# I. Overview

8002 / 8002B is a Shutdown mode audio amplifier IC. When operating in the 5V input voltage, average power load (3 [Omega) is 3W, distortion and no more than 10%. While for portable equipment, when applied to the closed ends VDD, 8002 / 8002B will enter shutdown mode, the power consumption is very low at this time, the IQ only 0.6uA.

8002 / 8002B is designed for high-power, high-fidelity applications designed audio amplifier IC. And fewer external components needed to operate at an input voltage of 2.0V ~ 5.5V.

# II. the functional characteristics

* No output buffer circuit or an external coupling capacitor.
* Stable gain output.
* External gain setting.
* Package: SOP8, SOP8-PP, DIP8, MSOP8.

# Third, the application

* It can be used in handheld devices, desktop computers and low-voltage operation of the audio device.

# Fourth, the pin arrangement and description

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pin arrangement of FIG.** | **No.** | **name** | **Types of** | **Explanation** |
| **SHUTDOWN 1 8 VO2**  **BYPASS 2 7 GND**  **+IN 3 6 VDD**  **-IN 4 5 VO1** | 1 | SHUTDOWN | I | Port Shutdown |
| 2 | BYPASS | I | A reference voltage terminal |
| 3 | + IN | I | Positive input |
| 4 | -IN | I | Inverting input terminal |
| 5 | VO1 | O | 1 volume output terminal |
| 6 | VDD | POWER | Power supply terminal |
| 7 | GND | POWER | Ground |
| 8 | VO2 | O | Volume output 2 |

Note: I: Input; O: Output; POWER: power.



# V. Function

## Bridge set

8002 / 8002B There are two internal op amps work, but two of the op amp settings are different.

A first operational amplifier gain can be set (+ IN and -IN port) with two RF and RJ external resistor, and the second amplifier gain is fixed. A first operational amplifier output signal is actually the second op amp's input signal, and generates the same signal number two op amps, opposite phase. Thus 8002 / 8002B gain as follows: AVD = 2 × (Rf / Ri)

To drive the load, arranged to bridge amplifier mode. Unlike some way to bridging the common operational amplifier circuit connected to the load side, in the same conditions

It enables the load generated at four times the output power.

## Power

Using the bridge circuit of the operational amplifier, the power consumption due to the load is relatively large, and therefore at a predetermined voltage, load power consumption as follows:

PDMAX = 4 × (VDD)2/ (2π2) RL

Thus a 5V input, 8 ohms load condition, the maximum output power of 625mW. But the results of this algorithm is as follows:

PDMAX = (TJMAX-TA) / ΘJA

NOTE: SOP package θJA = 140 ° C / W, DIP package θJA = 107 ° C / W, MSOP package θJA = 210 ° C / W

## The reference voltage

External voltage reference terminal of capacitor close to 8002 / 8002B possible, 0.1μF capacitor improves the stability of the internal bias voltage and reduces the

PSRR of influence. PSRR can be improved by increasing the capacitance value of the BYPASS terminal. CB value depends on the size requirements of the PSRR.

## Shutdown

To reduce power consumption, off stump 8002 / 8002B may turn off external bias circuit. When closed ends is high, the operational amplifier is closed,

8002 / 8002B does not work, then the operating current of 8002 / 8002B reduced to 0.6uA. When the OFF voltage slightly lower ends VDD, 8002 / 8002B operating state is unstable. So close the ends should be placed in a stable voltage values, so as to avoid the wrong operation state into the IC.

In many applications, the level conversion off ends are accomplished by a processor. When the knife switch is implemented using a one-way conversion level, pull-up resistor can be turned in the ends, so that when the switch is turned off, by the action of the pull-up resistor, such that 8002 / 8002B stump off level is at a correct state to ensure 8002 / 8002B will not go into the wrong operation.

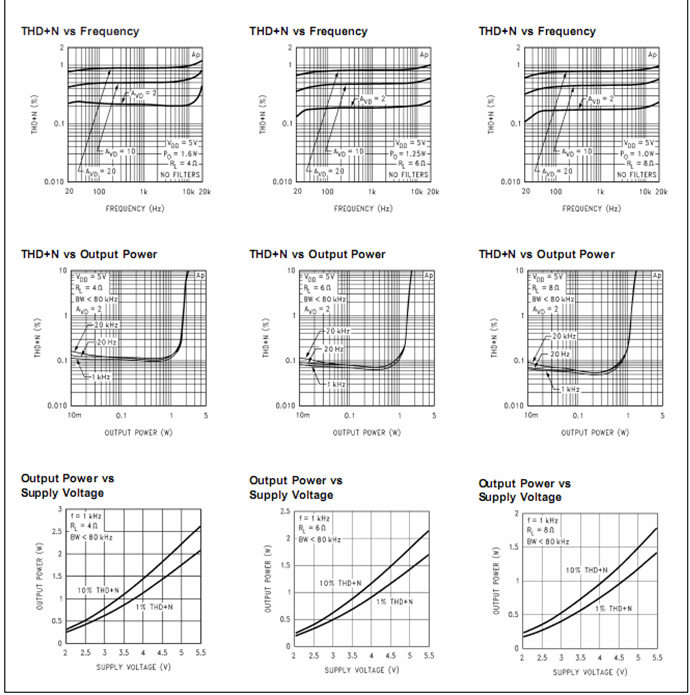
**Sixth, the limit parameter**(Ta = 25 ℃)

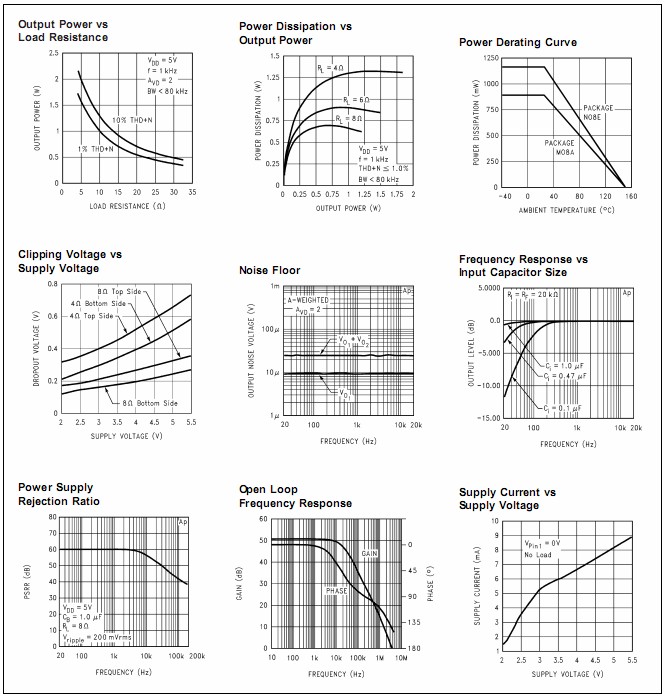
|  |  |  |  |
| --- | --- | --- | --- |
| **characteristic** | **symbol** | **range** | **unit** |
| Operating Voltage | VDD | 6 | V |
| Input voltage | VIN | -0.3 ~ VDD+0.3 | V |
| Operating temperature | TOPR | -65 to + 150 | ℃ |
| Ambient temperature | TA | -40 to + 85 | ℃ |
| Junction temperature | TJ | 150 | ℃ |

**Seven, electrical parameters**(VDD = 5V, RL = 8Ω, Ta = 25 ℃)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **name** | **symbol** | **Minimum** | **Typical values** | **Maximum** | **unit** | **Test Conditions** |
| Operating Voltage | VDD | 2.0 | - | 5.5 | V |  |
| Quiescent Current | IDD | - | 6.5 | 10 | mA | VIN= 0V, IO= 0mA |
| Off current | ISD | - | 0.6 | 2 | uA | VPIN1= VDD |
| Output bias | VOS | - | 5.0 | 50 | mV | VIN= 0V |
| Output Power | PO | - | 1.2 | - | W | THD = 1%, f = 1KHz, RL8 =Ω |
| - | 1.5 | - | THD = 10%, f = 1KHz, RL8 =Ω |
| THD + Noise | THD + N | - | 0.25 | - | % | 20Hz≤f≤20KHz, AVD= 2, RL =8Ω, PO= 1W |
| Power Supply Rejection Ratio |  | - | 60 | - | dB | VDD= 4.9V ~ 5.1V |

# Eight parameters





# Nine, circuit schematics

**RL 8Ω**



**VO1**

**VDD**

**Rf**

**20KΩ**

**Cs** +

**1.0uF**

**Tant**

**Audio Input**

**6**

**Ri**

**20KΩ**

**4**

**Ci 0 .39uF**

**-IN**

**3 + IN**

**-**

**+**

**5**

**40KΩ**

**100KΩ 40KΩ**

**VDD**

**2**

**Bypass**

**VDD / 2**

**C**

**-**

**AV = -1**

**+**

**VO2 8**

**B**

**R**

**PU**

**1.0 uF**

**100KΩ**

**1 Shutdown**

**Bias**

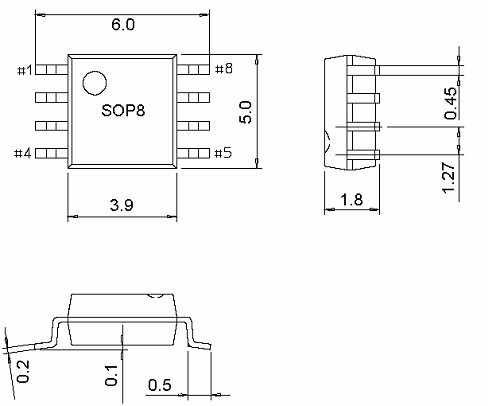
**NC**

**GND**

**7**

+

# X. FIG package size

SOP-8

SOP8-PP (with heat sink)

**1.27**



**2 .41 3**

**3 .9**

**6 .0**

**0.21**



**3.302**

**1 .5 5**

**0 .1**



**4.9**

**0.42**