TOSHIBA Bipolar Linear Integrated Circuit Silicon Monolithic

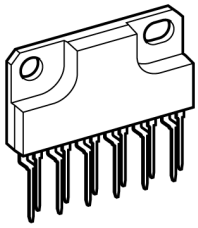
# TA8200AH

## Dual Audio Power Amplifier

The TA8200AH is dual audio power amplifier for consumer applications.

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

It is suitable for power amplifier of TV and home stereo.



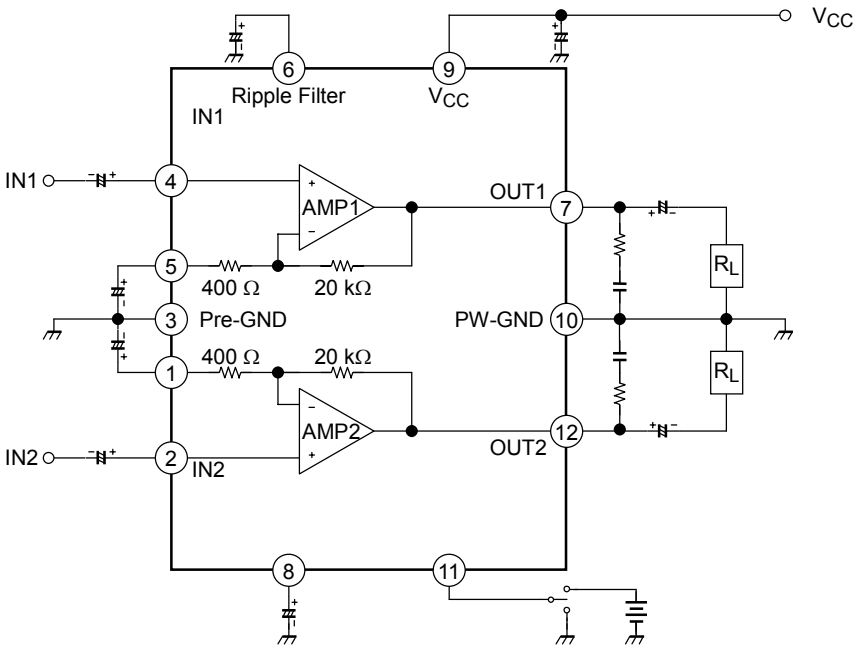
HZIP12-P-1.78B

Weight: 4.04 g (typ.)

## Features

- High output power: $P_{out}$ = 13 W/channel (Typ.)
  ($V_{CC}$ = 28 V, $R_L$ = 8 Ω, f = 1 kHz, THD = 10%)
- Low noise: $V_{no}$ = 0.14 mVrms (Typ.)
  ($V_{CC}$ = 28 V, $R_L$ = 8 Ω, $G_V$ = 34dB, $R_g$ = 10 kΩ, BW = 20 Hz~20 kHz)
- Very few external parts
- Built in audio muting circuit
- Built in thermal shut down protector circuit
- Operating supply voltage range: $V_{CC\ (opr)}$ = 10~37 V (Ta = 25°C)

## Block Diagram




## Application Information

### 1. Voltage gain

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

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

$$= 20\log\frac{20\,\mathrm{k}\Omega + 400\,\Omega}{400\,\Omega} = 34\,(\mathrm{dB})$$

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

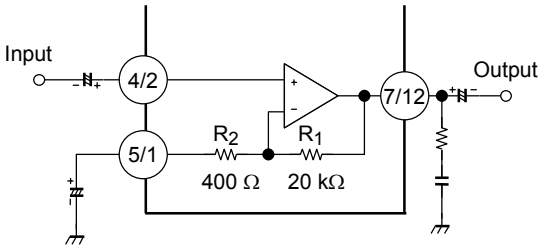



**Figure 1**

Amplifier with gain < 34dB

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

When $R_3 = 220\ \Omega$
$G_V \simeq 30$ (dB)
is given.

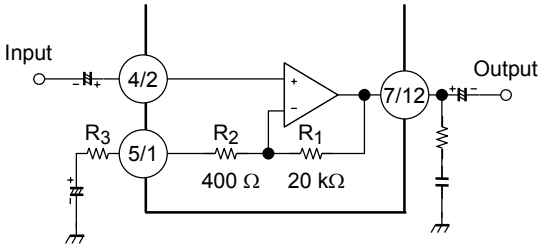



**Figure 2**

## 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, $Q_1$ is turned ON and the base voltage of $Q_2$ in the differential circuit fabricated with $Q_2$ and $Q_3$.

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

After muting, the bias circuit continues is 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 externary.

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 $V_{CC}$ 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 $Q_1$ is reduced and the muting operation is mode.

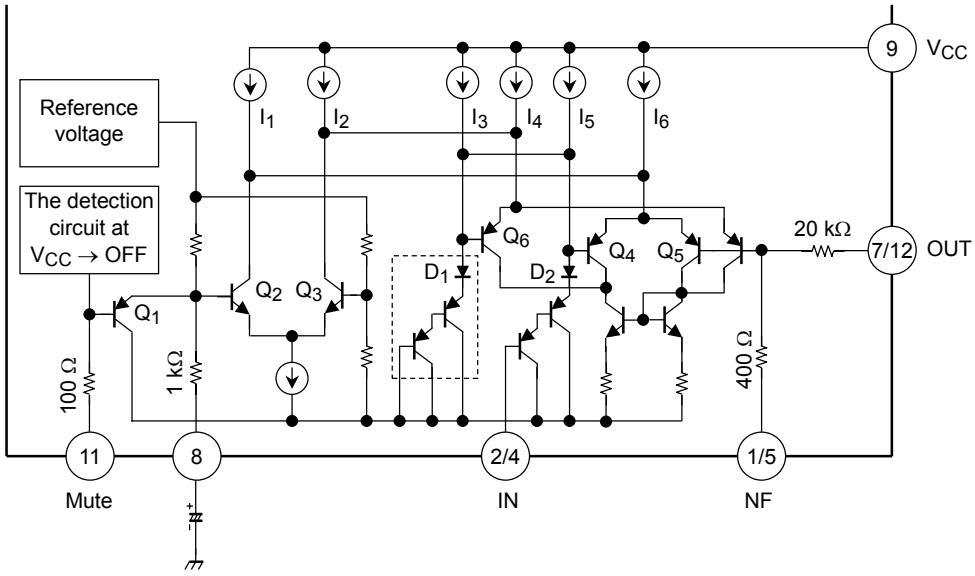
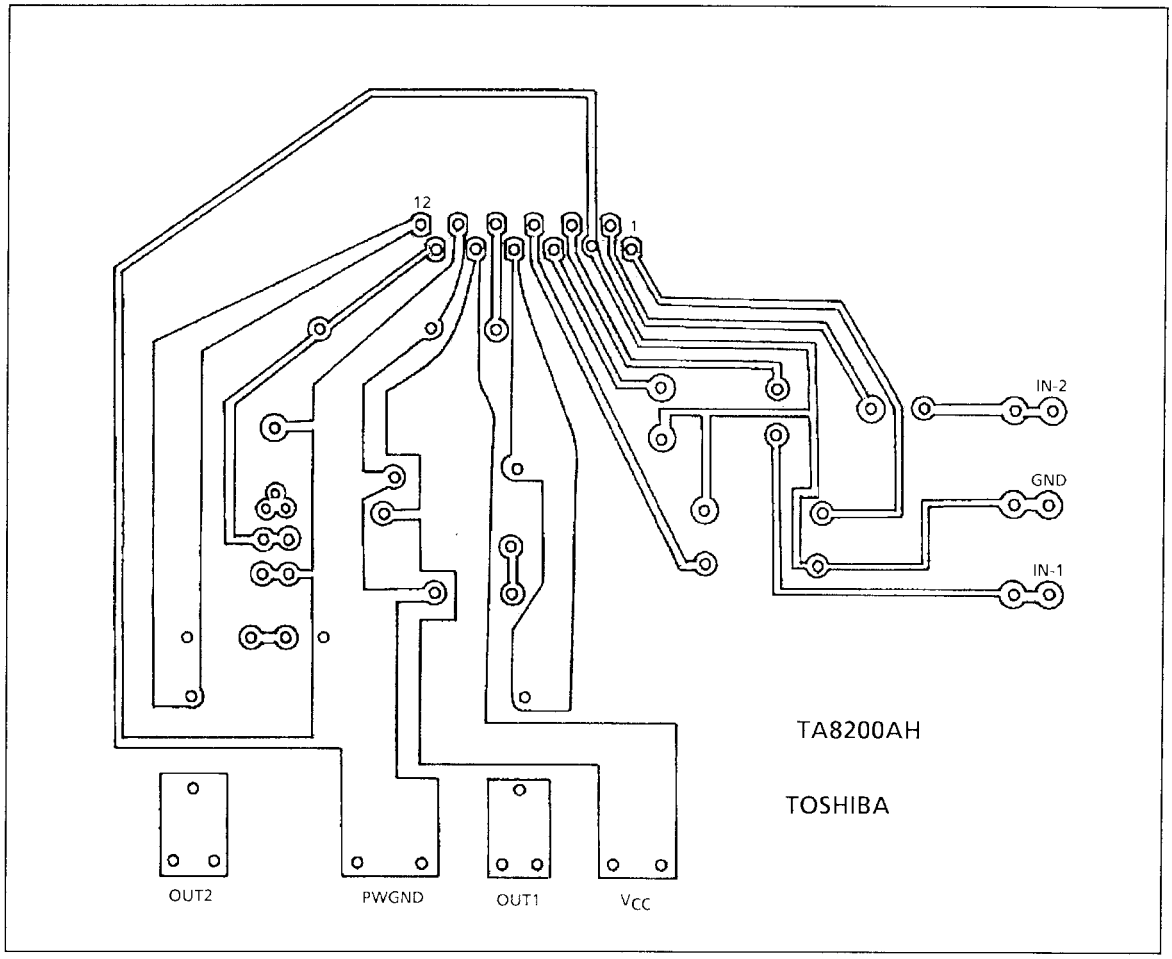



**Figure 3**

## 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**




(Bottom view)

## Maximum Ratings (Ta = 25°C)

| Characteristics | Symbol | Rating | Unit |
|---|---|---|---|
| Supply voltage | $V_{CC}$ | 37 | V |
| Output current (Peak/ch) | $I_{O\ (peak)}$ | 2.5 | A |
| Power dissipation | $P_D$ (Note) | 25 | W |
| Operating 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.

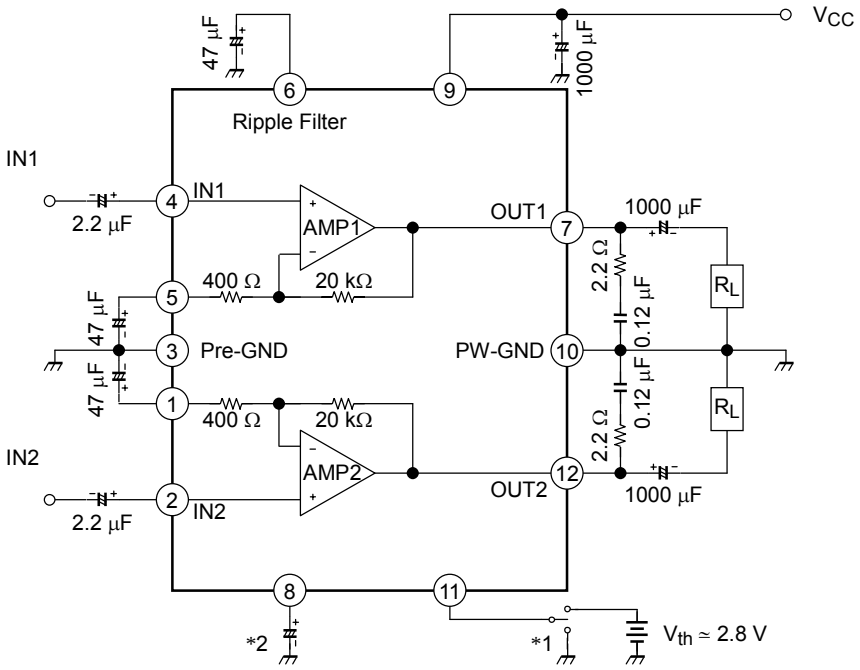
## Electrical Characteristics
## (unless otherwise specified, $V_{CC}$ = 28 V, $R_L$ = 8 Ω, $R_g$ = 600 Ω, f = 1 kHz, Ta = 25°C)

| 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 | — | |
| Total harmonic distortion | THD | — | $P_{out}$ = 2 W | — | 0.04 | 0.2 | % |
| Voltage gain | $G_V$ | — | $V_{out}$ = 0.775 Vrms (0dBm) | 32.5 | 34.0 | 35.5 | dB |
| Input resistance | $R_{IN}$ | — | — | — | 30 | — | kΩ |
| Ripple rejection ratio | R.R. | — | Rg = 0, $f_{ripple}$ = 100 Hz<br>$V_{ripple}$ = 0.775 Vrms (0dBm) | −40 | −50 | — | dB |
| Output noise voltage | $V_{no}$ | — | Rg = 10 kΩ,<br>BW = 20 Hz~20 kHz | — | 0.14 | 0.3 | mVrms |
| Cross talk | C.T. | — | Rg = 10 kΩ,<br>$V_{out}$ = 0.775 Vrms (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 |

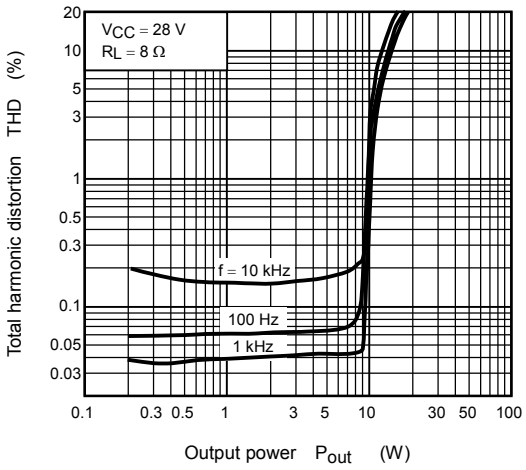
## Test Circuit



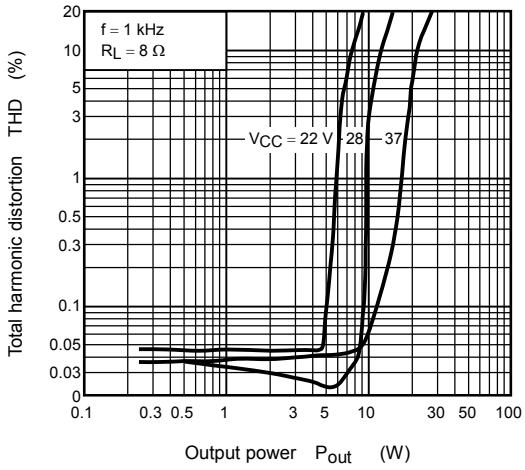

*1: Mute on at 11 pin low
$V_{th}$ 11 = 2.8 V (typ.) ($V_{CC}$ = 28 V, Ta = 25°C)

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

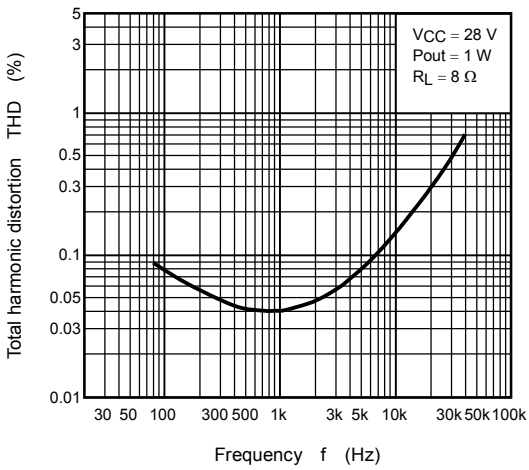
THD – $P_{out}$



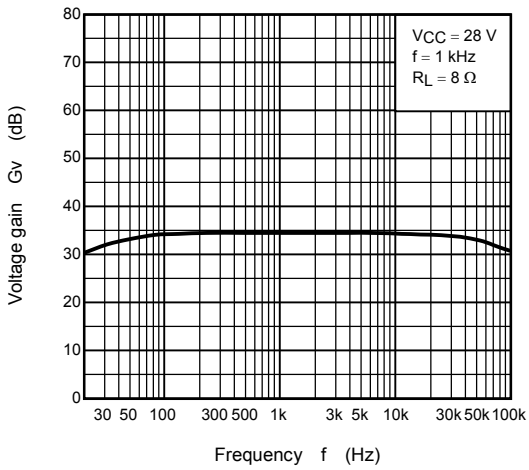

THD – $P_{out}$



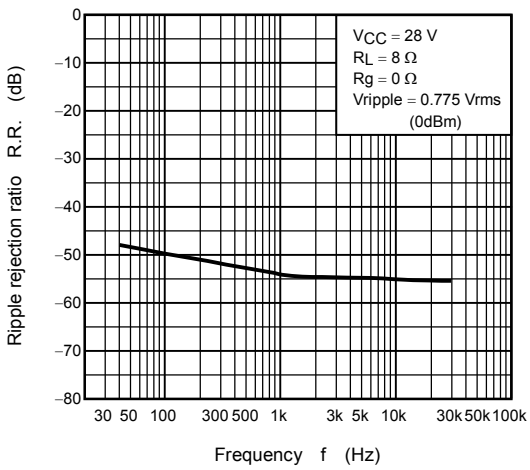

THD – f



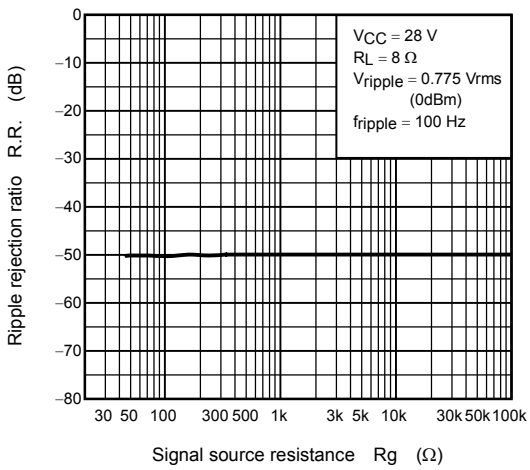

$G_V$ – f



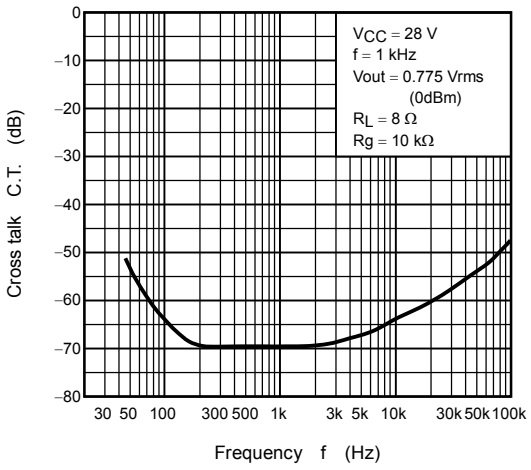

R.R. – f



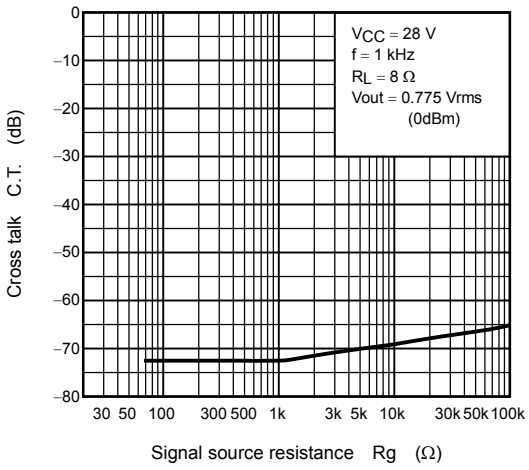

R.R. – Rg



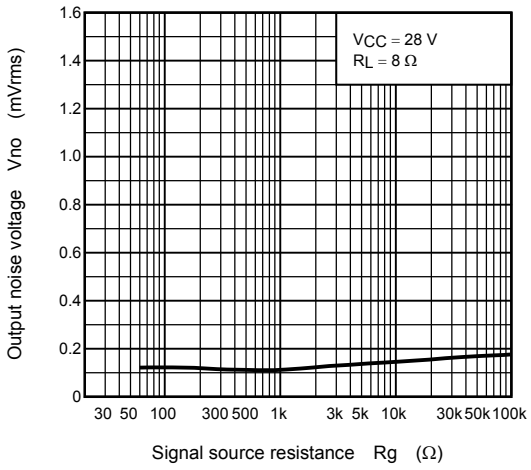
C.T. – f



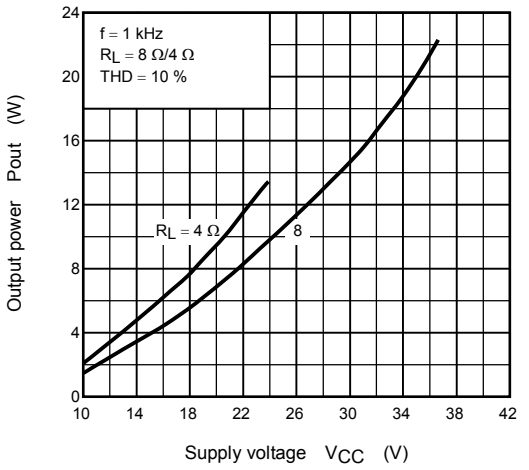

C.T. – Rg



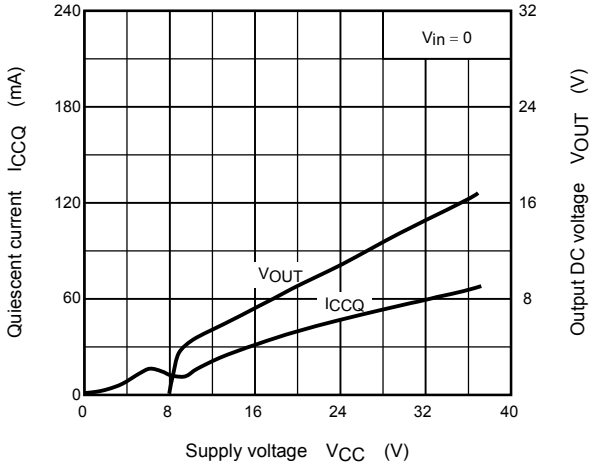

Vno – Rg



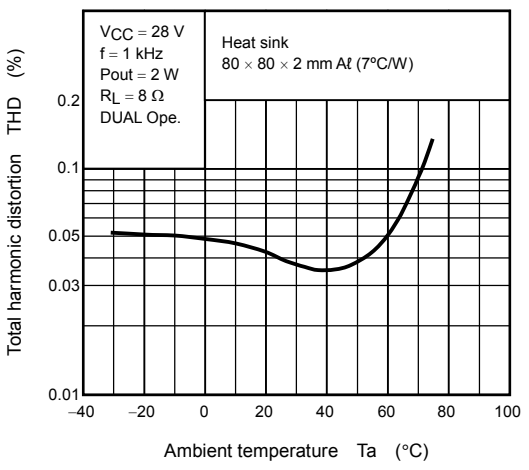

Pout – $V_{CC}$



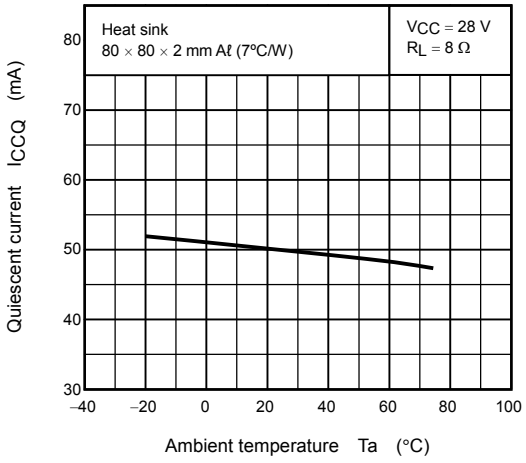

$I_{CCQ}$, $V_{OUT}$ – $V_{CC}$



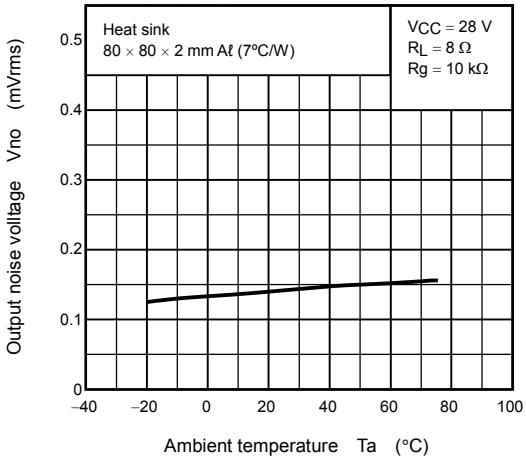

THD – Ta



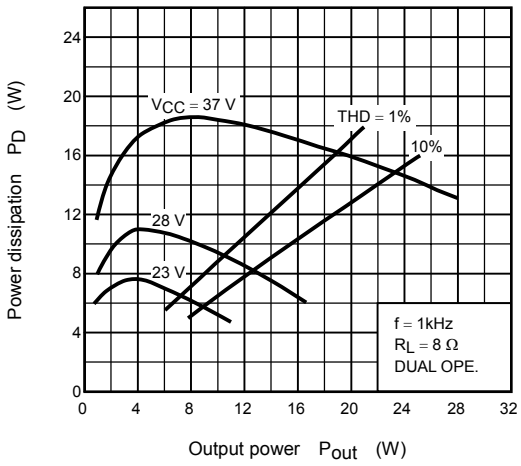
$I_{CCQ}$ – Ta



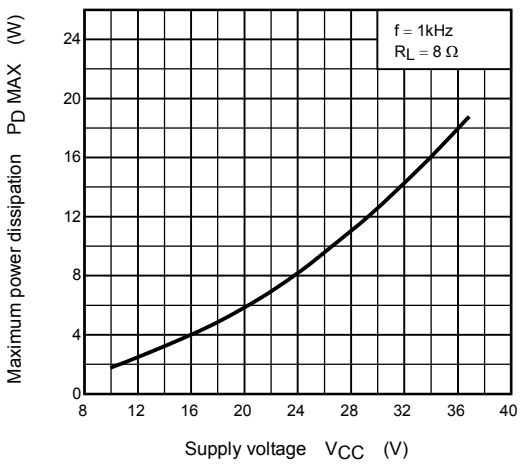

Vno – Ta



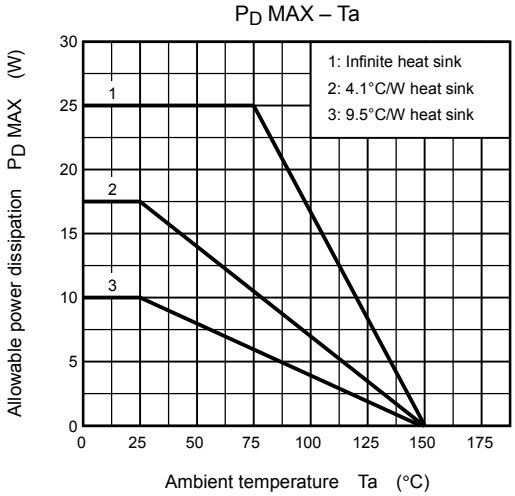

$P_D$ – $P_{out}$




$P_D$ MAX – $V_{CC}$

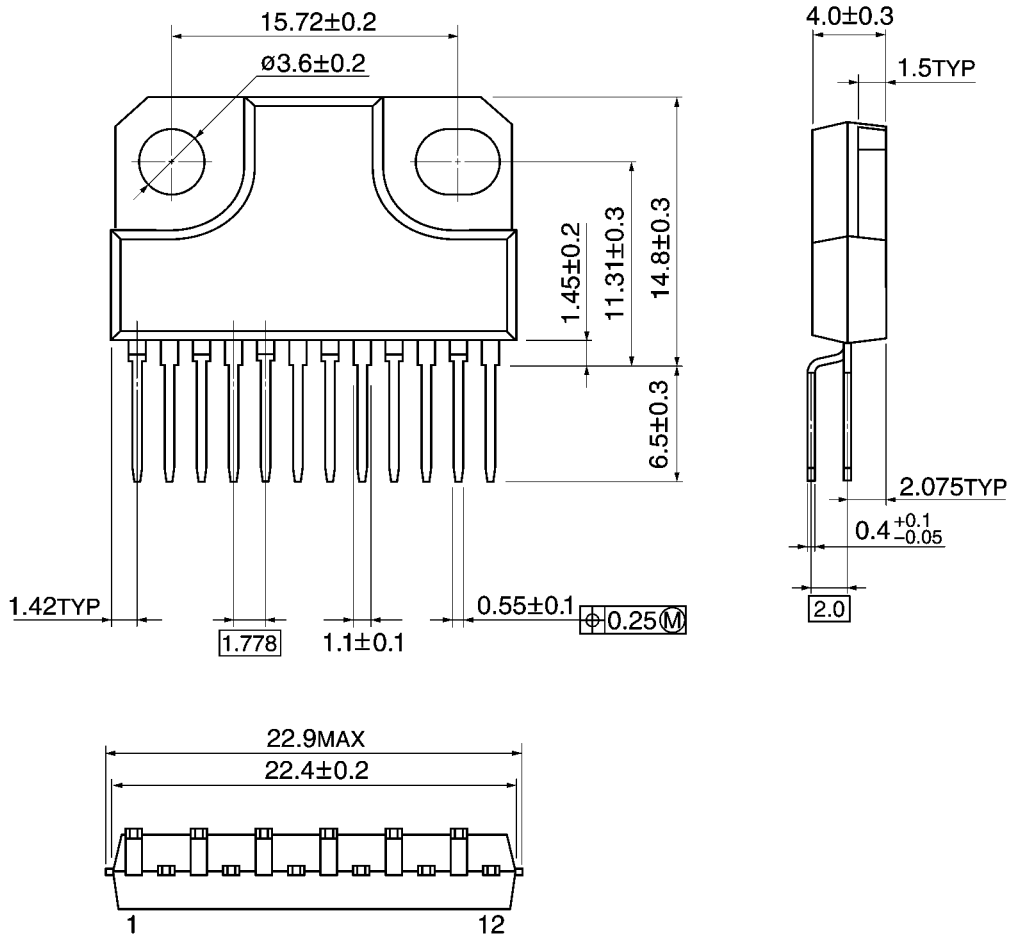



$P_D$ MAX – Ta



## Package Dimensions

HZIP12-P-1.78B Unit: mm




Weight: 4.04 g (typ.)

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