

# AN7510

## Dual 1-W BTL audio power amplifier

### ■ Overview

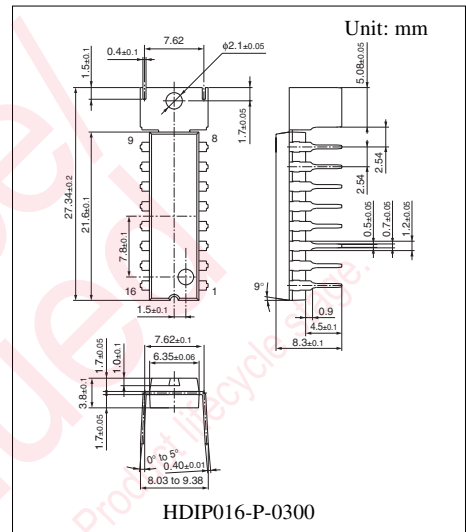
The AN7510 is an audio power amplifier IC for stereo system. The BTL (Balanced Transformer-Less) method can provide fewer external parts and more easy design for applications.

### ■ Features

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

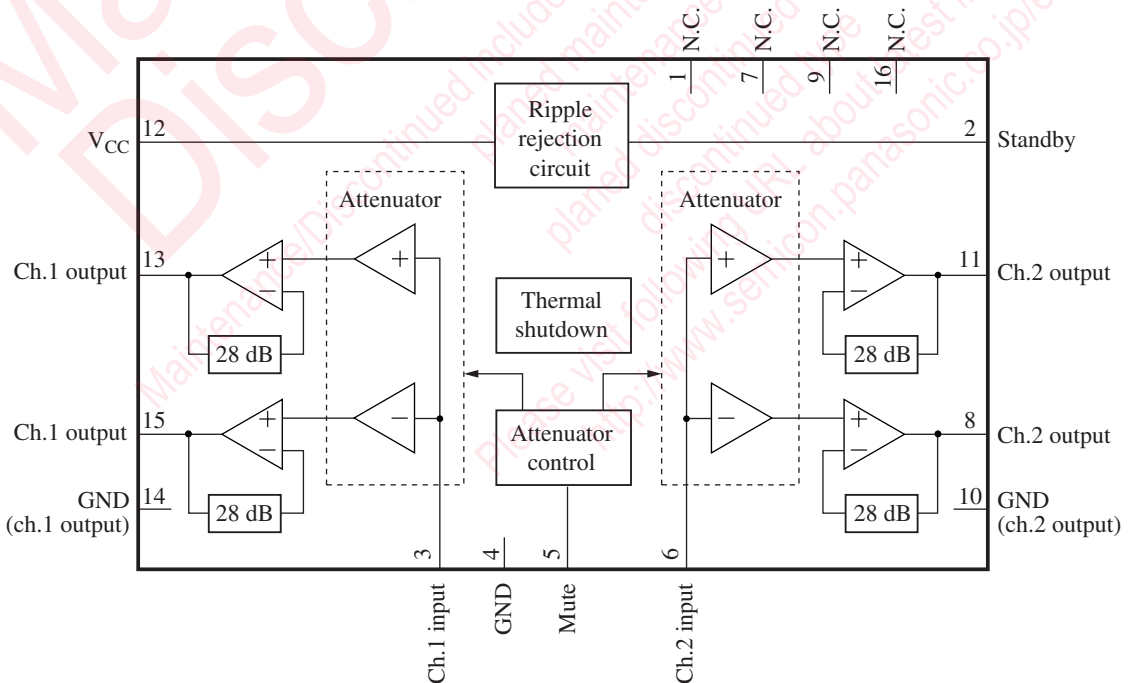
### ■ Applications

- 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 <sup>*2</sup>	$V_{CC}$	14	V
Supply current	$I_{CC}$	2.0	A
Power dissipation <sup>*3</sup>	$P_D$	1 127	mW
Operating ambient temperature <sup>*1</sup>	$T_{opr}$	-25 to +70	°C
Storage temperature <sup>*1</sup>	$T_{stg}$	-55 to +150	°C

Note) \*1: Except for the operating ambient temperature and storage temperature, all ratings are for  $T_a = 25^\circ\text{C}$ .

\*2: At no signal.

\*3: The power dissipation shown is the value for  $T_a = 70^\circ\text{C}$ .

### ■ Recommended Operating Range

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

■ Electrical Characteristics at  $V_{CC} = 5.0\text{ V}$ ,  $R_L = 8\ \Omega$ ,  $f = 1\text{ kHz}$ ,  $T_a = 25^\circ\text{C} \pm 2^\circ\text{C}$

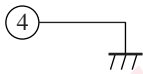
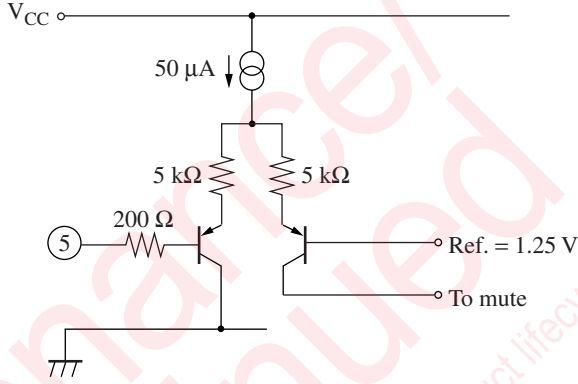
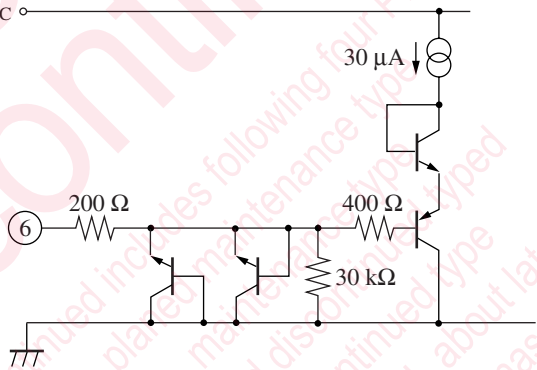
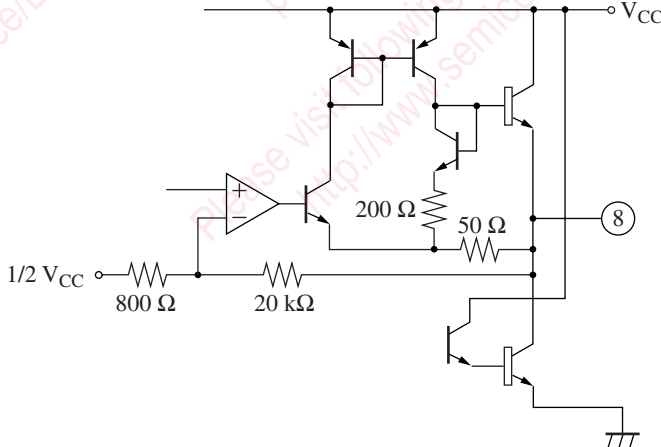
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent circuit current	$I_{CQ}$	$V_{IN} = 0\text{ mV}$	—	50	100	mA
Standby current	$I_{STB}$	$V_{IN} = 0\text{ mV}$	—	1	10	$\mu\text{A}$
Output noise voltage *	$V_{NO}$	$R_g = 10\text{ k}\Omega$	—	0.14	0.4	mV[rms]
Voltage gain	$G_V$	$P_O = 0.25\text{ W}$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

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

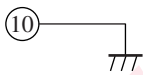
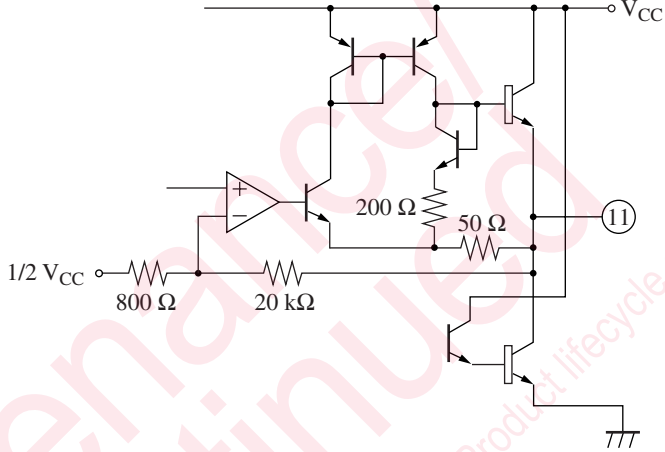
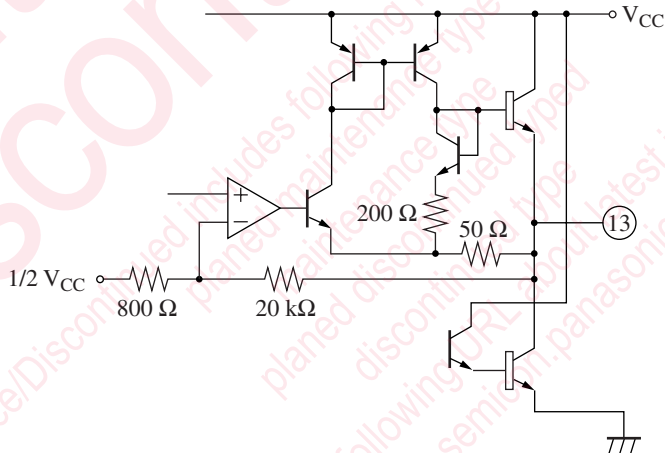
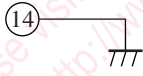
■ Terminal Equivalent Circuits

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 <sub>CC</sub>	—	5.0 V
13	Ch.1 + output pin		2.15 V
14	GND		0 V

■ Terminal Equivalent Circuits (continued)

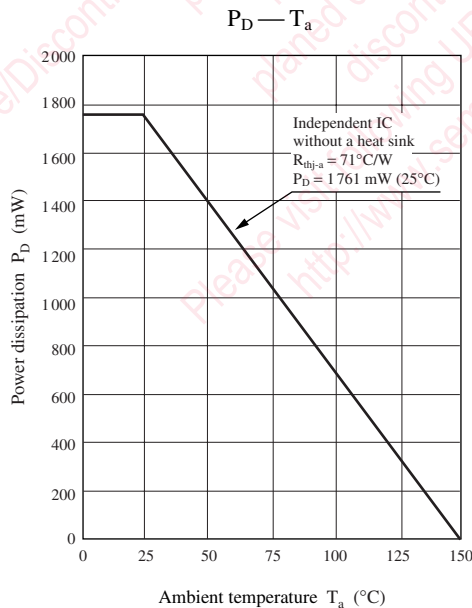
Pin No.	Pin name	Equivalent circuit	Voltage
15	Ch.1 – output pin		2.15 V
16	N.C.	Open	—

■ 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  $T_j = 150^\circ\text{C}$ . 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.

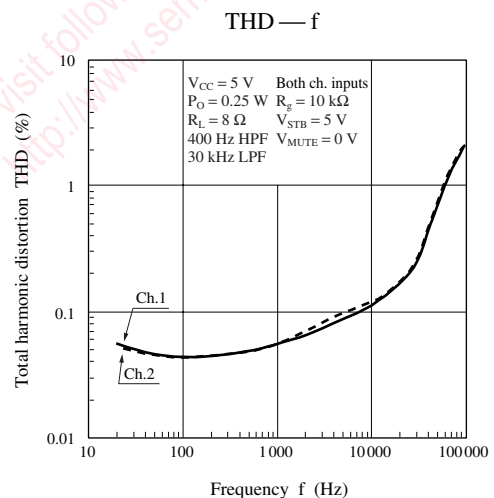
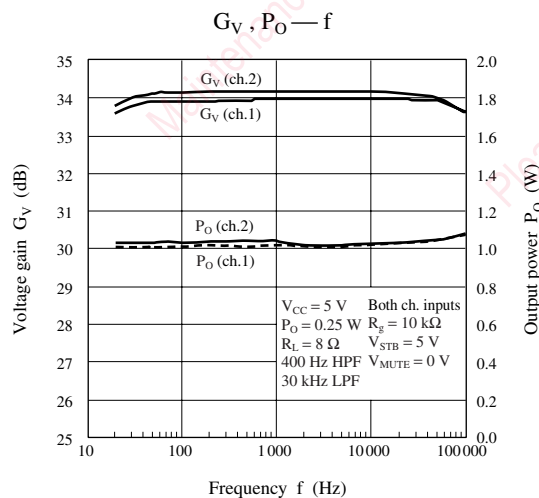
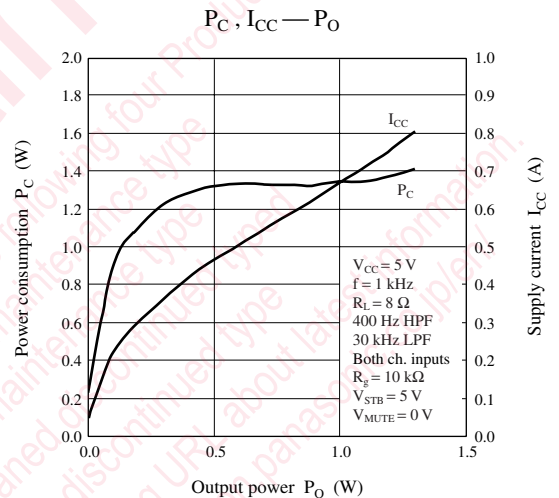
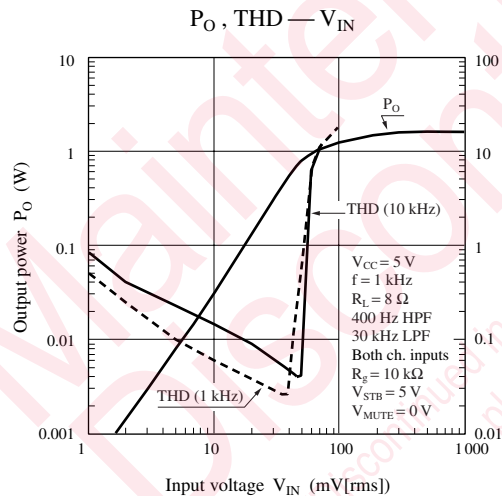
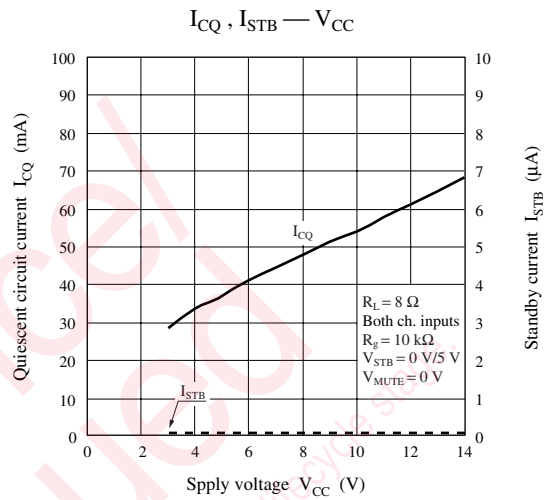
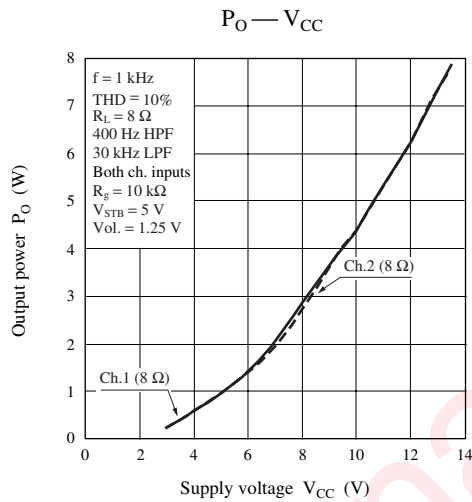
■ Technical Data

- $P_D - T_a$  curve of HDIP016-P-0300



■ Technical Data (continued)

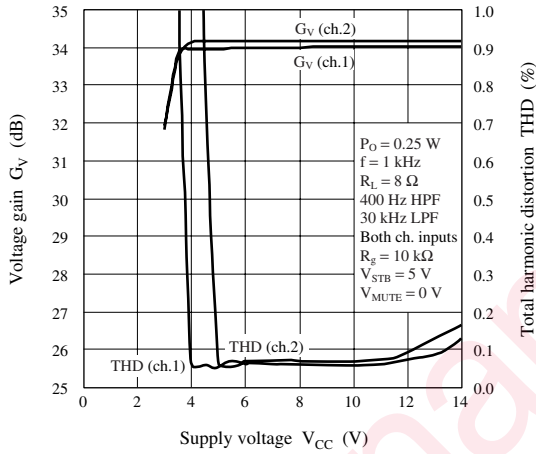
• Main characteristics



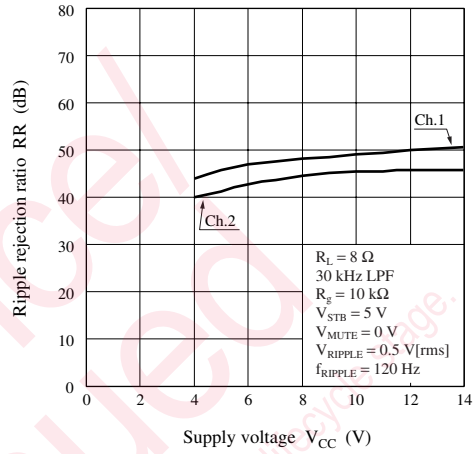
■ Technical Data (continued)

• Main characteristics (continued)

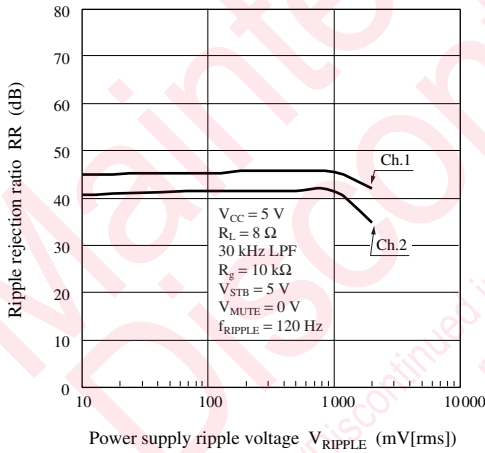
$G_V$ , THD —  $V_{CC}$



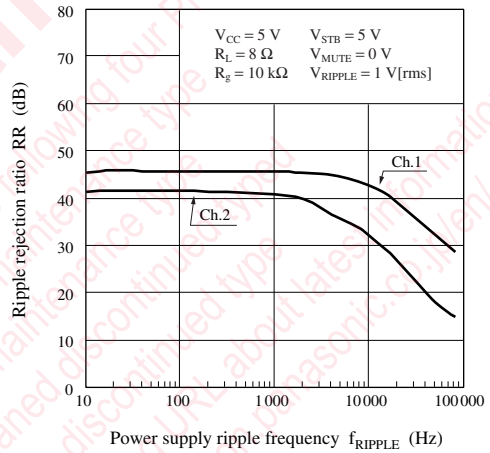
RR —  $V_{CC}$



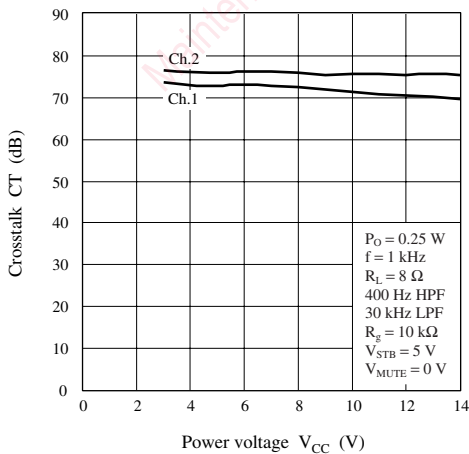
RR —  $V_{RIPPLE}$



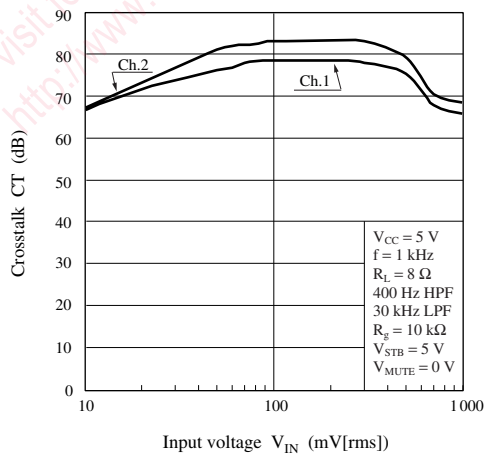
RR —  $f_{RIPPLE}$



CT —  $V_{CC}$



CT —  $V_{IN}$

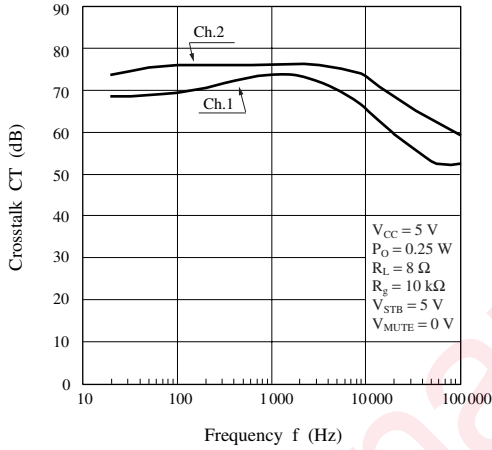




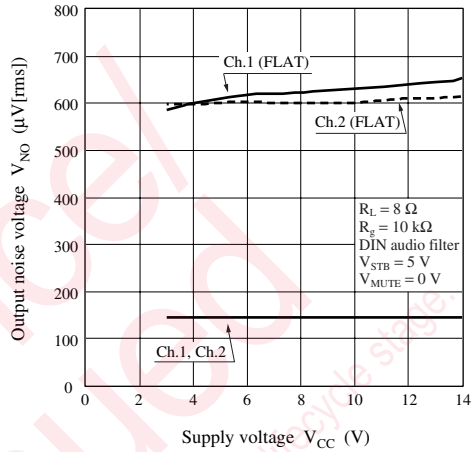
■ Technical Data (continued)

• Main characteristics (continued)

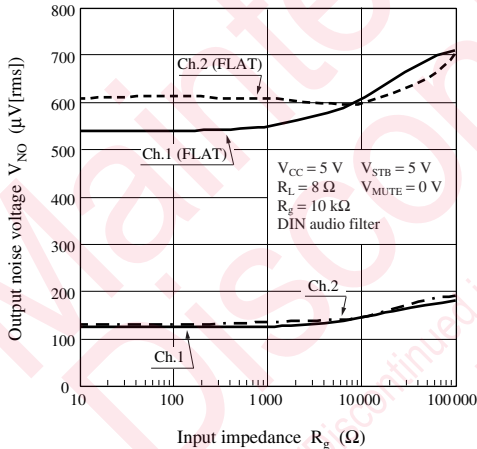
CT — f



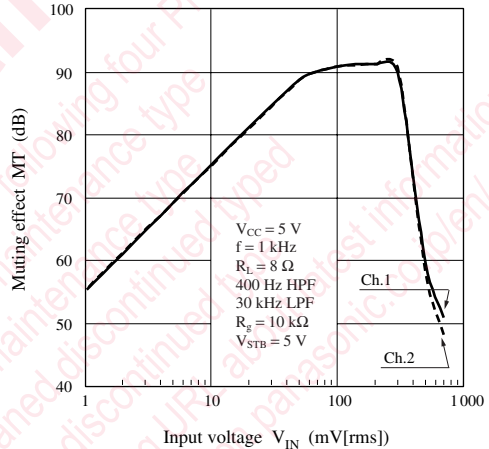
$V_{NO} — V_{CC}$



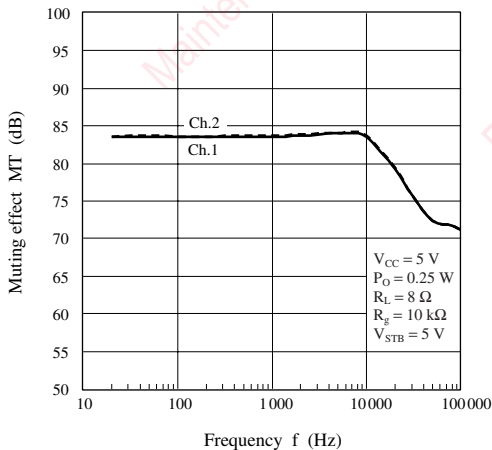
$V_{NO} — R_g$



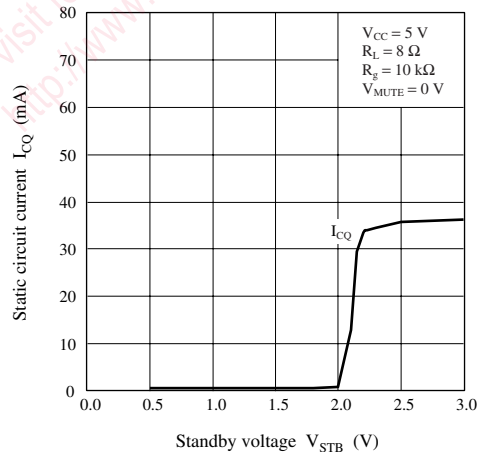
MT —  $V_{IN}$



MT — f

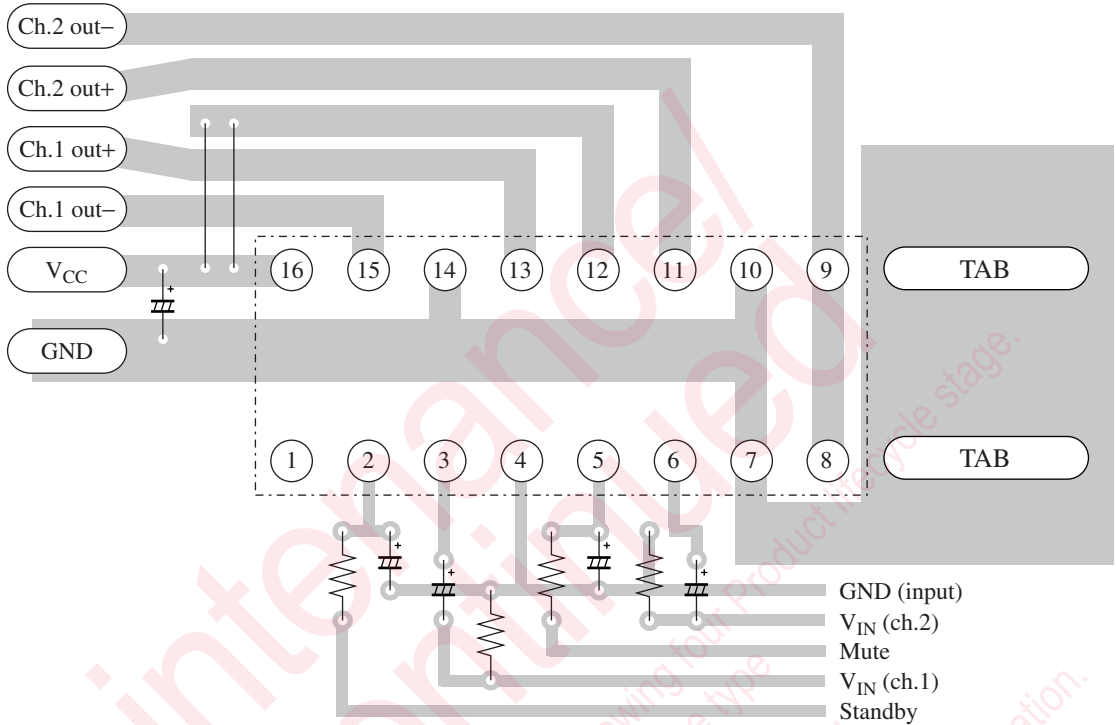


$I_{CQ} — V_{STB}$

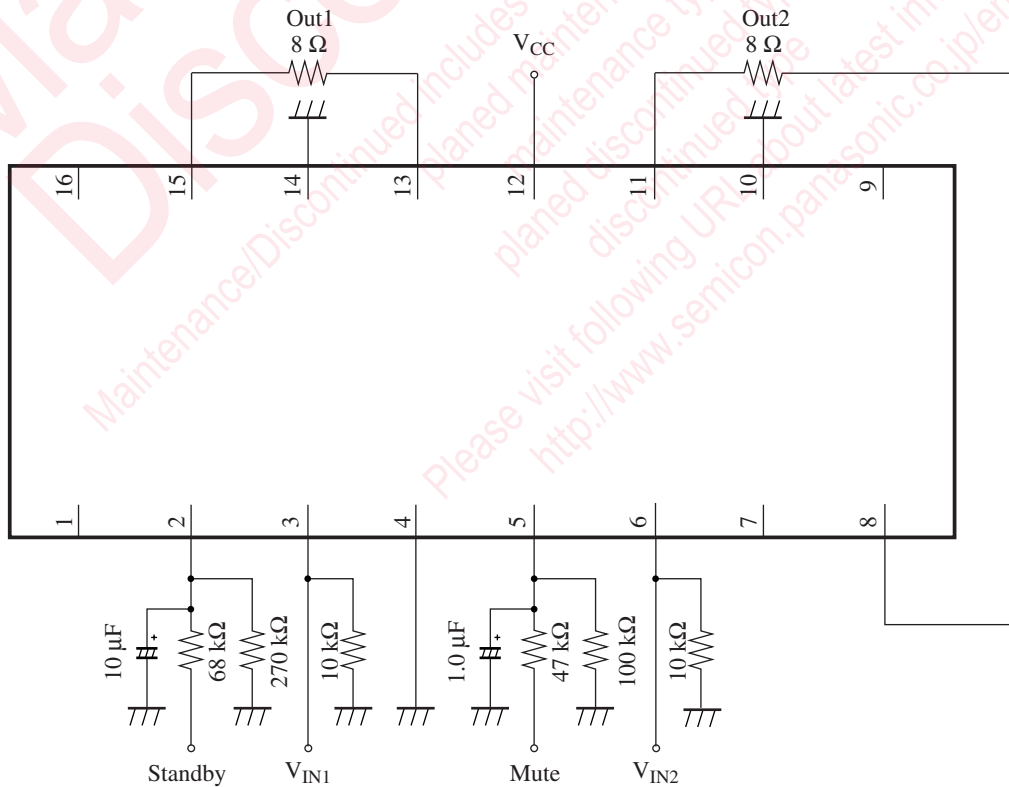


■ Technical Data (continued)

- Example of PCB pattern

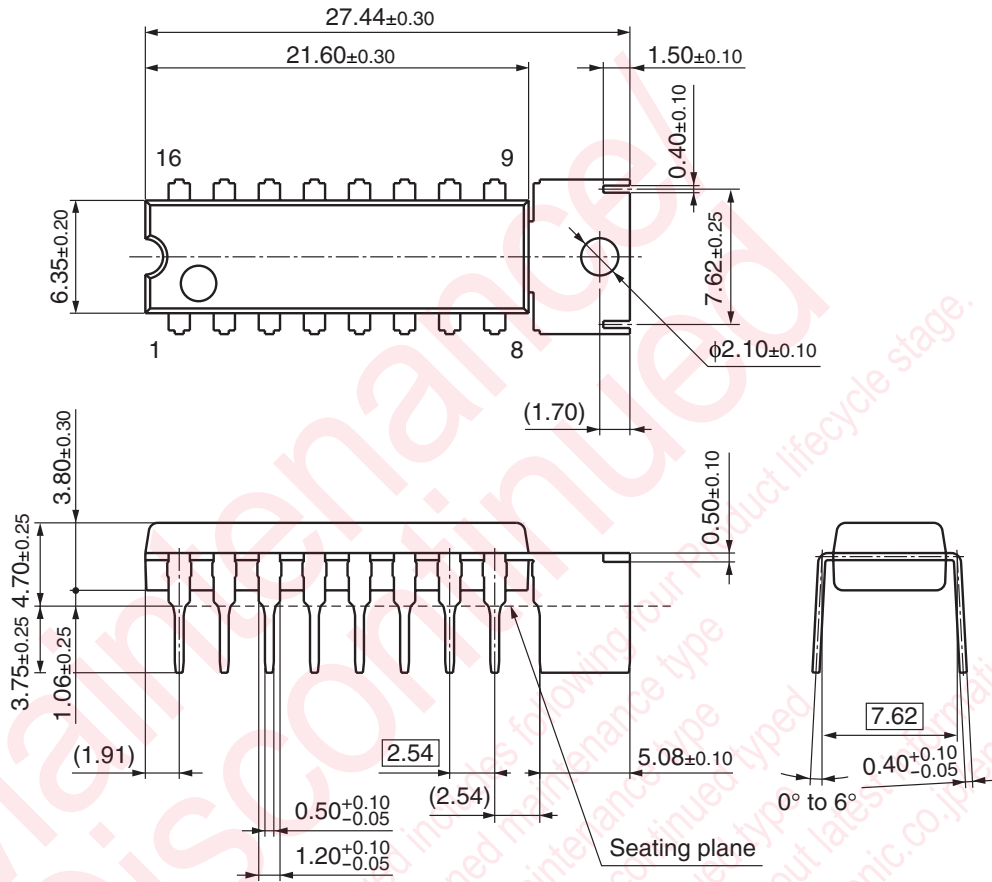


■ Application Circuit Example



■ New Package Dimensions (Unit: mm)

- HDIP016-P-0300A (Lead-free package)



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