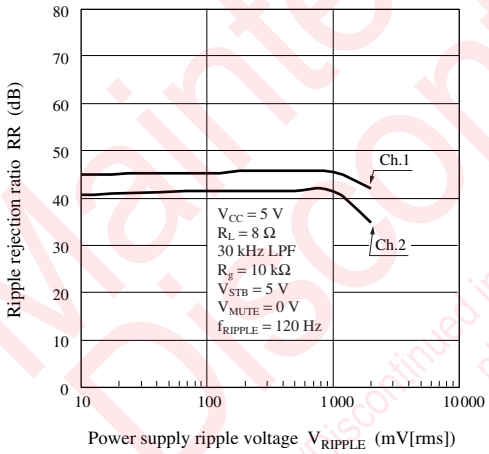
G_V , THD — V_{CC}



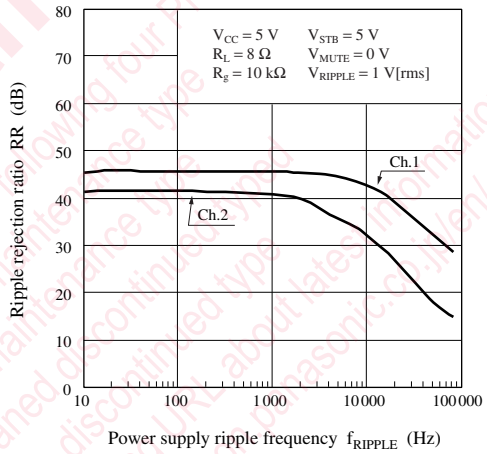
RR — V_{CC}



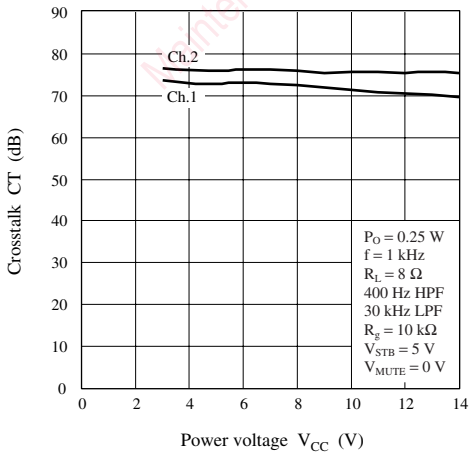
RR — V_{RIPPLE}



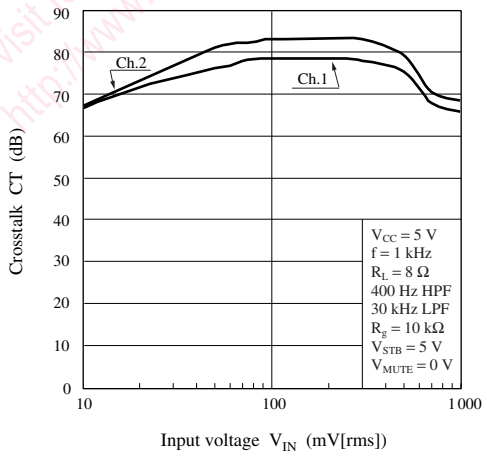
RR — f_{RIPPLE}



CT — V_{CC}



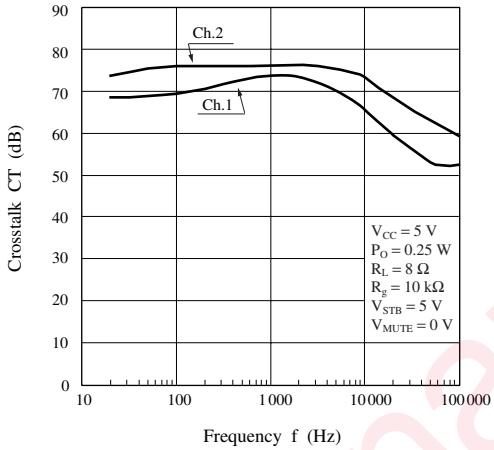
CT — V_{IN}



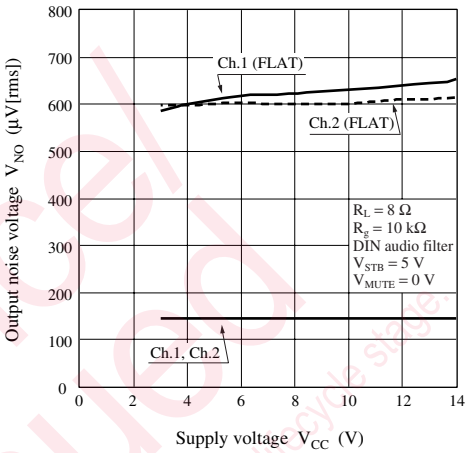
■ Technical Data (continued)

• Main characteristics (continued)

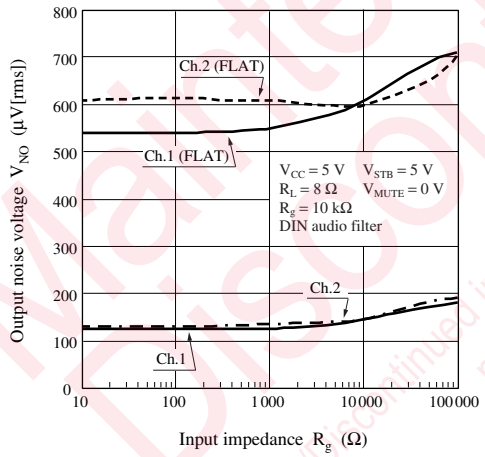
CT — f



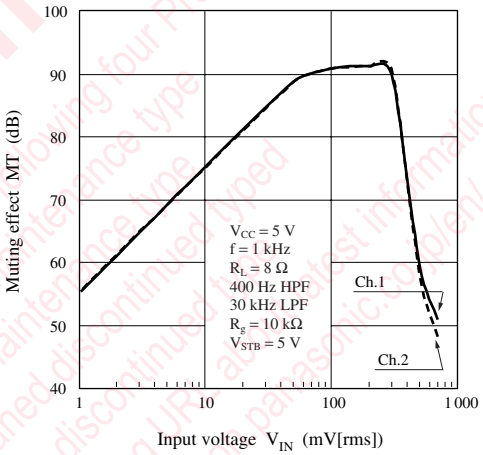
V_{NO} — V_{CC}



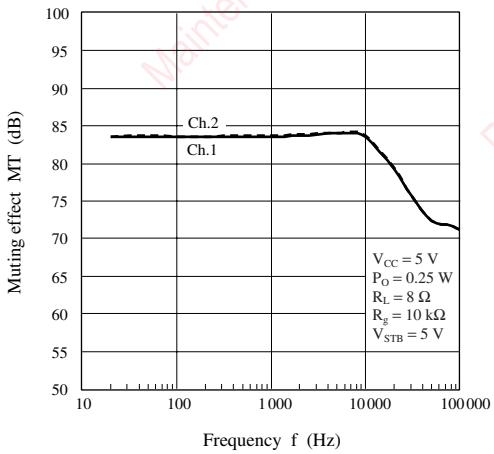
V_{NO} — R_g



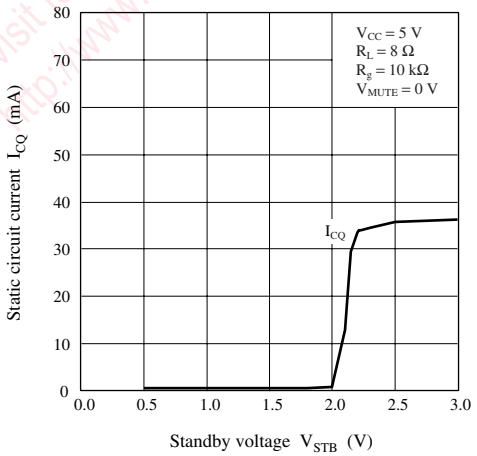
MT — V_{IN}



MT — f

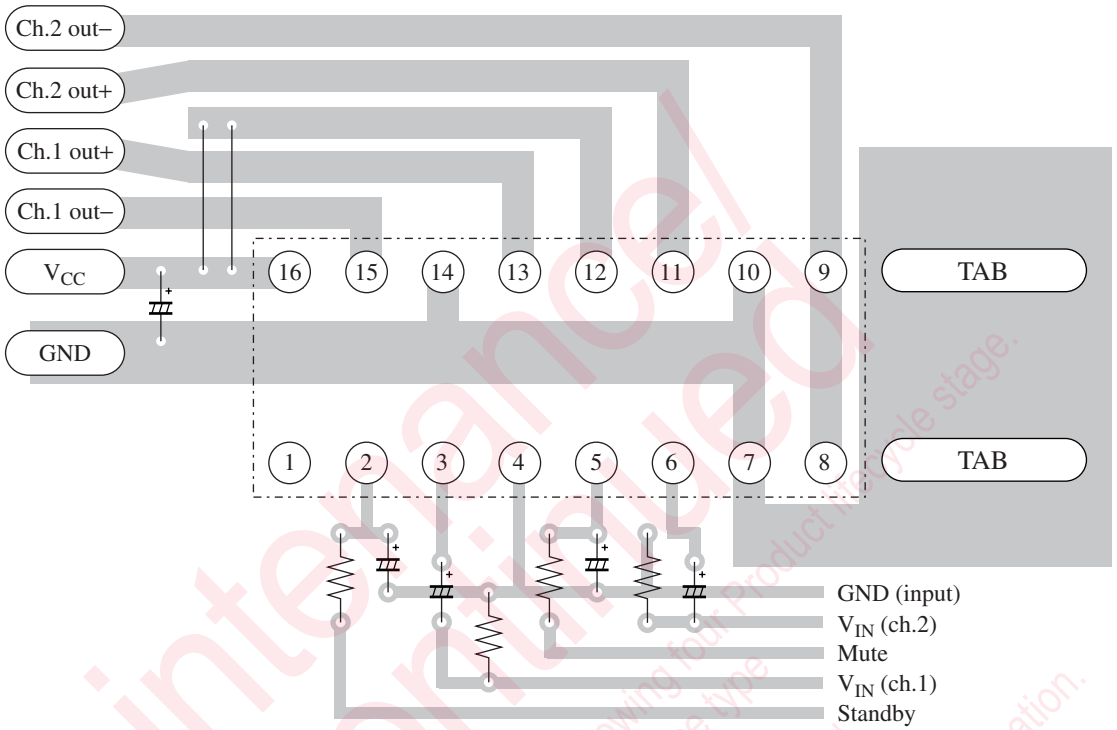


I_{CQ} — V_{STB}

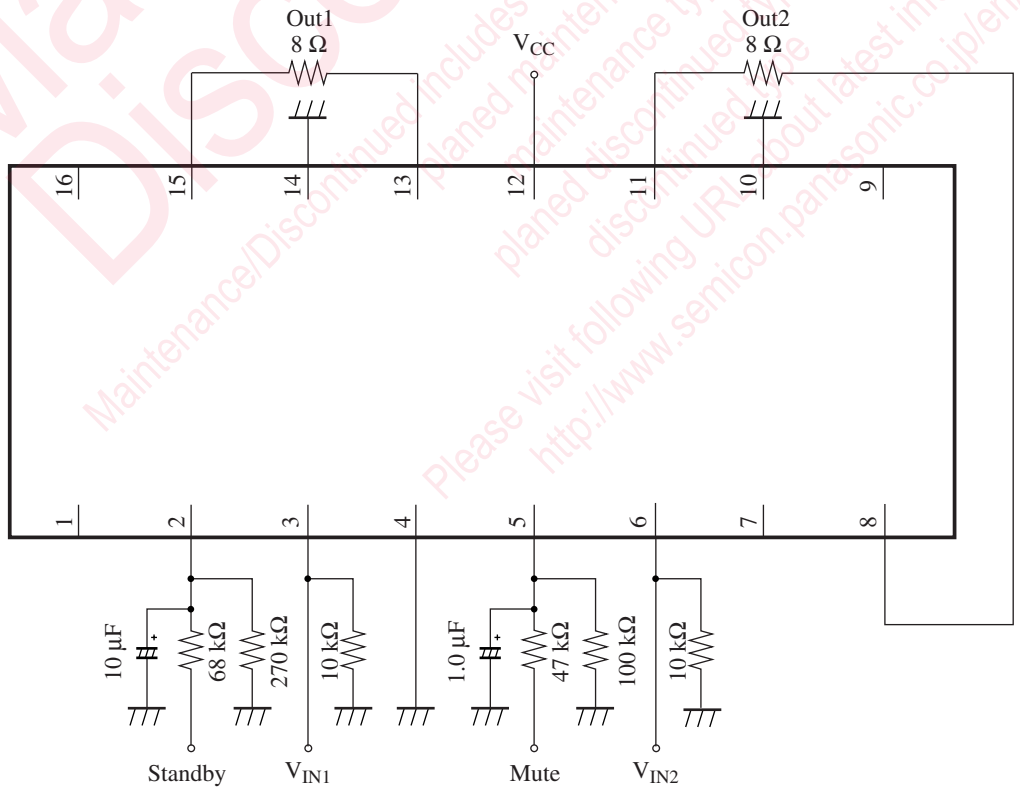


■ Technical Data (continued)

• Example of PCB pattern

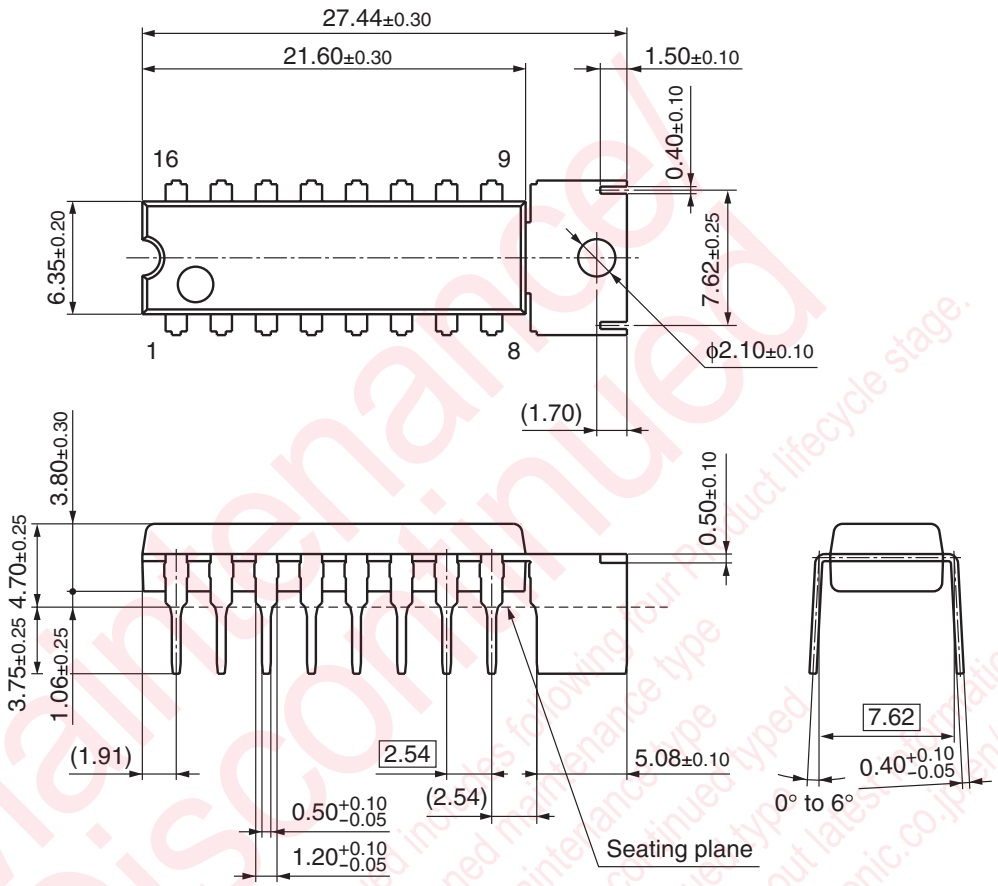


■ Application Circuit Example



■ New Package Dimensions (Unit: mm)

• HDIP016-P-0300A (Lead-free package)



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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.