

TA8258H

Dual Audio Power Amplifier

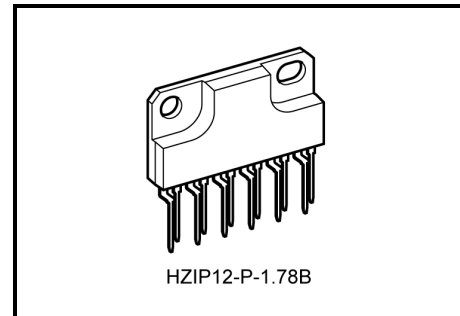
The TA8258H is dual audio power amplifier for consumer applications.

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.

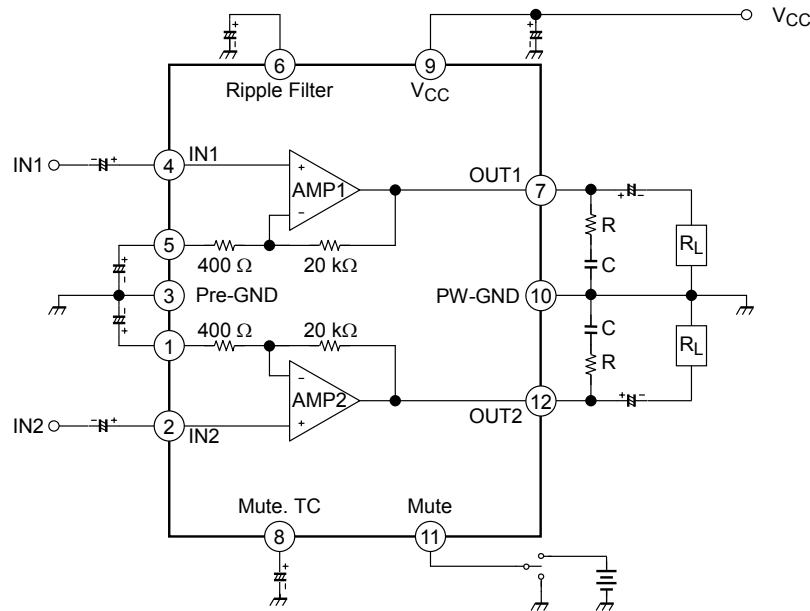
Features

- High output power: $P_{\text{out}} = 20\text{ W/channel}$ (Typ.)
($V_{CC} = 37\text{ V}$, $R_L = 8\ \Omega$, $f = 1\text{ kHz}$, $\text{THD} = 10\%$)
- Low noise: $V_{\text{no}} = 0.14\text{ mVrms}$ (Typ.)
($V_{CC} = 37\text{ V}$, $R_L = 8\ \Omega$, $\text{GV} = 34\text{ dB}$, $R_g = 10\text{ k}\Omega$, $\text{BW} = 20\text{ Hz}\sim 20\text{ kHz}$)
- 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.)

Block Diagram



Application Information

1. Voltage gain

The closed loop voltage gain is determined by R_1 , R_2 .

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

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

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

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

When $R_3 = 220 \Omega$

$G_V \approx 30 (\text{dB})$

is given.

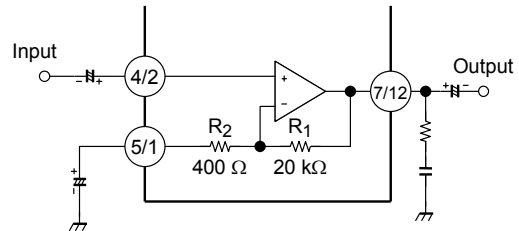


Figure 1

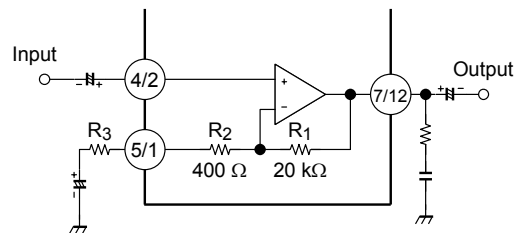


Figure 2

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, Q₁ will be ON.

Also the base voltage of Q₂ in the differential circuit that has Q₂ and Q₃ will be down.

When Q₂ is OFF, I₂ and I₅ 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 externaly. If 11 pin is not used, connect 11 pin and 8 pin, then set the voltage abode 4 V.

(2) IC internal muting at V_{CC} OFF

When V_{CC} = 8 V or less at V_{CC} off, the detection circuit at V_{CC} off is operated. And the base voltage of Q₁ is reduced and the muting is operated in IC.

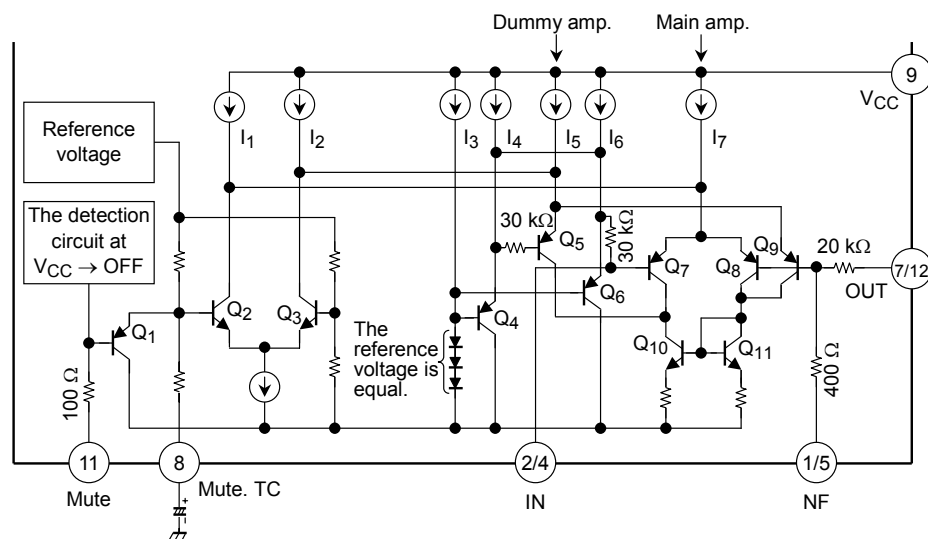


Figure 3

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.

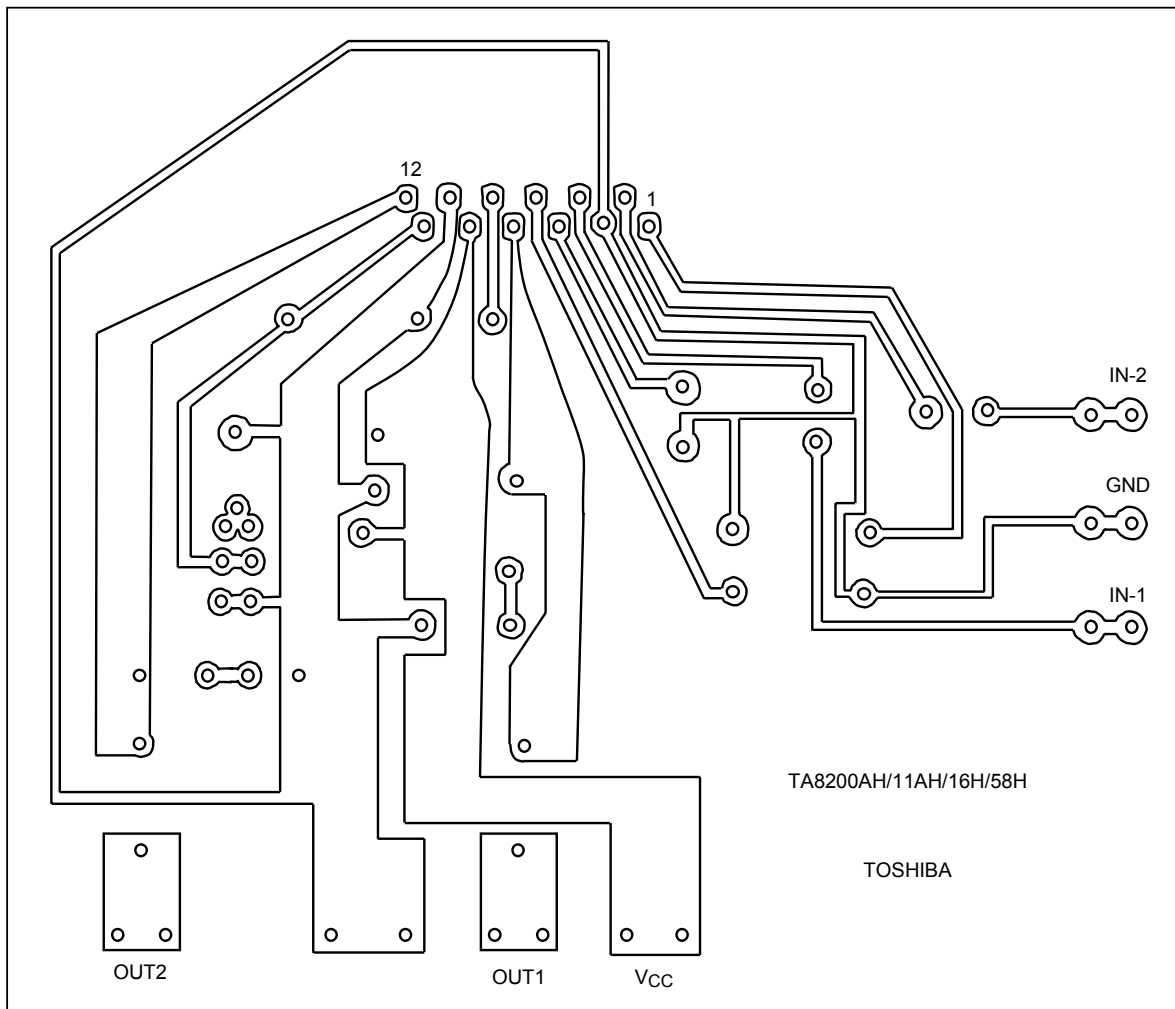
5. Heat-sink

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 _{CC}	50	V
Output current (Peak/ch)	I _O (peak)	3.5	A
Power dissipation	P _D (Note 3)	25	W
Operation temperature	T _{opr}	-20~75	°C
Storage temperature	T _{stg}	-55~150	°C

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

Electrical Characteristics

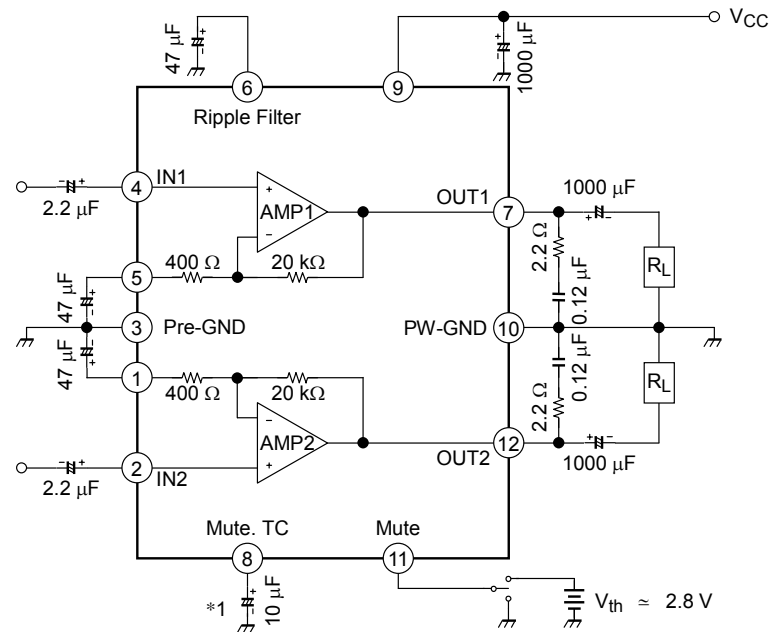
(unless otherwise specified V_{CC} = 37 V, R_L = 8 Ω, R_g = 600 Ω, f = 1 kHz, Ta = 25°C)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Quiescent current	I _{CCQ}	—	V _{in} = 0	—	75	130	mA
Output power	P _{out} (1)	—	THD = 10%	17	20	—	W
	P _{out} (2)	—	THD = 1%	—	15	—	
Total harmonic distortion	THD	—	P _{out} = 2 W	—	0.05	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.	—	f _{ripple} = 100 Hz V _{ripple} = 0.775 V _{rms} (0dBm)	-48	-60	—	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)	-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 _{out} = 0.775 V _{rms} → Mute	-50	-60	—	dB

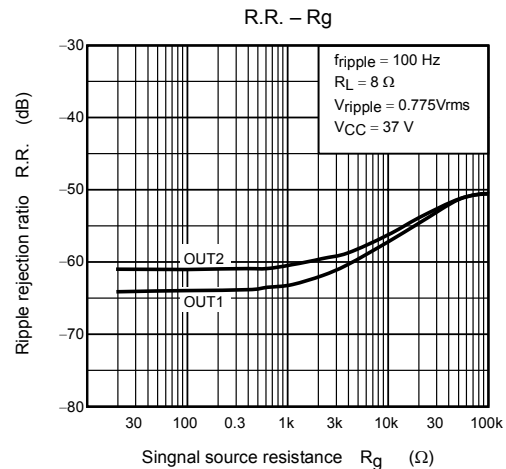
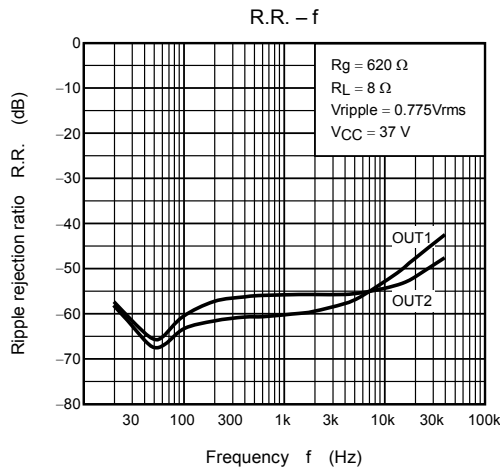
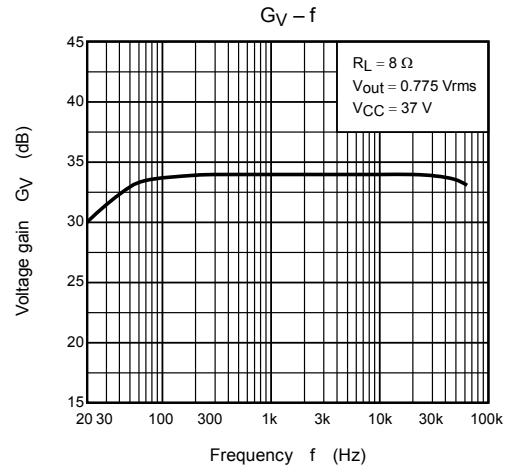
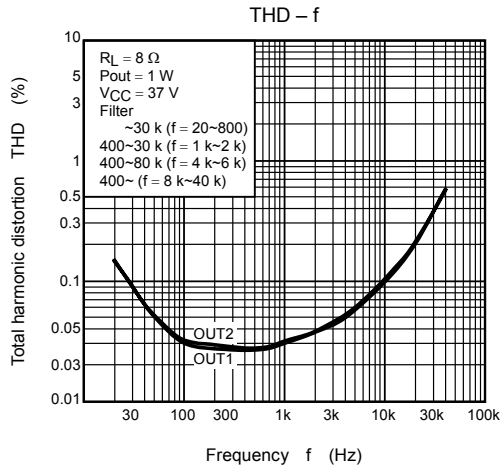
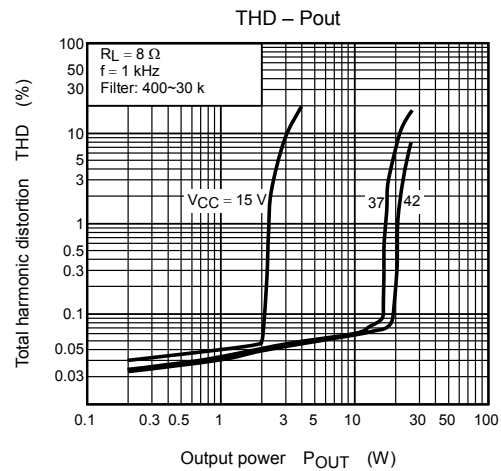
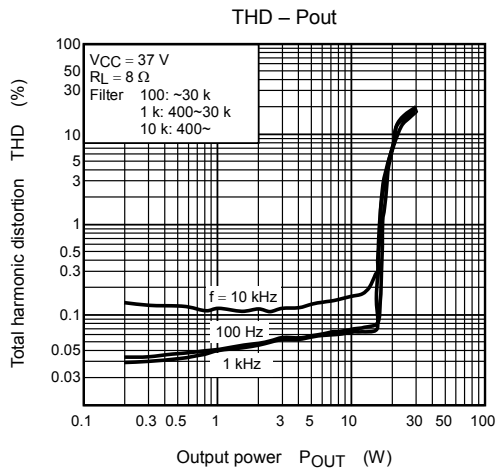
Typ. DC Voltage of Each Terminal (V_{CC} = 28 V, Ta = 25°C)

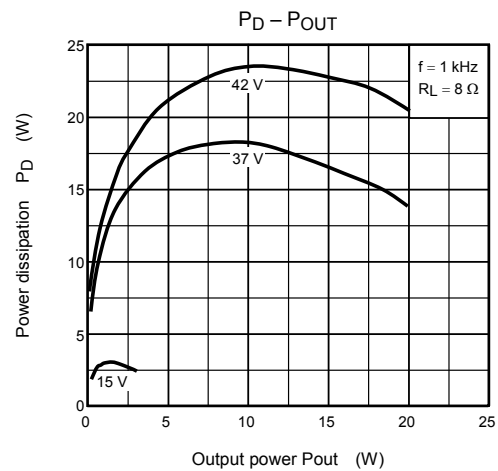
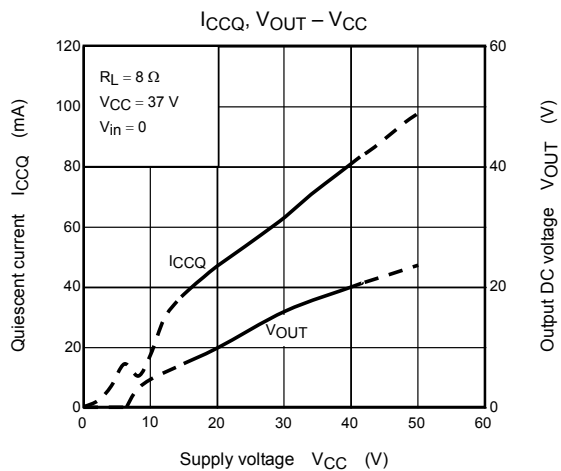
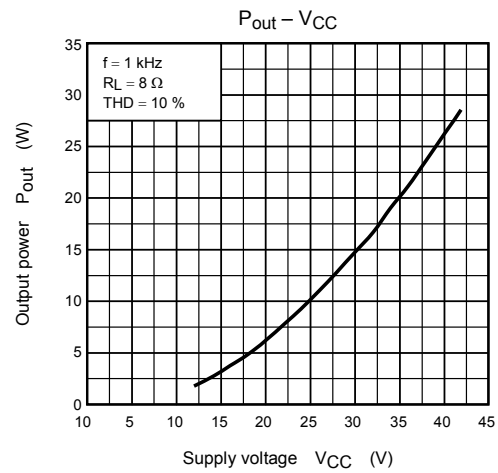
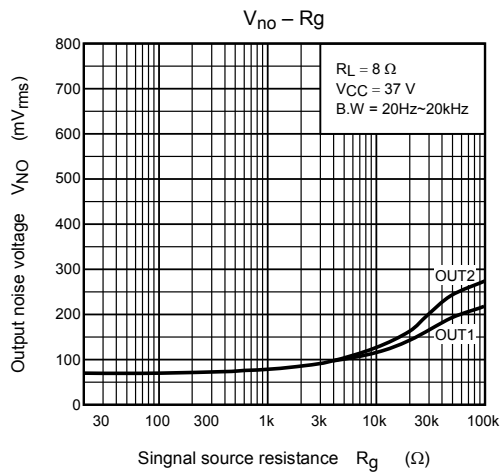
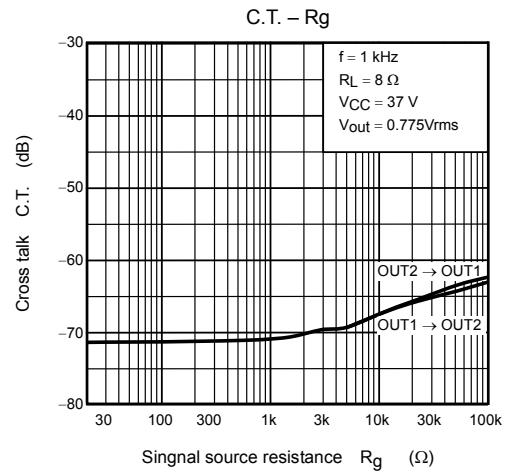
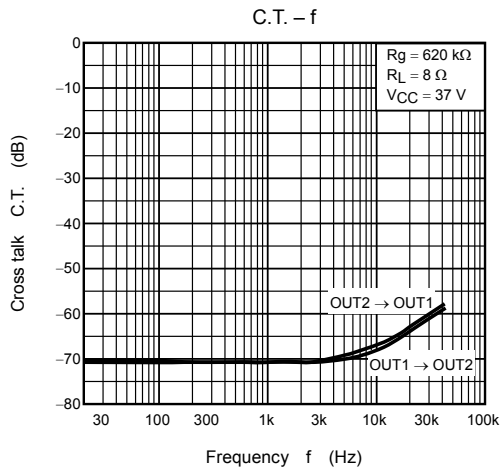
Terminal No.	1	2	3	4	5	6	7	8	9	10	11	12
DC voltage (V)	2.5	2.8	GND	2.8	2.5	12.5	19.4	5.1	V _{CC}	GND	4.8	19.4

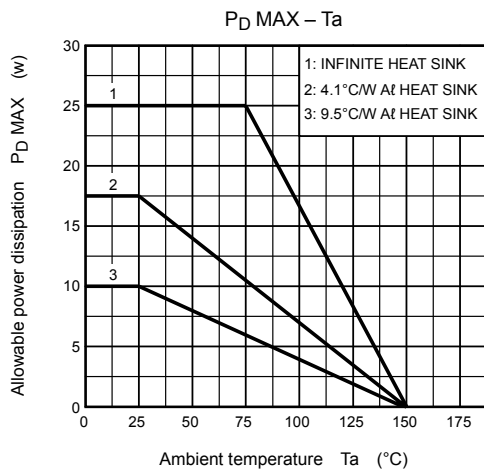
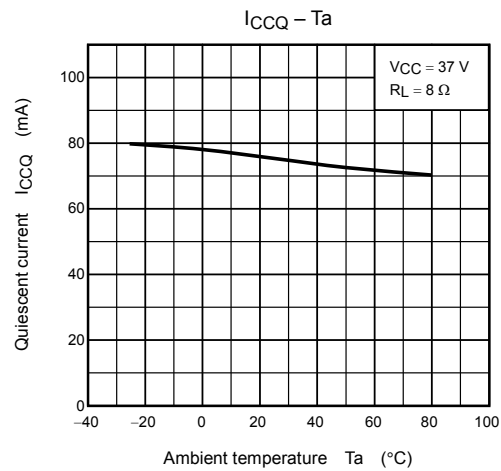
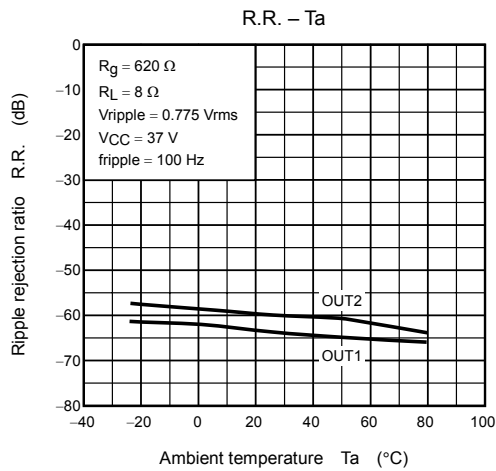
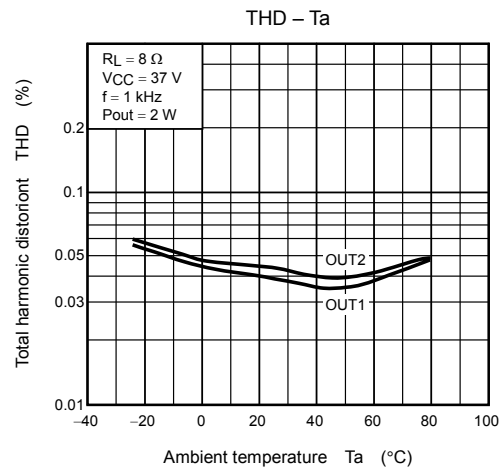
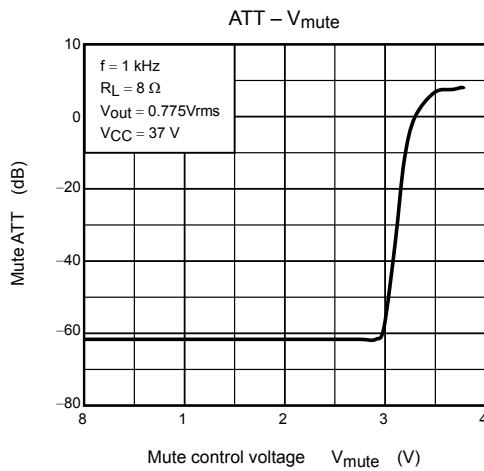
Test Circuit



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







HZIP12-P-1.78B

Technical drawing of a 12-pin connector. The drawing includes three views: top, side, and bottom.

Top View Dimensions:

- Overall width: 15.72 ± 0.2
- Mounting hole diameter: $\varnothing 3.6 \pm 0.2$
- Pin pitch: 1.42 TYP
- Pin width: 0.55 ± 0.1
- Pin height: 6.5 ± 0.3
- Mounting hole offset: 1.45 ± 0.2
- Pin offset: 11.31 ± 0.3
- Overall height: 14.8 ± 0.3

Side View Dimensions:

- Overall height: 14.8 ± 0.3
- Pin height: 6.5 ± 0.3

Bottom View Dimensions:

- Overall length: 22.9 MAX
- Mounting hole diameter: $\varnothing 0.25$

2002-02-13

RESTRICTIONS ON PRODUCT USE

000707EBF

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- This product generates heat during normal operation. However, substandard performance or malfunction may cause the product and its peripherals to reach abnormally high temperatures.
The product is often the final stage (the external output stage) of a circuit. Substandard performance or malfunction of the destination device to which the circuit supplies output may cause damage to the circuit or to the product.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.