

TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

# TA8258HQ

## Dual Audio Power Amplifier

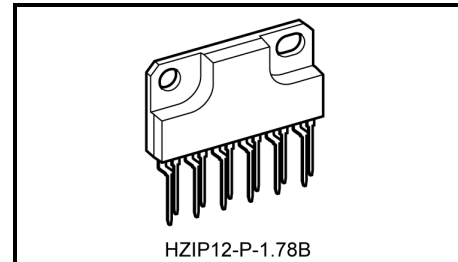
The TA8258HQ is dual audio power amplifier for consumer applications.

This IC provides an output power of 20 watts per channel (at  $V_{CC} = 37\text{ V}$ ,  $f = 1\text{ kHz}$ ,  $\text{THD} = 10\%$ ,  $R_L = 8\ \Omega$ ).

It is suitable for power amplifier of music center.

### Features

- High output power:  $P_{out} = 20\text{ W/channel}$  (Typ.)  
( $V_{CC} = 37\text{ V}$ ,  $R_L = 8\ \Omega$ ,  $f = 1\text{ kHz}$ ,  $\text{THD} = 10\%$ )
- Low noise:  $V_{no} = 0.14\text{ mVrms}$  (Typ.)  
( $V_{CC} = 37\text{ V}$ ,  $R_L = 8\ \Omega$ ,  $G_V = 34\text{ dB}$ ,  $R_g = 10\text{ k}\Omega$ ,  $\text{BW} = 20\text{ Hz}\sim 20\text{ kHz}$ )
- Very few external parts.
- Built in audio muting circuit.
- Built in thermal shut down protector circuit.
- Built in output shifted to GND protection circuit. (AC short)
- Available for using same PCB layout with: TA8200AH, TA8211AH, TA8216H
- Operation supply voltage range ( $T_a = 25^\circ\text{C}$ )  
:  $V_{CC}(\text{opr}) = 15\sim 42\text{ V}$



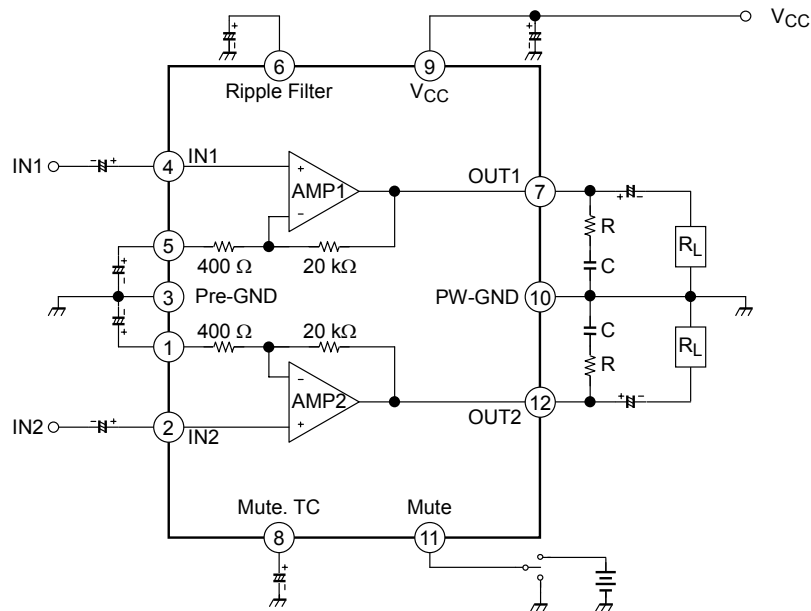
Weight: 4.04 g (typ.)

The TA8258HQ is plated with lead-free lead finishes, but the silicon pellet is attached to a heatsink with lead-containing solder paste.

About solderability, following conditions were confirmed

- Solderability
  - (1) Use of Sn-63Pb solder Bath
    - solder bath temperature =  $230^\circ\text{C}$
    - dipping time = 5seconds
    - the number of times = once
    - use of R-type flux
  - (2) Use of Sn-3.0Ag-0.5Cu solder Bath
    - solder bath temperature =  $245^\circ\text{C}$
    - dipping time = 5seconds
    - the number of times = once
    - use of R-type flux

**Block Diagram**



**Application Information**

**1. Voltage gain**

The closed loop voltage gain is determined by R<sub>1</sub>, R<sub>2</sub>.

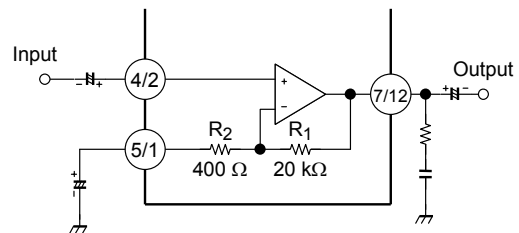
$$G_V = 20 \log \frac{R_1 + R_2}{R_2} \text{ (dB)}$$

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

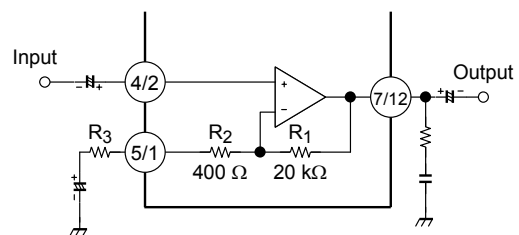
$$= 34 \text{ (dB)}$$

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

When R<sub>3</sub> = 220 Ω  
 G<sub>V</sub> ≈ 30 (dB)  
 is given.



**Figure 1**



**Figure 2**

Toshiba has confirmed that the G<sub>V</sub> (min) is approximately 28 (dB) on a regular printed circuit board. However, if the value of R<sub>2</sub> + R<sub>3</sub> is larger, the feedback voltage increases and oscillation will start. Determine the value of R<sub>2</sub> + R<sub>3</sub> to ensure proper startup behavior under actual usage conditions.

**2. Muting**

This product has an excellent muting system.

(1) Audio muting

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

Figure 3 shows the equivalent circuit in the muting circuit.

By reducing the voltage of 11 pin to 2.8 V or less, Q<sub>1</sub> will be ON.

Also the base voltage of Q<sub>2</sub> in the differential circuit that has Q<sub>2</sub> and Q<sub>3</sub> will be down.

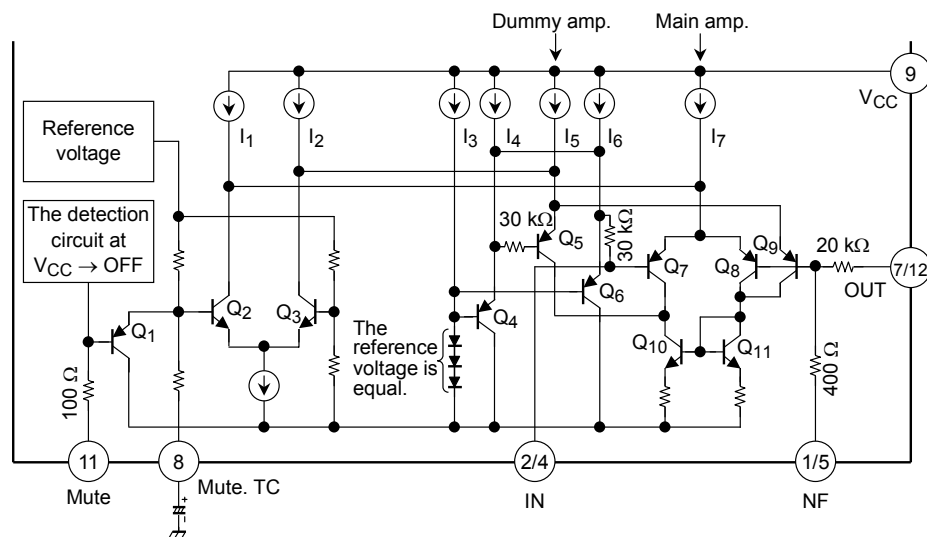
When Q<sub>2</sub> is OFF, I<sub>2</sub> and I<sub>5</sub> dummy circuits will be operated, and it will shut down the input.

However, the bias circuit is operating after muting, and it takes power supply current at no signal.

8 pin is the capacitor terminal for reducing the pop noise, and it can make the time constant longer by inserting the capacitor externally. If 11 pin is not used, connect 11 pin and 8 pin, then set the voltage abode 4 V.

(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 Q<sub>1</sub> is reduced and the muting is operated in IC.



**Figure 3**

**3. The Mounting Place of an Integrated Circuit**

This IC cannot withstand the strong electromagnetic fields generated by a CRT. These are likely to cause the device to exhibit malfunctions such as leakage. Please ensure that the IC is kept away from CRT.

**4. Preventive Measures Against Oscillation**

To prevent oscillation, it is advisable to use capacitors made of polyester film, which have low temperature and frequency fluctuation characteristics, as C.

The resistance R in series with C performs phase correction at high frequencies and improves the oscillation allowance.

- (1) Capacitor rating and type
- (2) PCB layout

Note 1: Since the oscillation allowance varies according to the PCB layout, it is recommended that a standard Toshiba PCB be used as a reference for design.

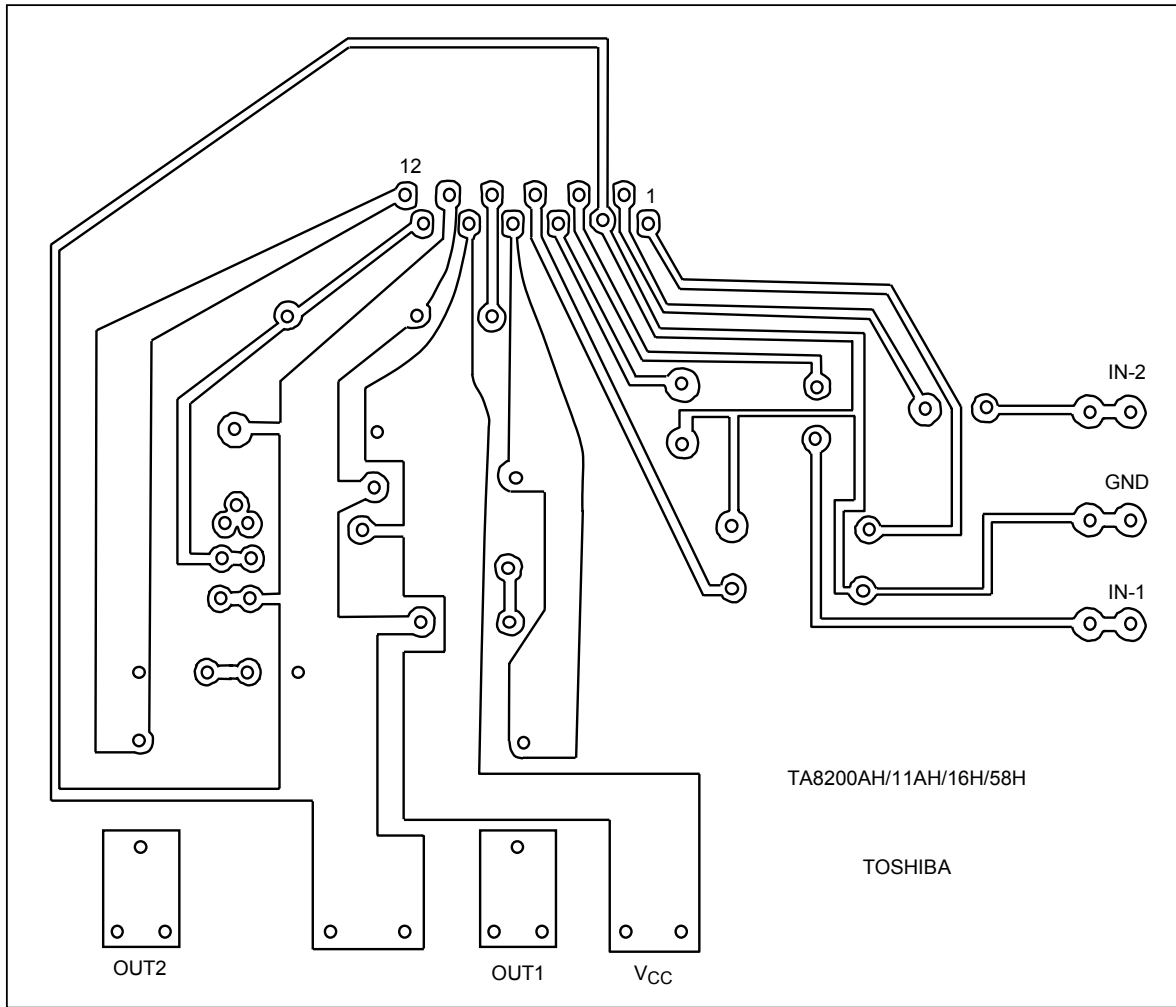
**5. Heat-sink**

Be aware of the heat-sink capacity.

Use a heat-sink that has high heat conduction.

Note 2: Please connected a Heat-sink to GND potential, otherwise THD may deteriorate.

Standard PCB



(bottom view)

## Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	50	V
Output current (Peak/ch)	I <sub>O</sub> (peak)	3.5	A
Power dissipation	P <sub>D</sub> (Note 3)	25	W
Operation temperature	T <sub>opr</sub>	-20 to 75	°C
Storage temperature	T <sub>stg</sub>	-55 to 150	°C

Note 3: Derated above Ta = 25°C in the proportion of 200 mW/°C.

## Electrical Characteristics

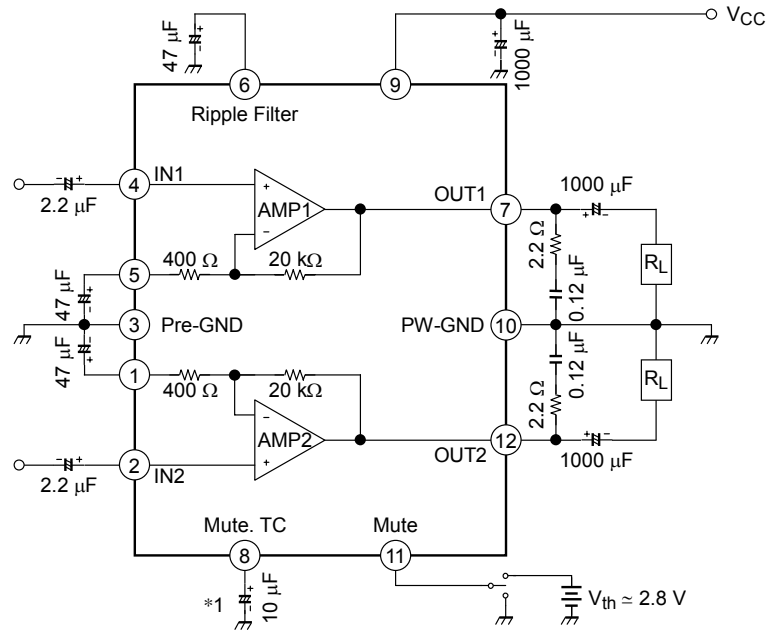
(unless otherwise specified V<sub>CC</sub> = 37 V, R<sub>L</sub> = 8 Ω, R<sub>g</sub> = 600 Ω, f = 1 kHz, Ta = 25°C)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Quiescent current	I <sub>CCQ</sub>	—	V <sub>in</sub> = 0	—	75	130	mA
Output power	P <sub>out</sub> (1)	—	THD = 10%	17	20	—	W
	P <sub>out</sub> (2)	—	THD = 1%	—	15	—	
Total harmonic distortion	THD	—	P <sub>out</sub> = 2 W	—	0.05	0.2	%
Voltage gain	G <sub>V</sub>	—	V <sub>out</sub> = 0.775 V <sub>rms</sub> (0dBm)	32.5	34.0	35.5	dB
Input resistance	R <sub>IN</sub>	—	—	—	30	—	kΩ
Ripple rejection ratio	R.R.	—	f <sub>ripple</sub> = 100 Hz V <sub>ripple</sub> = 0.775 V <sub>rms</sub> (0dBm)	-48	-60	—	dB
Output noise voltage	V <sub>no</sub>	—	R <sub>g</sub> = 10 kΩ, BW = 20 Hz~20 kHz	—	0.14	0.3	mV <sub>rms</sub>
Cross talk	C.T.	—	R <sub>g</sub> = 10 kΩ, V <sub>out</sub> = 0.775 V <sub>rms</sub> (0dBm)	-50	-60	—	dB
Mute on voltage	Mute-on	—	Mute on	GND	—	1.4	V
Mute off voltage	Mute-off	—	Mute off	3.7	—	10	V
Mute ATT	ATT	—	V <sub>out</sub> = 0.775 V <sub>rms</sub> → Mute	-50	-60	—	dB

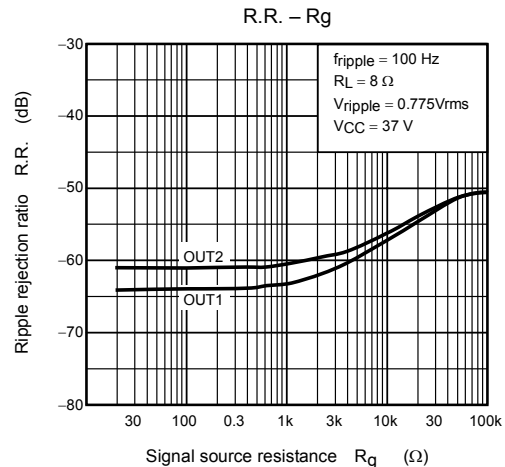
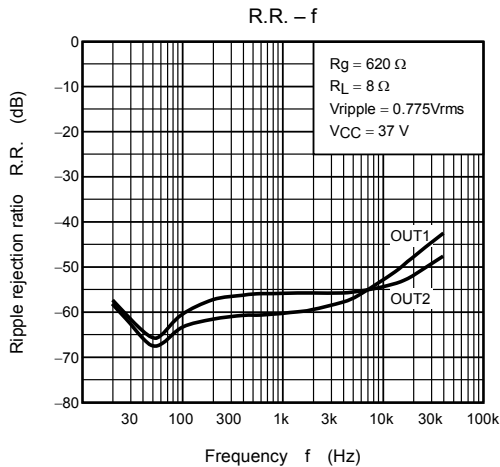
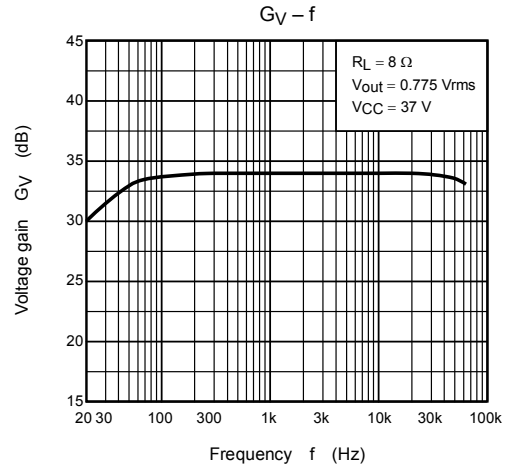
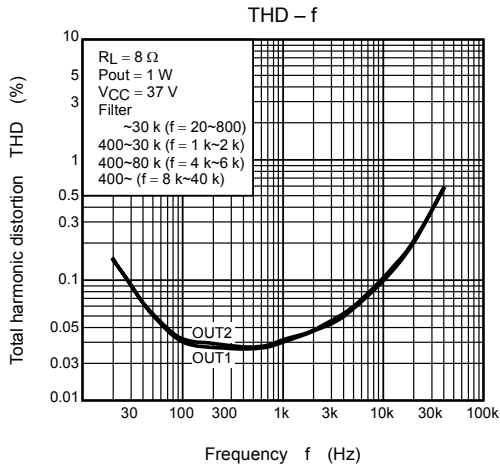
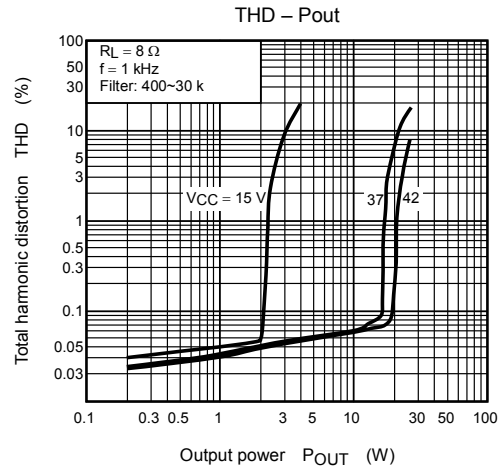
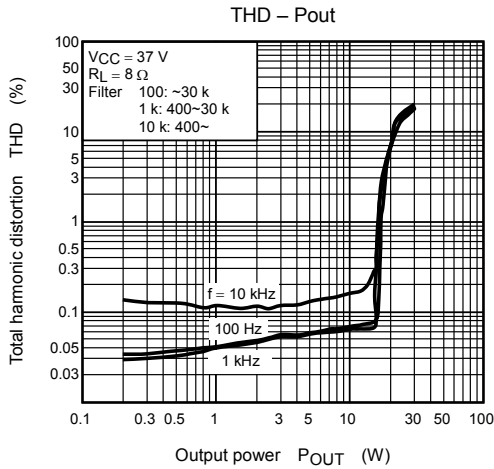
## Typ. DC Voltage of Each Terminal (V<sub>CC</sub> = 28 V, Ta = 25°C)

Terminal No.	1	2	3	4	5	6	7	8	9	10	11	12
DC voltage (V)	2.5	2.8	GND	2.8	2.5	12.5	19.4	5.1	V <sub>CC</sub>	GND	4.8	19.4

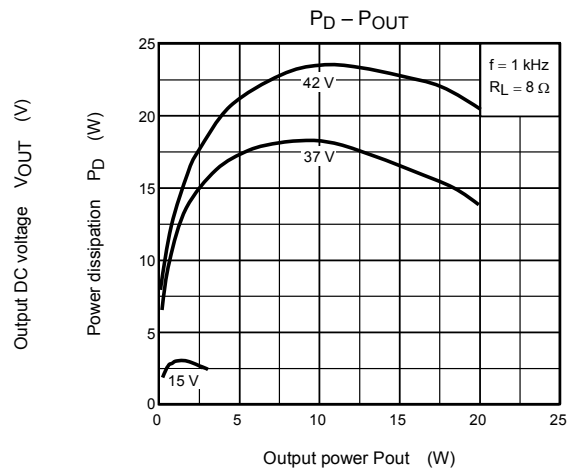
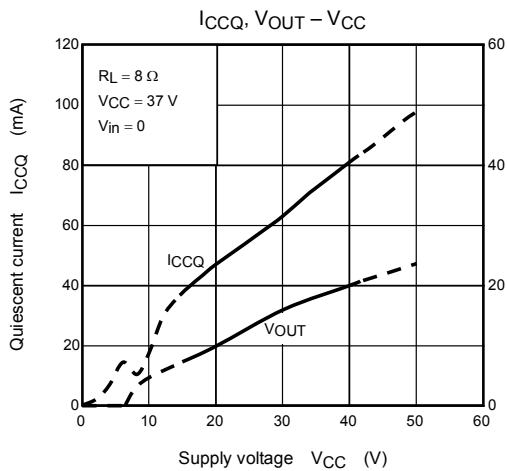
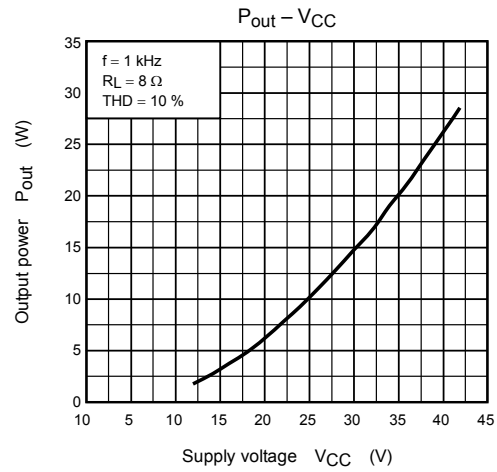
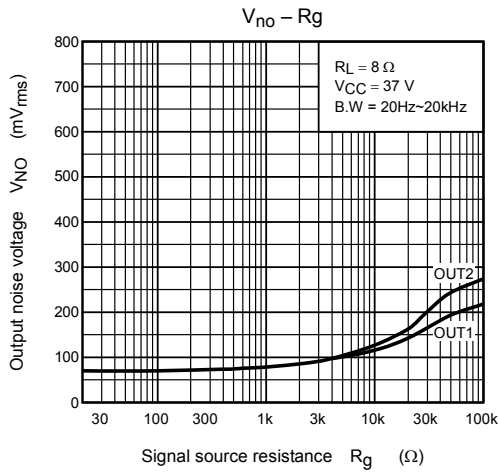
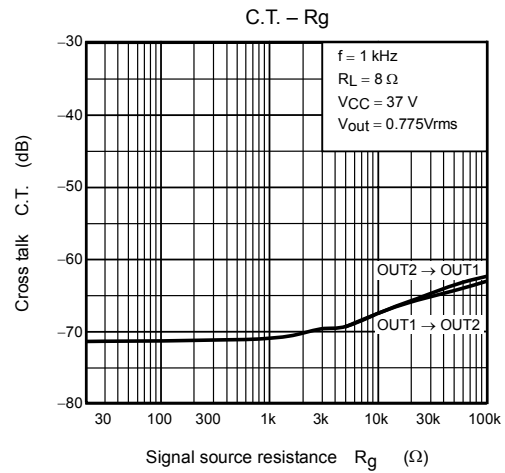
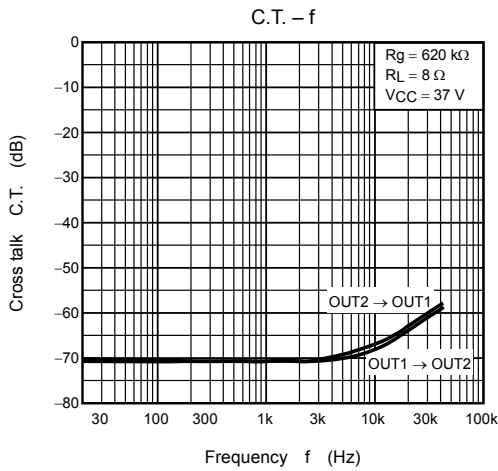
**Test Circuit**

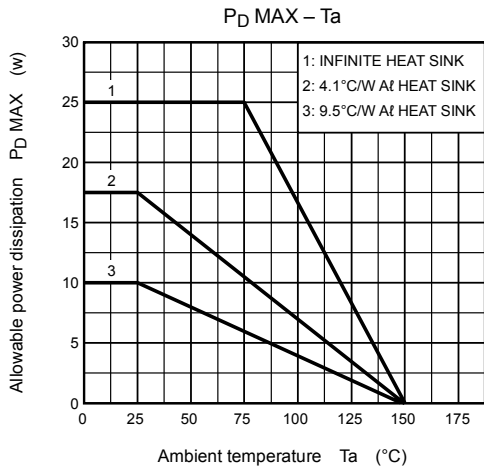
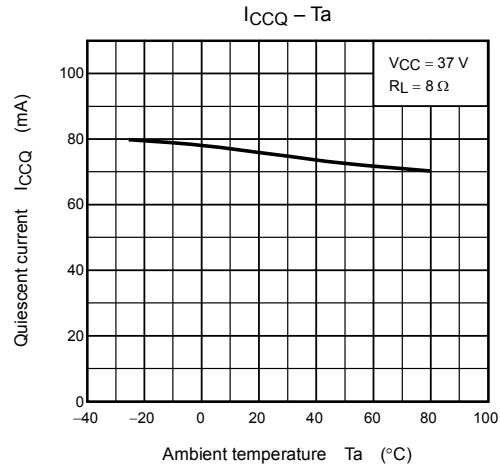
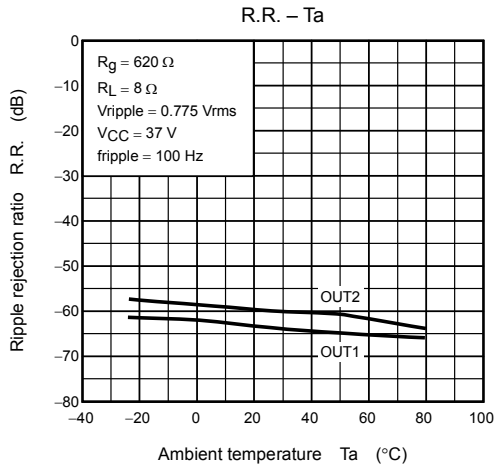
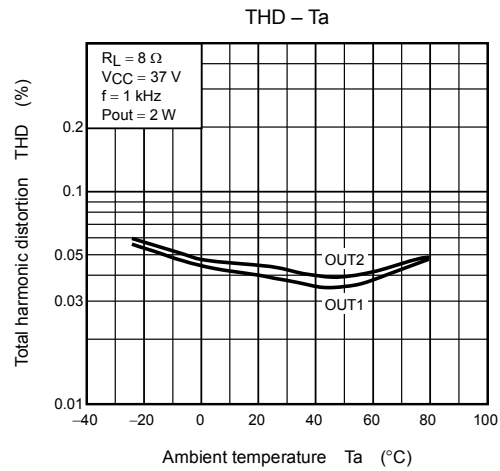
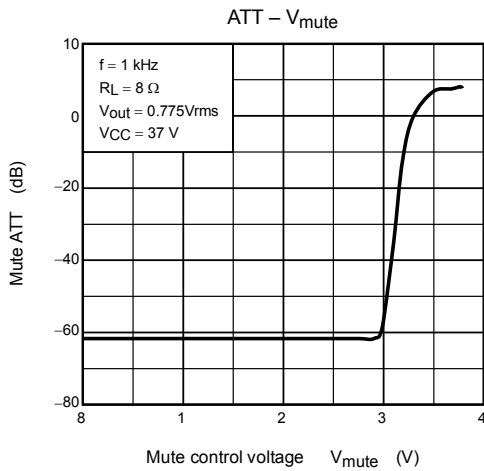


\*1: The capacitor for reducing POP noise at mute ON.





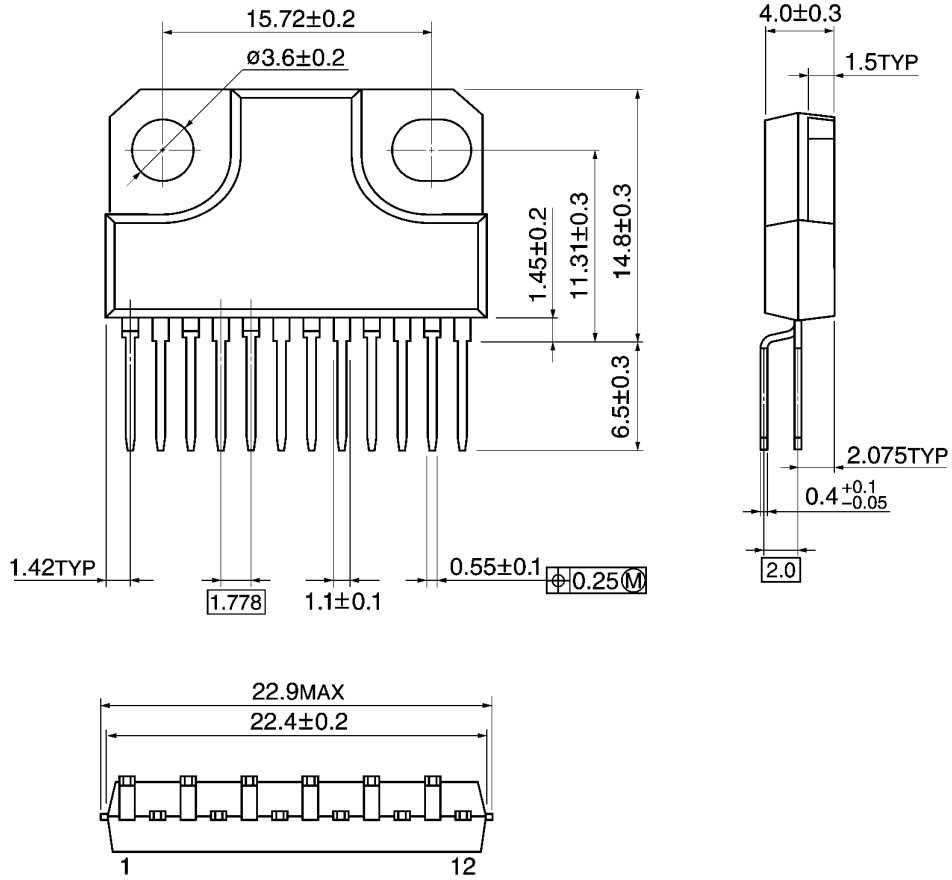




## Package Dimensions

HZIP12-P-1.78B

Unit: mm



Weight: 4.04 g (typ.)

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