

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

TA8216HQ

Dual Audio Power Amplifier

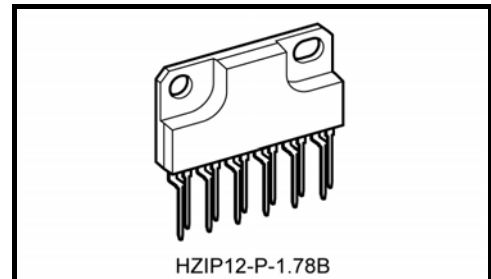
The TA8216HQ is dual audio power amplifier for consumer applications.

This IC provides an output power of 13 watts per channel (at $V_{CC} = 28V$, $f = 1kHz$, $THD = 10\%$, $R_L = 8\Omega$).

It is suitable for power amplifier of music center.

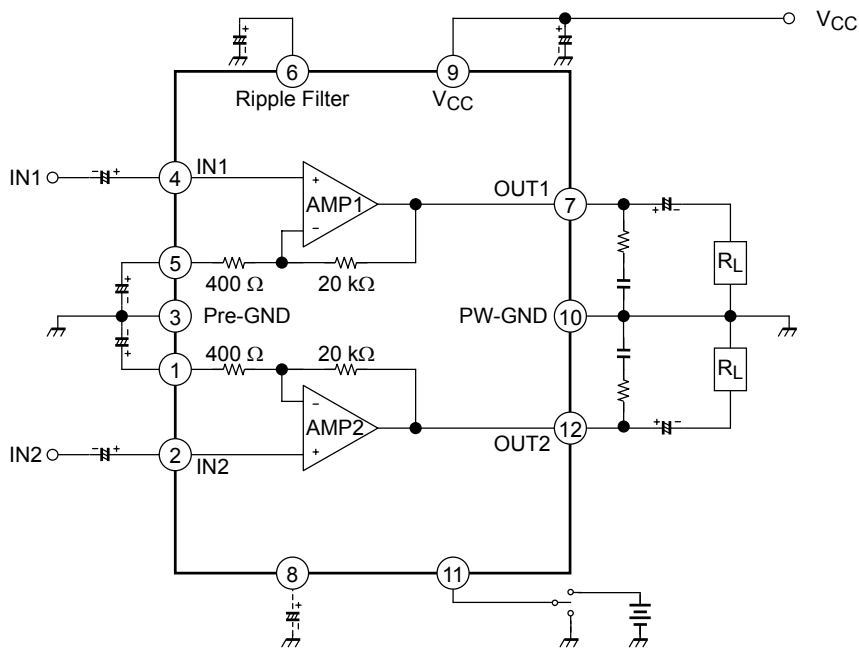
Features

- High output power: $P_{out} = 13\text{ W/channel (Typ.)}$
($V_{CC} = 28\text{ V}$, $R_L = 8\Omega$, $f = 1\text{ kHz}$, $THD = 10\%$)
- Low noise: $V_{no} = 0.14\text{ mVrms (Typ.)}$
($V_{CC} = 28\text{ V}$, $R_L = 8\Omega$, $G_v = 34\text{ dB}$, $R_g = 10\text{ k}\Omega$,
 $BW = 20\text{ Hz}\sim 20\text{ kHz}$)
- Very few external parts.
- Built in audio muting circuit.
- Built in thermal shut down protector circuit.
- Operation supply voltage range ($T_a = 25^\circ\text{C}$)
 - : $V_{CC (opr)} = 10\sim 37\text{ V}$ ($R_L = 8\Omega$)
 - : $V_{CC (opr)} = 10\sim 24\text{ V}$ ($R_L = 4\Omega$)



Weight: 4.04 g (typ.)

Block Diagram



Application Information

1. Voltage gain

The closed loop voltage gain is determined by R₁, R₂.

$$G_V = 20 \log \frac{R_1 + R_2}{R_2} \text{ (dB)}$$

$$= 20 \log \frac{20 \text{ k}\Omega + 400 \Omega}{400 \Omega}$$

$$= 34 \text{ (dB)}$$

$$G_V = 20 \log \frac{R_1 + R_2 + R_3}{R_2 + R_3} \text{ (dB)}$$

When R₃ = 220 Ω
 G_V ≈ 30 (dB)
 is given.

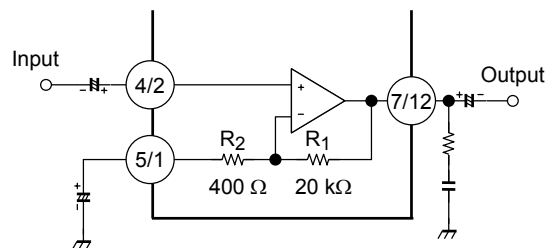


Figure 1

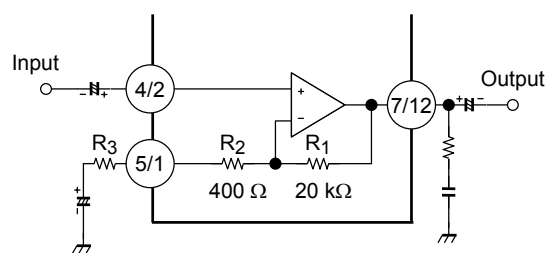


Figure 2

2. Muting

(1) Audio muting

This IC is possible to make audio muting operation by using 11 pin muting terminal.

In Fig.3, the equivalent circuit in the muting circuit section is shown.

By means of reducing the voltage of 11 pin down to 2.8 V or less in Fig.3, Q₁ is turned ON and the base voltage of Q₂ in the differential circuit fabricated with Q₂ and Q₃.

Therefore, with the voltage reduction of 11 pin, the input circuits of dummy of input terminal and that in the dotted line operate and cut-off the input signal.

After muting, the bias circuit continues 1st operation and the power supply current of quiescent time.

8 pin, the capacitor terminal for reducing the pop noise can reduce the pop noise through making the time constant longer by means of inserting the capacitor exteryary.

In the care this terminal is not used, short 8 pin with 11 pin.

The voltage of 11 pin set up to 4 V or more.

(2) IC internal muting at VCC OFF

When VCC = 8 V or less at VCC off, the detection circuit at VCC off is operated. And the base voltage of Q₁ is reduced and the muting operation is mode.

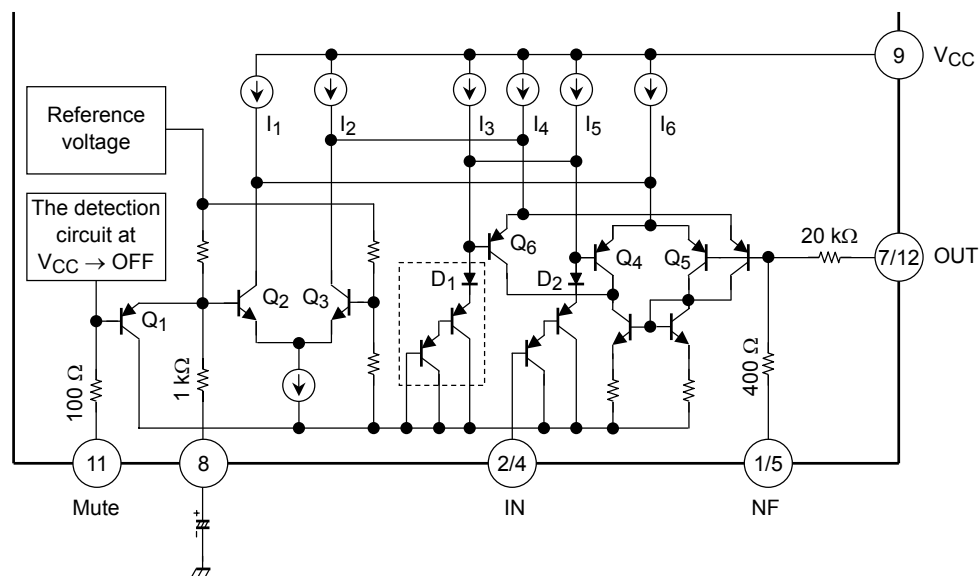


Figure 3

3. Precaution for 4 Ω load resistance use

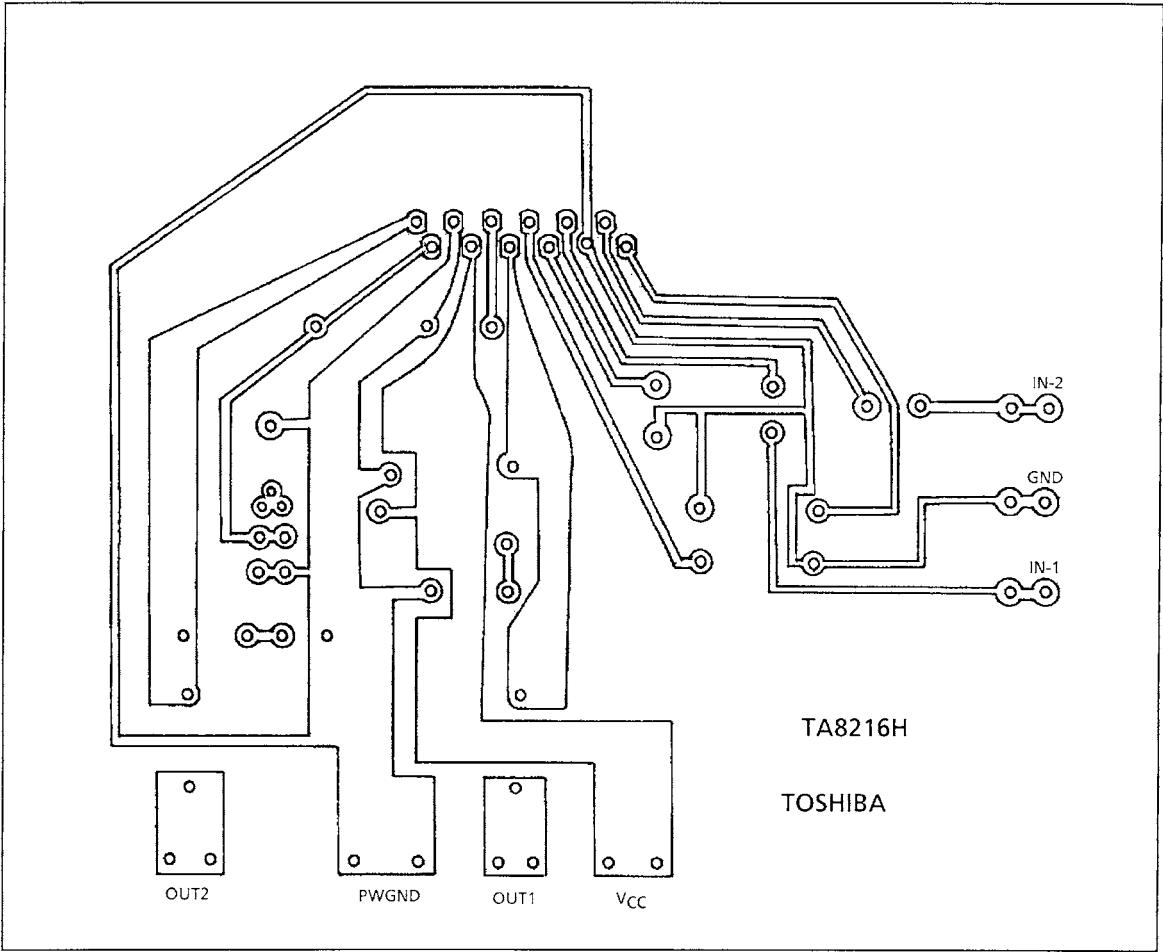
Internal output current detection and protection circuit protect the IC from the influence of unusual excess current. And this function causes the interrupted sound in case of excess input voltage with VCC higher than recommended supply voltage (24V).

Therefore, the power supply regulation must be fully investigated so as not to make the VCC be high than recommendation supply voltage (24V).

Cautions

This IC is not proof enough against a strong E-M field by CRT which may cause malfunction such as leak. Please set the IC keeping the distance from CRT.

Standard PCB TA8216H



(Bottom View)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	40	V
Output current (Peak/ch)	I _O (peak)	3.0	A
Power dissipation	P _D (Note)	25	W
Operation temperature	T _{opr}	-20~75	°C
Storage temperature	T _{stg}	-55~150	°C

Note: Derated above Ta = 25°C in the proportion of 200 mW/°C.

Electrical Characteristics

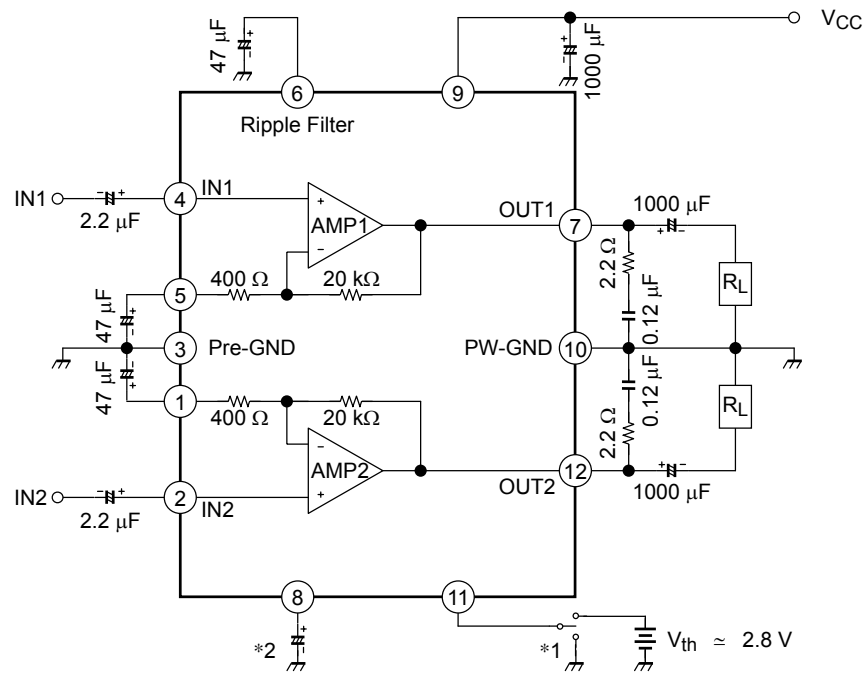
(unless otherwise specified V_{CC} = 28 V, R_L = 8 Ω, R_g = 600 Ω, f = 1 kHz, Ta = 25°C)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Quiescent current	I _{CCQ}	—	V _{in} = 0	—	50	105	mA
Output power	P _{out} (1)	—	THD = 10%	10	13	—	W
	P _{out} (2)	—	THD = 1%	—	10	—	
	P _{out} (3)	—	THD = 10%, V _{CC} = 24 V, R _L = 4 Ω	—	13	—	
Total harmonic distortion	THD	—	P _{out} = 2 W	—	0.04	0.2	%
Voltage gain	G _V	—	V _{out} = 0.775 V _{rms} (0dBm)	32.5	34.0	35.5	dB
Input resistance	R _{IN}	—	—	—	30	—	kΩ
Ripple rejection ratio	R.R.	—	R _g = 0, f _{ripple} = 100 Hz V _{ripple} = 0.775 V _{rms} (0dBm)	-40	-50	—	dB
Output noise voltage	V _{no}	—	R _g = 10 kΩ, BW = 20 Hz~20 kHz	—	0.14	0.3	mV _{rms}
Cross talk	C.T.	—	R _g = 10 kΩ, V _{out} = 0.775 V _{rms} (0dBm)	—	-70	—	dB
Muting threshold voltage	V _{th} 11	—	—	2.6	2.8	—	V

Typ. DC Voltage of Each Terminal (V_{CC} = 28 V, Ta = 25°C)

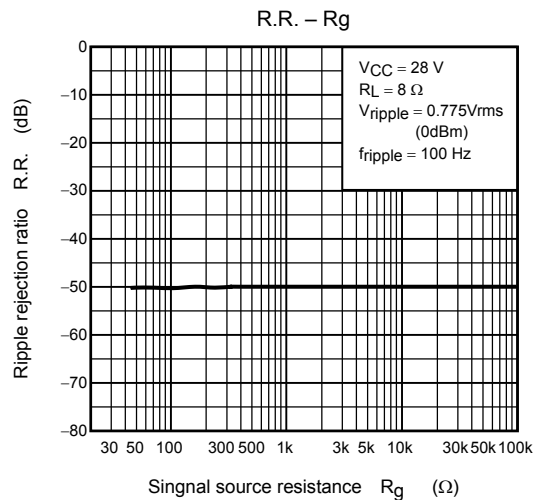
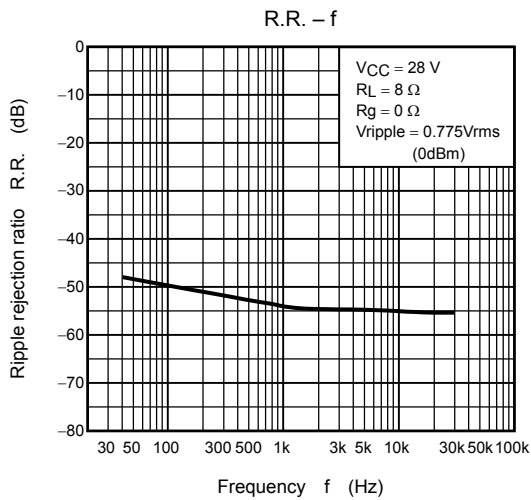
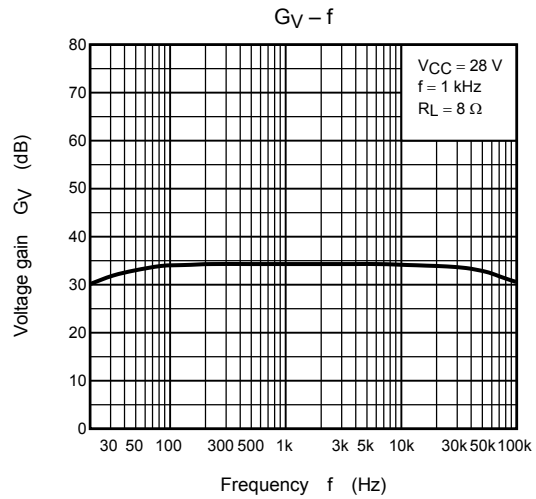
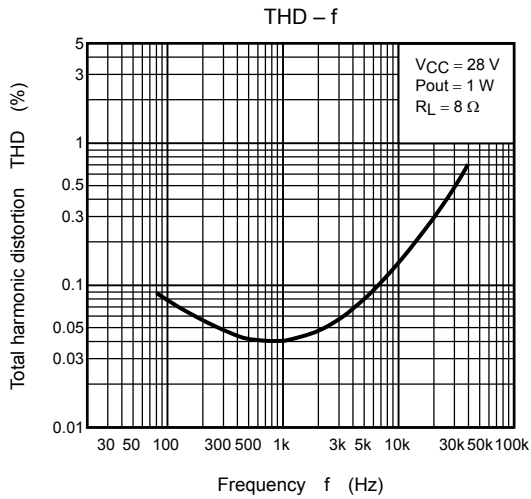
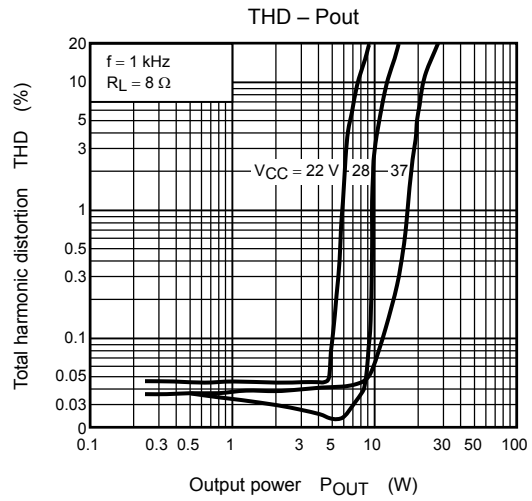
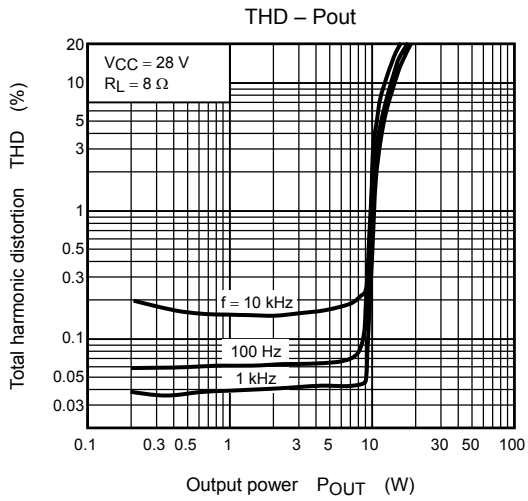
Terminal No.	1	2	3	4	5	6	7	8	9	10	11	12
DC voltage (V)	1.6	20m	GND	20m	1.6	9.4	13.0	5.0	V _{CC}	GND	2.8	13.0

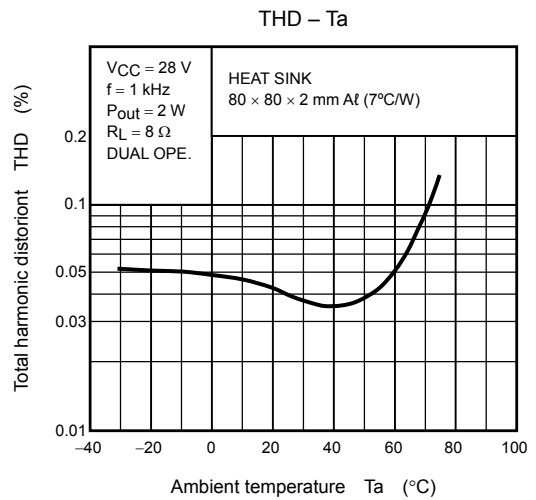
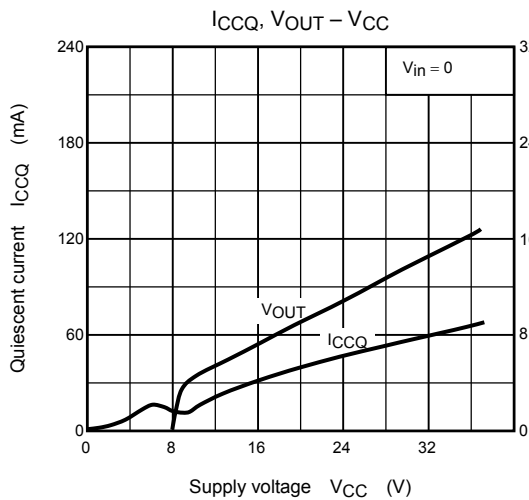
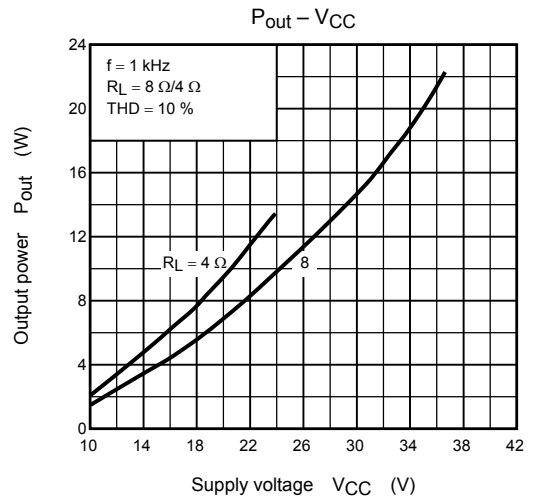
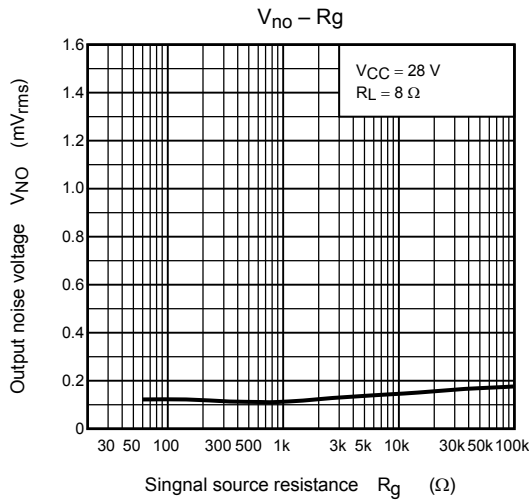
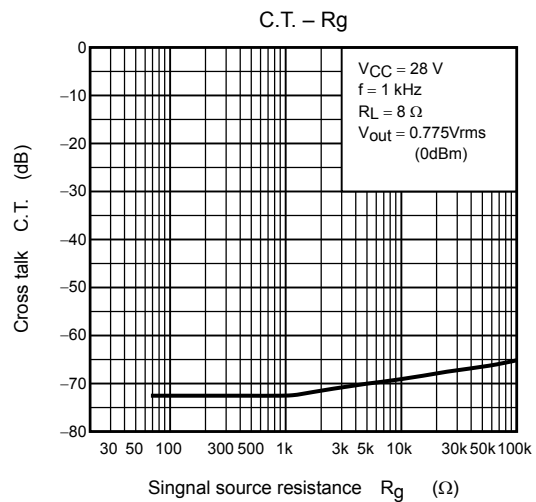
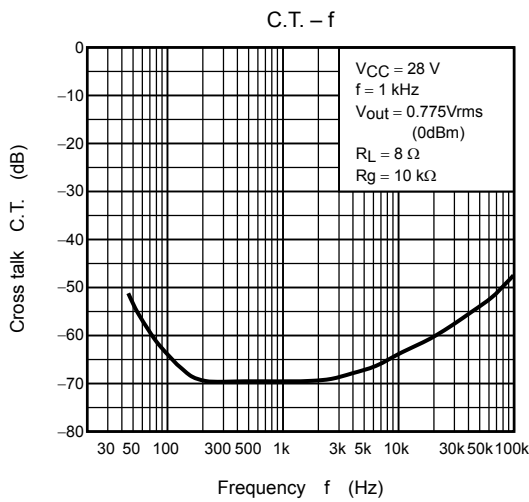
Test Circuit

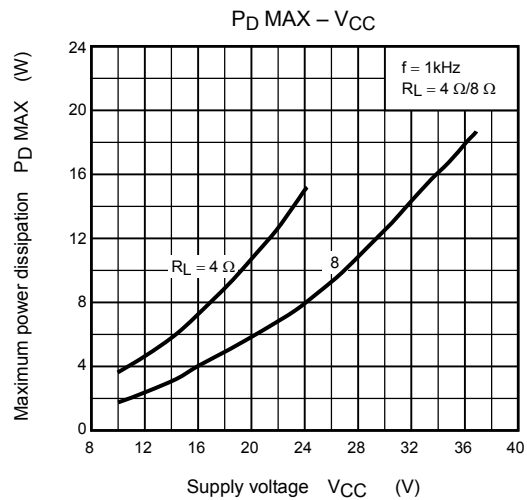
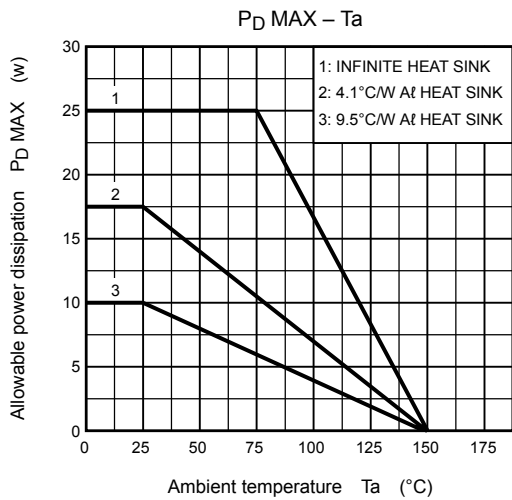
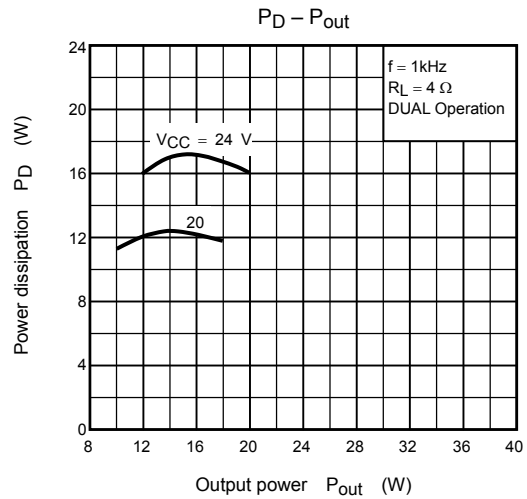
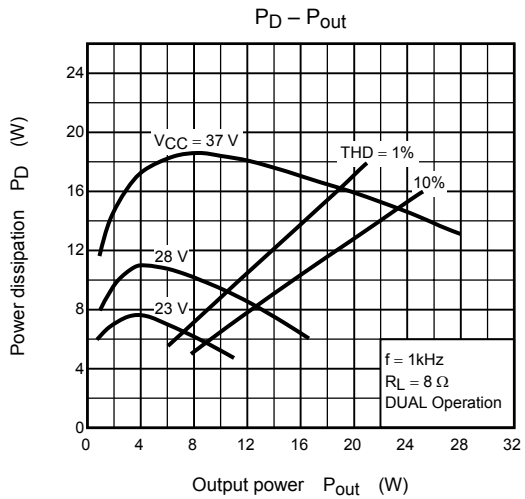
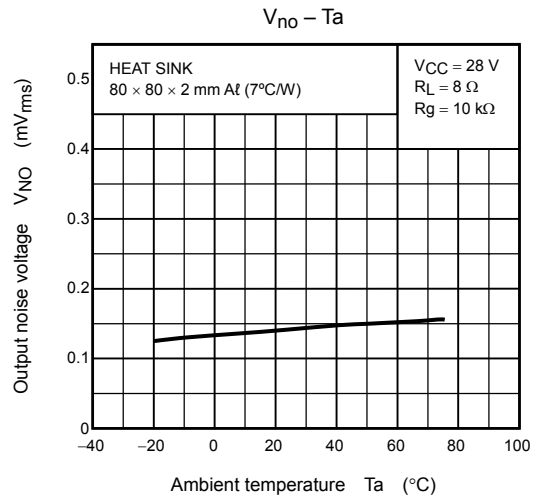
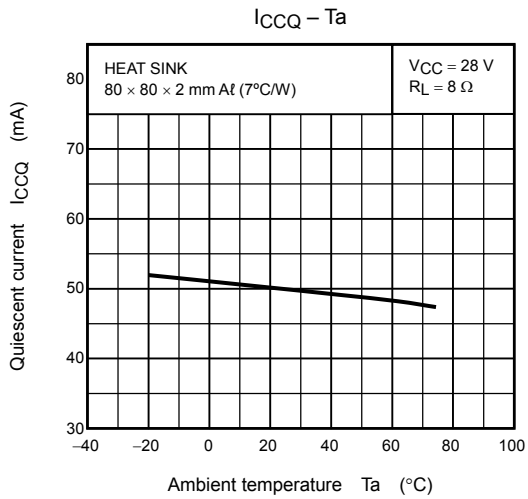


(*1) Mute on at 11 pin low
 $V_{th} 11 = 2.8 \text{ V (Typ.) } V_{CC} = 28 \text{ V, } T_a = 25^\circ\text{C}$

(*2) The capacitor for reducing POP noise at mute ON.



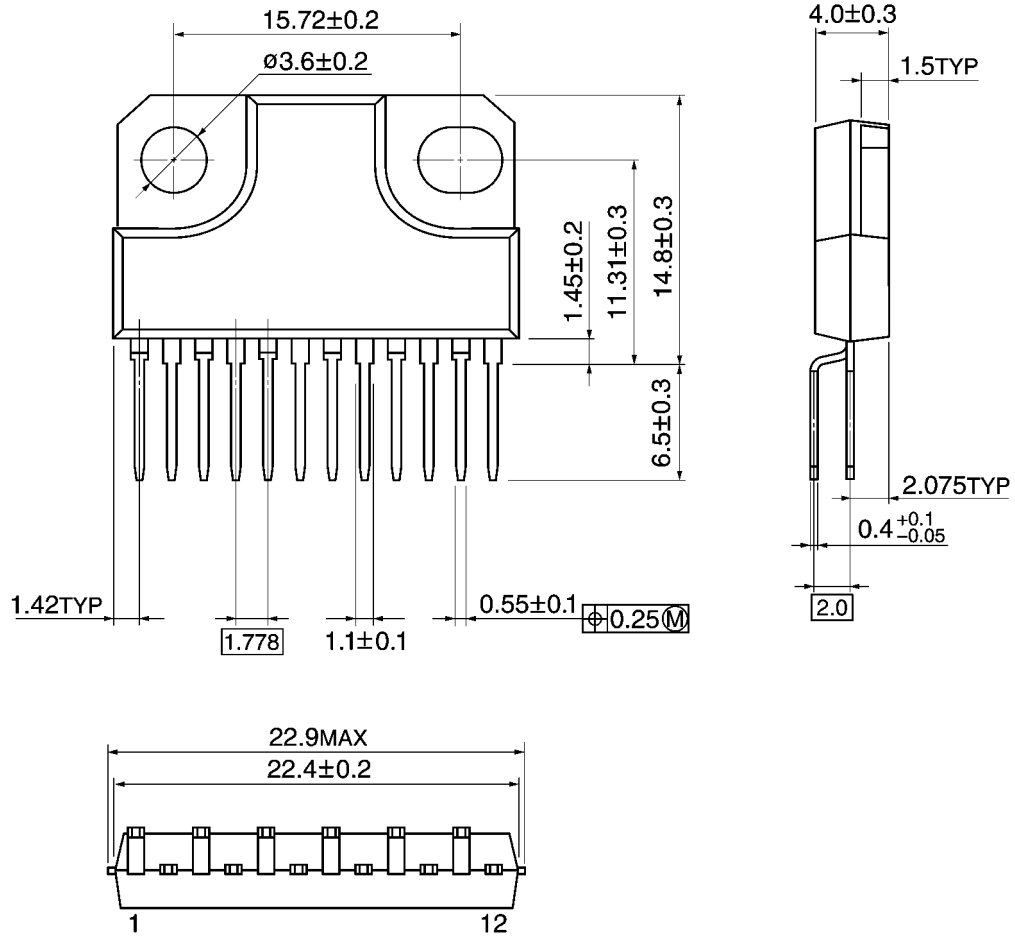




Package Dimensions

HZIP12-P-1.78B

Unit: mm



Weight: 4.04 g (typ.)

About solderability, following conditions were confirmed

- Solderability

- (1) Use of Sn-63Pb solder Bath

- solder bath temperature = 230°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

- (2) Use of Sn-3.0Ag-0.5Cu solder Bath

- solder bath temperature = 245°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

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