

## 2.0 Watt Audio Power Amplifier

---

### **Features**

- Improved PSRR at 217 Hz & 1 KHz      60 dB
- Power output at 5.0V, 10% THD+N, 4Ω      2.0 W (typ.)
- Power output at 5.0V, 1% THD+N, 8Ω      1.5 W (typ.)
- 2.2V – 5.5V operation
- Improved circuitry eliminates pop-click noise during turn-on and turn-off transitions
- No output coupling capacitors, snubber networks or bootstrap capacitors required
- Unity-gain stable
- External gain configuration capability
- Packages: SOP8

### **General Description**

The 8002 is a Class-AB audio power amplifier. It is capable of delivering 2.0 watts of continuous average power to an 4Ω BTL load with less than 10% distortion (THD+N) from a 5V<sub>DC</sub> power supply, or 1.5 watts continuous average power to an 8 Ω BTL load with less than 1% distortion.

The 8002 is designed specifically to provide high quality output power with a minimal amount of external components. It does not require output coupling capacitors or bootstrap capacitors. The 8002 is ideally suited for audio speakers and other low voltage applications.

With special pop-click eliminating circuit, the 8002 provides perfect pop-click characteristic during turn-on and turn-off transitions.

The 8002 is unity-gain stable and can be configured by external gain-setting resistors.

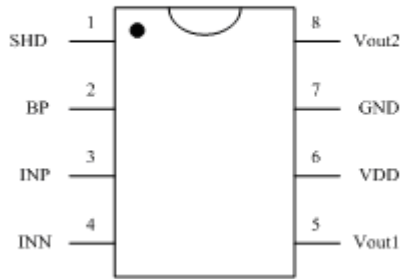
### **Applications**

- Audio speakers
- Desktop computers
- Low voltage audio systems

### **Pin Diagrams**

---

Mini Small Outline Package (SOP8)  
(Top View)



**Pin Description**

No.	Pin Name	I/O	Description
1	SHD	I	Shut-down Logical Control, '1' is active.
2	BP	I/O	Analog ground for inner OPAs. It's about a half of VDD.
3	INP	I	Positive Input
4	INN	I	Negative Input
5	Vout1	O	Negative BTL Output
6	VDD	I/O	Power Supply (2.2 – 5.5 V)
7	GND	I/O	Ground
8	Vout2	O	Positive BTL Output

## Typical Application Circuit

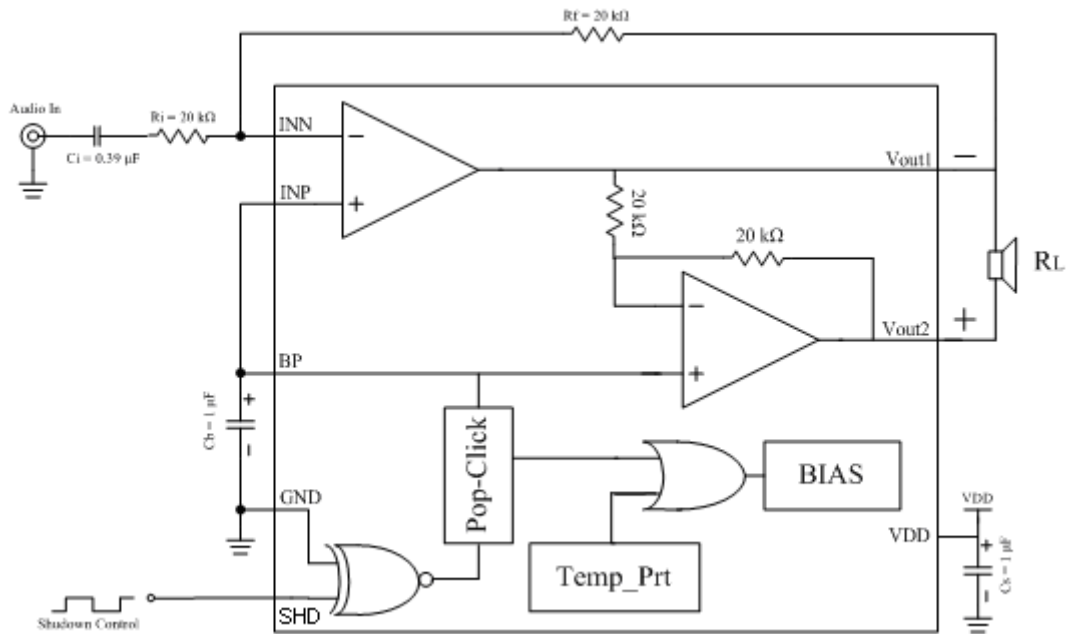


FIGURE 1. 8002 Typical Application Circuit

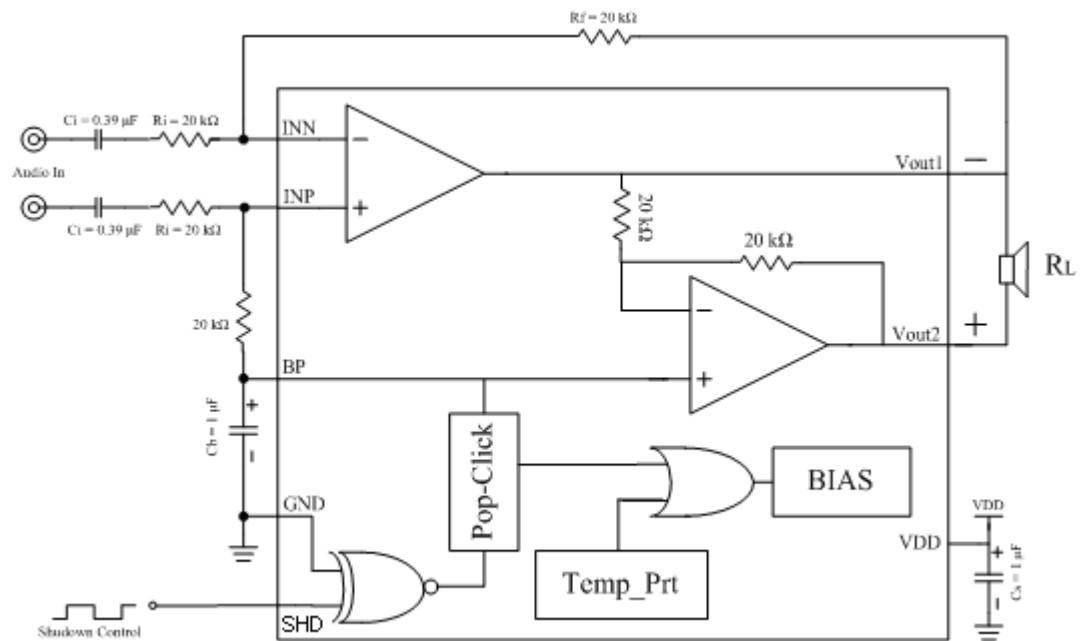


FIGURE 2. 8002 Differential Amplifier Configuration

## External Components Description

Components	Functional Description
Ri	Inverting input resistance which sets the closed-loop gain in conjunction with Rf. This resistor also forms a high pass filter with Ci at $f_c = 1/(2\pi R_i * C_i)$ .
Ci	Input coupling capacitor which blocks the DC voltage at the amplifiers input terminates. Also creates a high-pass filter with Ri at $f_c = 1/(2\pi R_i * C_i)$ .
Rf	Feedback resistance which sets the closed-loop gain in conjunction with Ri. The gain is $A_{VD} = 2 * (R_f / R_i)$ .
Cs	Supply bypass capacitor which provides power supply filtering.
Cb	Bypass pin capacitor which provides half-supply filtering. Refer to the section.

### Absolute Maximum Ratings

Supply Voltage	-0.3V to 6V
Input Voltage	-0.3V to VDD+0.3V
Power Dissipation	

See Dissipation Rating Table

Junction Temperature	-40°C to +150°C
Storage Temperature	-65°C to +150°C
Thermal Resistance	
$\theta_{JC}$ (MSOP8)	56°C/W
$\theta_{JA}$ (MSOP8)	190°C/W
$\theta_{JA}$ (SOP8)	184°C/W

### Operating Ratings

Temperature Range	-40°C $\leq$ T <sub>A</sub> $\leq$ 85°C
Supply Voltage	2.2V $\leq$ V <sub>DD</sub> $\leq$ 5.5V

**NOTE:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur.  
Operating Rating indicate conditions for which the device is functional, but do not guarantee specific performance limits.

## Electrical Characteristics

The following specifications apply for the circuit shown in Figure 1, unless otherwise specified. Limits apply for T<sub>A</sub> = 25°C.

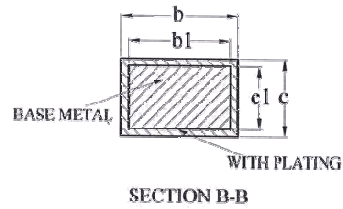
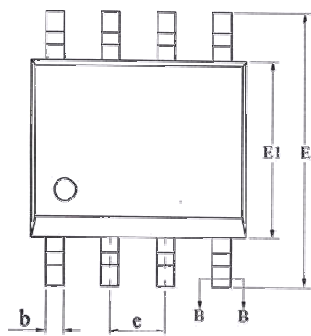
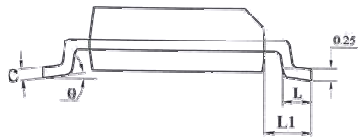
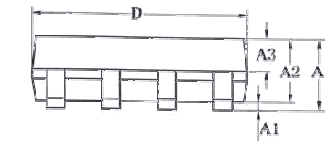
□ V<sub>DD</sub> = 5V

Symbol	Parameter	Conditions	Spec			Units
			Min.	Typ.	Max.	
I <sub>DD</sub>	Quiescent Power Supply Current	V <sub>IN</sub> = 0V, 8Ω Load		3.0	8	mA
		V <sub>IN</sub> = 0V, No Load		2.5	7	mA
I <sub>SD</sub>	Shutdown Current	V <sub>IN</sub> =0V, V <sub>SHD</sub> =GND, No Load		0.5		uA

V <sub>SDIH</sub>	Shutdown Voltage Input High		1.2			V
V <sub>SDIL</sub>	Shutdown Voltage Input Low				0.9	V
V <sub>OS</sub>	Output Offset Voltage		-50	6	50	mV
THD+N	Total Harmonic Distortion+Noise	P <sub>O</sub> =0.5W <sub>rms</sub> , f=1KHz,		0.07		%
P <sub>O</sub>	Output Power	THD+N<=1%, f=1KHz, 8Ω Load		1.5		W
P <sub>O</sub>	Output Power	THD+N<=10%, f=1KHz, 4Ω Load		2.0		W
PSRR	Power Supply Rejection Ratio	Input terminated with 10Ω, V <sub>DDRIPPLE</sub> =0.2V <sub>P-P</sub> , f=217Hz		60		dB
		Input terminated with 10Ω, V <sub>DDRIPPLE</sub> =0.2V <sub>P-P</sub> , f=1KHz		61		dB
T <sub>WU</sub>	Wake-up time			100		ms

□ V<sub>DD</sub> = 3V

Symbol	Parameter	Conditions	Spec			Units
			Min.	Typ.	Max.	
I <sub>DD</sub>	Quiescent Power Supply Current	V <sub>IN</sub> = 0V, 8Ω Load		2	7	mA
		V <sub>IN</sub> = 0V, No Load		1.5	6	mA
I <sub>SD</sub>	Shutdown Current	V <sub>IN</sub> =0V, V <sub>SHD</sub> =GND, No Load		0.5		uA
V <sub>SDIH</sub>	Shutdown Voltage Input High		1.0			V
V <sub>SDIL</sub>	Shutdown Voltage Input Low				0.7	V
V <sub>OS</sub>	Output Offset Voltage		-50	6	50	mV
THD+N	Total Harmonic Distortion+Noise	P <sub>O</sub> =0.25W <sub>rms</sub> , f=1KHz,		0.08		%
P <sub>O</sub>	Output Power	THD+N<=1%, f=1KHz, 8Ω Load		350		mW
PSRR	Power Supply Rejection Ratio	Input terminated with 10Ω, V <sub>DDRIPPLE</sub> =0.2V <sub>P-P</sub> , f=217Hz		57		dB
		Input terminated with 10Ω, V <sub>DDRIPPLE</sub> =0.2V <sub>P-P</sub> , f=1KHz		58		dB
T <sub>WU</sub>	Wake-up time			75		ms



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.77
A1	0.08	0.18	0.28
A2	1.20	1.40	1.60
A3	0.55	0.65	0.75
b	0.39	—	0.48
b1	0.38	0.41	0.43
c	0.21	—	0.26
c1	0.19	0.20	0.21
D	4.70	4.90	5.10
E	5.80	6.60	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
L	0.50	0.65	0.80
L1	1.05BSC		
0	0	—	8°

SOP8