

**LM4871**
**3W Audio Power Amplifier with Shutdown Mode**
**FEATURES**

- No Output Coupling Capacitors, Bootstrap Capacitors, or Snubber Circuits Required
- Unity-gain Stable
- WSON, VSSOP, SOIC, or PDIP Packaging
- External Gain Configuration Capability

- Pin Compatible with the LM4861

**APPLICATIONS**

- Portable Computers
- Desktop Computers
- Low Voltage Audio Systems

**KEY SPECIFICATIONS**

- PO at 10% THD+N, 1kHz
- LM4871LD: 3.Ω , 4.Ω Loads; 3W (typ), 2.5 W (typ)
- All other LM4871 Packages: 8.Ω load 1.5 W (typ)
- Shutdown Current 0.6μA (typ)
- Supply Voltage Range 2.0V to 5.5 V
- THD at 1kHz at 1W Continuous Average Output Power into 8.Ω 0.5% (max)

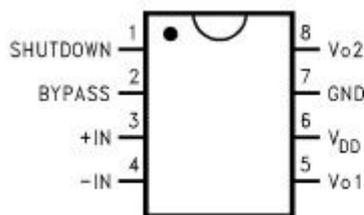
**Connection Diagrams**


Figure 1. VSSOP, Small Outline, and PDIP Package Top View  
 See Package Number DGK0008A, D0008A, or D0008E

**DESCRIPTION**

The LM4871 is a mono bridged audio power amplifier capable of delivering 3W of continuous average power into a 3 Ω load with less than 10% THD when powered by a 5V power supply (see Note). To conserve power in portable applications, the LM4871's micropower shutdown mode ( $I_Q = 0.6\mu A$ , typ) is activated when  $V_{DD}$  is applied to the SHUTDOWN pin.

Boomer audio power amplifiers are designed specifically to provide high power, high fidelity audio output. They require few external components and operate on low supply voltages from 2.0V to 5.5V. Since the LM4871 does not require output coupling capacitors, bootstrap capacitors, or snubber networks, it is ideally suited for low-power portable systems that require minimum volume and weight. Additional LM4871 features include thermal shutdown protection, unity-gain stability, and external gain set.

**Note:** An LM4871LD that has been properly mounted to a circuit board will deliver 3W into 3 Ω (at 10% THD). The other package options for the LM4871 will deliver 1.5W into 8 Ω (at 10% THD). See the [Application Information](#) section for further information concerning the LM4871LD, LM4871MM, LM4871M, and the LM4871N.

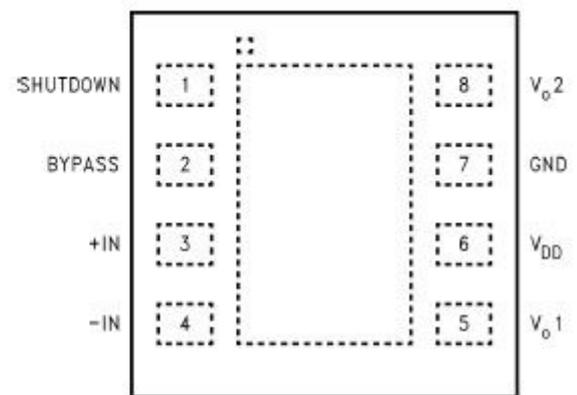


Figure 2. WSON Package (Top View)  
 See Package Number NGN0008A

Typical Application

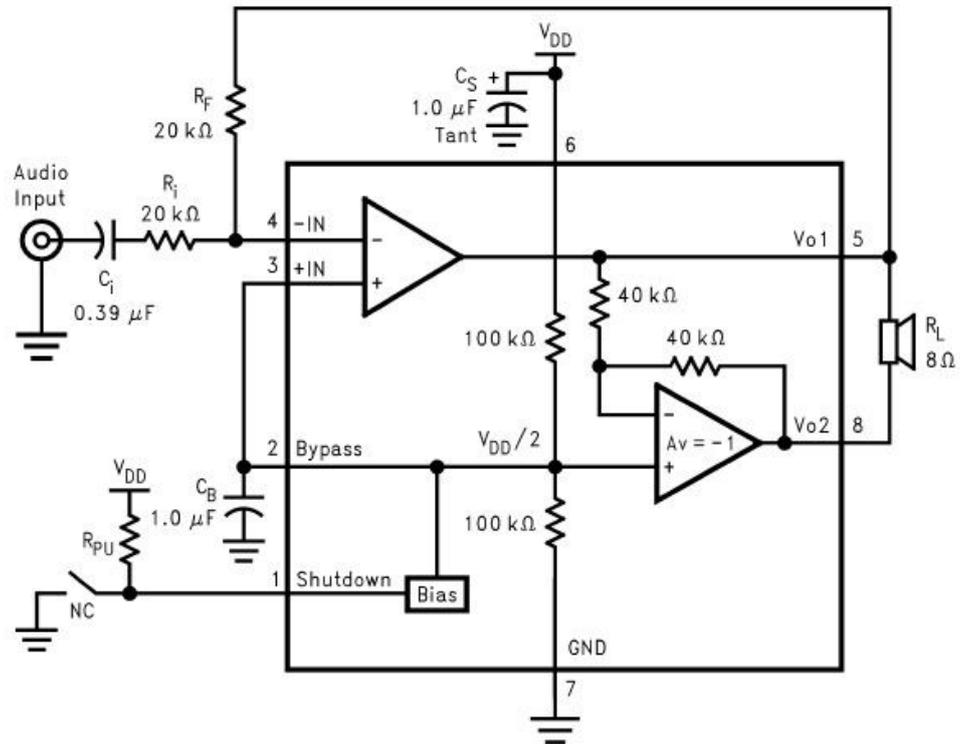


Figure 3. Typical Audio Amplifier Application Circuit

**Absolute Maximum Ratings<sup>(1)(2)</sup>**

Supply Voltage		6.0V	
Supply Temperature		-65°C to +150°C	
Input Voltage		-0.3V to V <sub>DD</sub> to +0.3V	
Power Dissipation <sup>(3)</sup>		Internally Limited	
ESD Susceptibility <sup>(4)</sup>		5000V	
ESD Susceptibility <sup>(5)</sup>		250V	
Junction Temperature		150°C	
Soldering Information	Small Outline Package	Vapor Phase (60 sec.)	215°C
		Infrared (15 sec.)	220°C
$\theta_{JC}$ (typ)—D0008A		35°C/W	
$\theta_{JA}$ (typ)—D0008A		140°C/W	
$\theta_{JC}$ (typ)—D0008E		37°C/W	
$\theta_{JA}$ (typ)—D0008E		107°C/W	
$\theta_{JC}$ (typ)—DGK0008A		56°C/W	
$\theta_{JA}$ (typ)—DGK0008A		210°C/W	
$\theta_{JC}$ (typ)—NGN0008A		4.3°C/W	
$\theta_{JA}$ (typ)—NGN0008A		56°C/W <sup>(6)</sup>	

- (1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not ensure specific performance limits. Electrical Characteristics state DC and AC electrical specifications under particular test conditions which ensure specific performance limits. This assumes that the device is within the Operating Ratings. Specifications are not ensured for parameters where no limit is given, however, the typical value is a good indication of device performance.
- (2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/Distributors for availability and specifications.
- (3) The maximum power dissipation must be derated at elevated temperatures and is dictated by T<sub>JMAX</sub>,  $\theta_{JA}$ , and the ambient temperature T<sub>A</sub>. The maximum allowable power dissipation is P<sub>DMAX</sub> = (T<sub>JMAX</sub> - T<sub>A</sub>) /  $\theta_{JA}$  or the number given in Absolute Maximum Ratings, whichever is lower. For the LM4871, T<sub>JMAX</sub> = 150°C. For the  $\theta_{JA}$ 's for different packages, please see the [Application Information](#) section or the absolute maximum ratings section.
- (4) Human body model, 100pF discharged through a 1.5k $\Omega$  resistor.
- (5) Machine Model, 220pF–240pF discharged through all pins.
- (6) The given  $\theta_{JA}$  is for an LM4871 packaged in an NGN0008A with the Exposed-DAP soldered to an exposed 1in<sup>2</sup> area of 1oz printed circuit board copper.

**Operating Ratings**

Temperature Range T <sub>MIN</sub> ≤ T <sub>A</sub> ≤ T <sub>MAX</sub>	-40°C ≤ T <sub>A</sub> ≤ 85°C
Supply Voltage	2.0V ≤ V <sub>DD</sub> ≤ 5.5V

**Electrical Characteristics<sup>(1)(2)</sup>**

The following specifications apply for V<sub>DD</sub> = 5V and R<sub>L</sub> = 8 $\Omega$  unless otherwise specified. Limits apply for T<sub>A</sub> = 25°C.

Symbol	Parameter	Conditions	LM4871			Units (Limits)
			Min <sup>(3)</sup>	Typical <sup>(4)</sup>	Limit <sup>(3)</sup>	
V <sub>DD</sub>	Supply Voltage		2.0		5.5	V
I <sub>DD</sub>	Quiescent Power Supply Current	V <sub>IN</sub> = 0V, I <sub>o</sub> = 0A		6.5	10.0	mA
I <sub>SD</sub>	Shutdown Current	V <sub>PIN1</sub> = V <sub>DD</sub>		0.6	2	$\mu$ A
V <sub>OS</sub>	Output Offset Voltage	V <sub>IN</sub> = 0V		5.0	50	mV

- (1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not ensure specific performance limits. Electrical Characteristics state DC and AC electrical specifications under particular test conditions which ensure specific performance limits. This assumes that the device is within the Operating Ratings. Specifications are not ensured for parameters where no limit is given, however, the typical value is a good indication of device performance.
- (2) All voltages are measured with respect to the ground pin, unless otherwise specified.
- (3) Typicals are specified at 25°C and represent the parametric norm.
- (4) Limits are specified to TI's AOQL (Average Outgoing Quality Level).

**Electrical Characteristics<sup>(1)(2)</sup> (continued)**

 The following specifications apply for  $V_{DD} = 5V$  and  $R_L = 8\Omega$  unless otherwise specified. Limits apply for  $T_A = 25^\circ C$ .

Symbol	Parameter	Conditions	LM4871			Units (Limits)
			Min <sup>(3)</sup>	Typical <sup>(4)</sup>	Limit <sup>(3)</sup>	
P <sub>o</sub>	Output Power	THD = 1%, f = 1kHz LM4871LD, R <sub>L</sub> = 3Ω <sup>(5)</sup> LM4871LD, R <sub>L</sub> = 4Ω <sup>(5)</sup> LM4871, R <sub>L</sub> = 8Ω <sup>(5)</sup>		2.38 2 1.2		W
		THD+N = 10%, f = 1kHz LM4871LD, R <sub>L</sub> = 3Ω <sup>(5)</sup> LM4871LD, R <sub>L</sub> = 4Ω <sup>(5)</sup> LM4871, R <sub>L</sub> = 8Ω <sup>(5)</sup>		3 2.5 1.5		W
THD+N	Total Harmonic Distortion+Noise	20Hz ≤ f ≤ 20kHz, A <sub>VD</sub> = 2 LM4871LD, R <sub>L</sub> = 4Ω, P <sub>o</sub> = 1.6W LM4871, R <sub>L</sub> = 8Ω, P <sub>o</sub> = 1W		0.13 0.25		%
PSRR	Power Supply Rejection Ratio	V <sub>DD</sub> = 4.9V to 5.1V		60		dB

(5) When driving 3Ω or 4Ω loads from a 5V supply, the LM4871LD must be mounted to a circuit board.