Low-Cost, 1.27W Audio Power Amplifiers

■ General Description

The LN4872 is a Class-AB audio power amplifier designed for mobile phones and other portable communication devices. It is capable of delivering 1.2W of continuous average power to an 8Ω BTL load with less than 1% distortion (THD+N) from a 5V DC power supply.

The LN4872 was 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. And with ultra low shutdown current, the LN4872 is ideally suited for mobile phone and other low voltage applications where minimal power consumption is a primary requirement. With special pop-click eliminating circuit, the LN4872 provides perfect pop-click characteristic during turn-on and turn-off transitions.

The LN4872 is unity-gain stable and can be configured by external gain-setting resistors.

■ Key Specifications

- PSRR @ f_{IN}=217Hz VDD = 5V 62dB(typ.)
- Power Output @ VDD=5V & 1% THD RL=8Ω 1.27W(typ.)
- Power Output @ VDD=3V &1% THD RL=8Ω 400mW(typ.)
- Power Output @ VDD=5V &1% THD RL=4Ω 2W(typ.)
- Shutdown Current 0.1μA(typ.)

■ Features

- 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
- Available in space-saving packages

■ Applications

- Wireless handsets
- Portable electronic devices
- PDAs, Handheld computers

■ Package

- SOP-8
- MSOP-8

■ Ordering Information

Ordering Number	Package Type
LN4872M	SOP-8
LN4872MM	MSOP-8

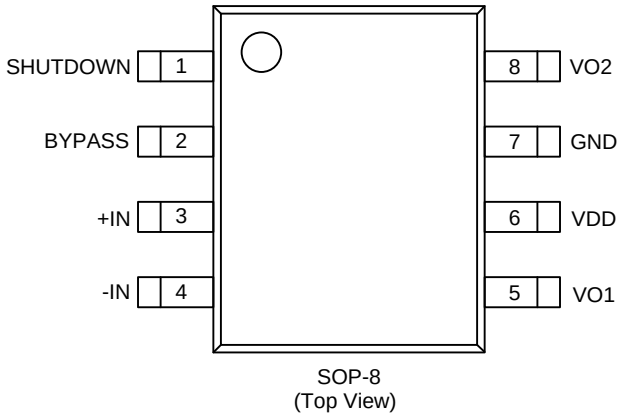
■ Operating Ratings

Temperature Range

TMIN ≤ TA ≤ TMAX---------- −40°C ≤ TA ≤ 85°C

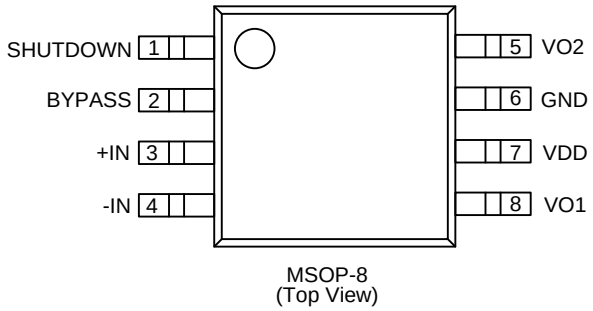
Supply Voltage ---------- 2.2V ≤ VDD ≤ 5.5V

■ Pin Configuration



SOP-8
(Top View)

Ordering Number：LN4872M



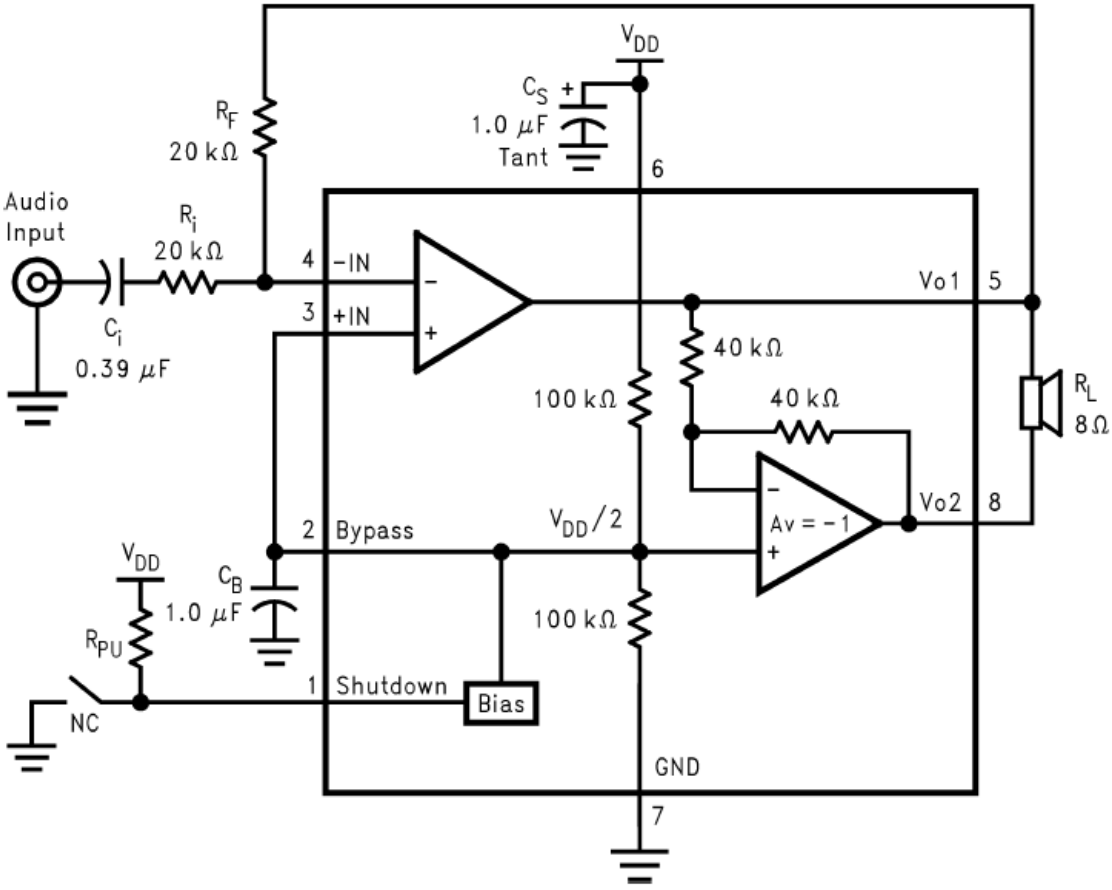
MSOP-8
(Top View)

Ordering Number：LN4872MM

■ Pin Function Description

Pin Name	Pin Number	I/O	Function Description
SHUTDOWN	1	I	Shutdown terminal (active high logic)
BYPASS	2		Adding a bypass capacitor
+IN	3	I	Channel positive input
-IN	4	I	Channel negative input
VO1	5	O	Channel output 1
VDD	6		Power supply
GND	7		High-current ground
VO2	8	O	Channel output 2

■ Function Block Diagram



■ Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V_{DD}	-0.3—6.5	V
Input Voltage	V_{IN}	-0.3—V_{DD}+0.3	V
Power Output	—	Internal limit	
Junction Temperature	—	-150	℃
Storage Temperature	Tstg	-65—150	℃
ESD Susceptibility	-	8000	V

■ Electrical Characteristics

(VDD = 5V Unless otherwise specified. Limits apply for TA = 25°C.)

Symbol	Parameters	Test Conditions	Min.	Typ.	Max.	Unit
I_{DD}	Quiescent Power Supply Current	VIN = 0V, Io = 0A, No Load	—	4	8	mA
		VIN = 0V, Io = 0A, 8Ω Load	—	5	10	mA
I_{SD}	Shutdown Current	$V_{SHUTDOWN}$ = 0V	—	0.1	2	μA
V_{SDIH}	Shutdown Voltage Input High		1.2	—	—	V
V_{SDIL}	Shutdown Voltage Input Low		—	—	0.4	V
V_{OS}	Output Ofsett Voltage		—	7	50	mV
$R_{OUT-GND}$	Resistor Output to GND		7.0	8.5	9.7	kΩ
P_O	Output Power (8Ω)	THD = 1% (max); f = 1 kHz 8Ω Load	0.8	1.2	—	W
T_{WU}	Wake-up time		—	170	220	ms
T_{SD}	Thermal Shutdown Temperature		150	170	190	℃
THD+N	Total Harmonic Distortion+Noise	Po = 0.4 Wrms; f = 1kHz	—	0.1	—	%
PSRR	Power Supply Rejection Ratio	V_{ripple} = 200mV $_{sine\ p-p}$ f=217Hz	55	62	—	dB
		V_{ripple} = 200mV $_{sine\ p-p}$ f=1kHz		66		
T_{SDT}	Shut Down Time	8Ω Load	—	1.0	—	ms

(VDD = 3V Unless otherwise specified. Limits apply for TA = 25°C.)

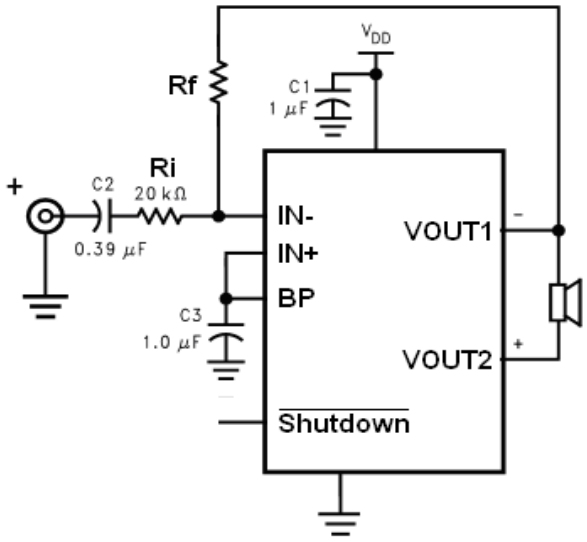
Symbol	Parameters	Test Conditions	Min.	Typ.	Max.	Unit
I_{DD}	Quiescent Power Supply Current	VIN = 0V, Io = 0A, No Load	—	3.5	7	mA
		VIN = 0V, Io = 0A, 8Ω Load	—	4.5	9	mA
I_{SD}	Shutdown Current	$V_{SHUTDOWN}$ = 0V	—	0.1	2	μA
V_{SDIH}	Shutdown Voltage Input High		1.2	—	—	V
V_{SDIL}	Shutdown Voltage Input Low		—	—	0.4	V
V_{OS}	Output Ofsett Voltage		—	7	50	mV
$R_{OUT-GND}$	Resistor Output to GND		7.0	8.5	9.7	kΩ
P_O	Output Power (8Ω)	THD = 2% (max); f = 1 kHz 8Ω Load	0.28	0.41	—	W
T_{WU}	Wake-up time		—	170	220	ms
T_{SD}	Thermal Shutdown Temperature		150	170	190	℃
THD+N	Total Harmonic Distortion+Noise	Po = 0.4 Wrms; f = 1kHz	—	0.1	—	%
PSRR	Power Supply Rejection Ratio	V_{ripple} = 200mV $_{sine\ p-p}$ f=217Hz	45	56	—	dB
		V_{ripple} = 200mV $_{sine\ p-p}$ f=1kHz		62		

(VDD = 2.6V Unless otherwise specified. Limits apply for TA = 25°C.)

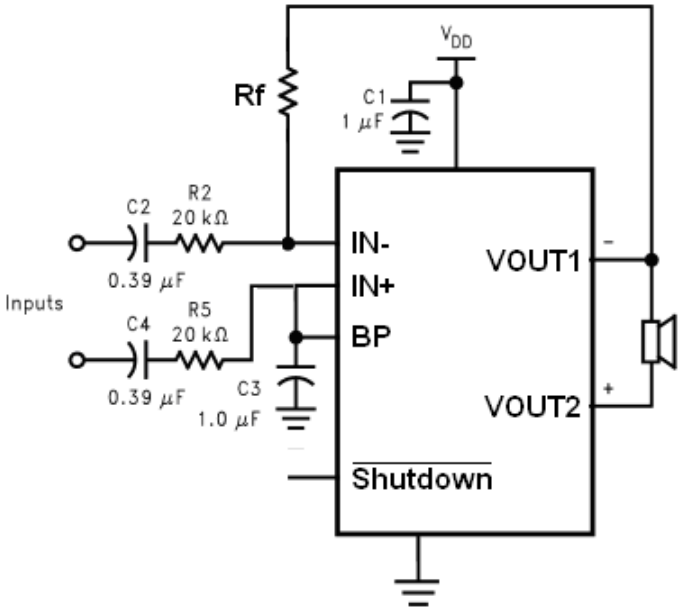
Symbol	Parameters	Test Conditions		Min.	Typ.	Max.	Unit
I_{DD}	Quiescent Power Supply Current	VIN = 0V, Io = 0A, No Load		—	2.6	5.5	mA
I_{SD}		$V_{SHUTDOWN}$ = 0V		—	0.1	2	μA
P_O	Output Power	THD = 1% (max); f = 1 kHz	8Ω Load		0.3	—	W
			4Ω Load		0.5		
THD+N	Total Harmonic Distortion+Noise	Po = 0.1 Wrms; f = 1kHz		—	0.08	—	%
PSRR	Power Supply Rejection Ratio	V_{ripple} = 200mV $_{sine\ p-p}$ f=217Hz		—	44	—	dB
		V_{ripple} = 200mV $_{sine\ p-p}$ f=1kHz			44		

■ Typical Application Circuit

- **Single-Ended Input Configuration**



- **Differential Input Configuration**

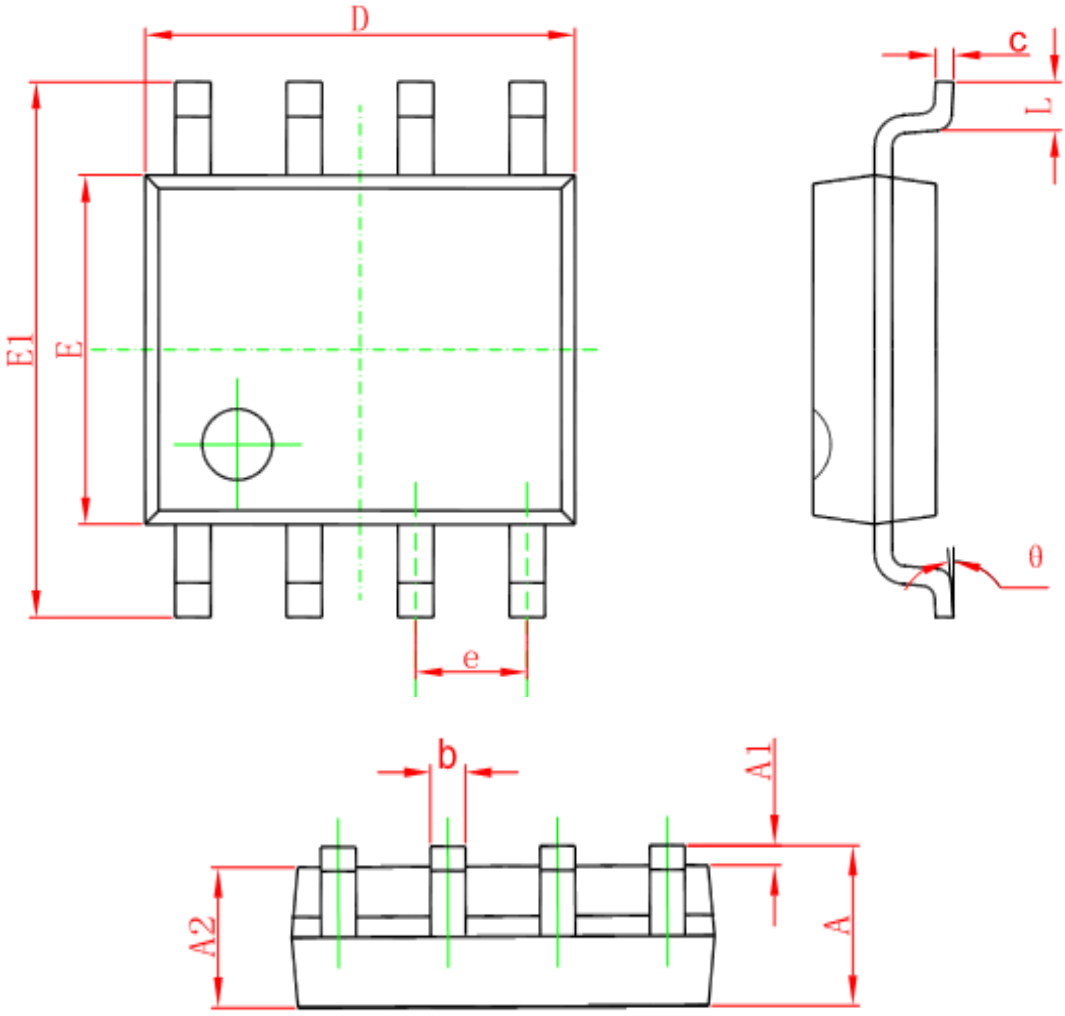


The resistors (Rf) set the gain of the amplifier according to equation (1). Gain = 2 * Rf / Ri

Typical Ri=20K Rf=20K,GAIN=2

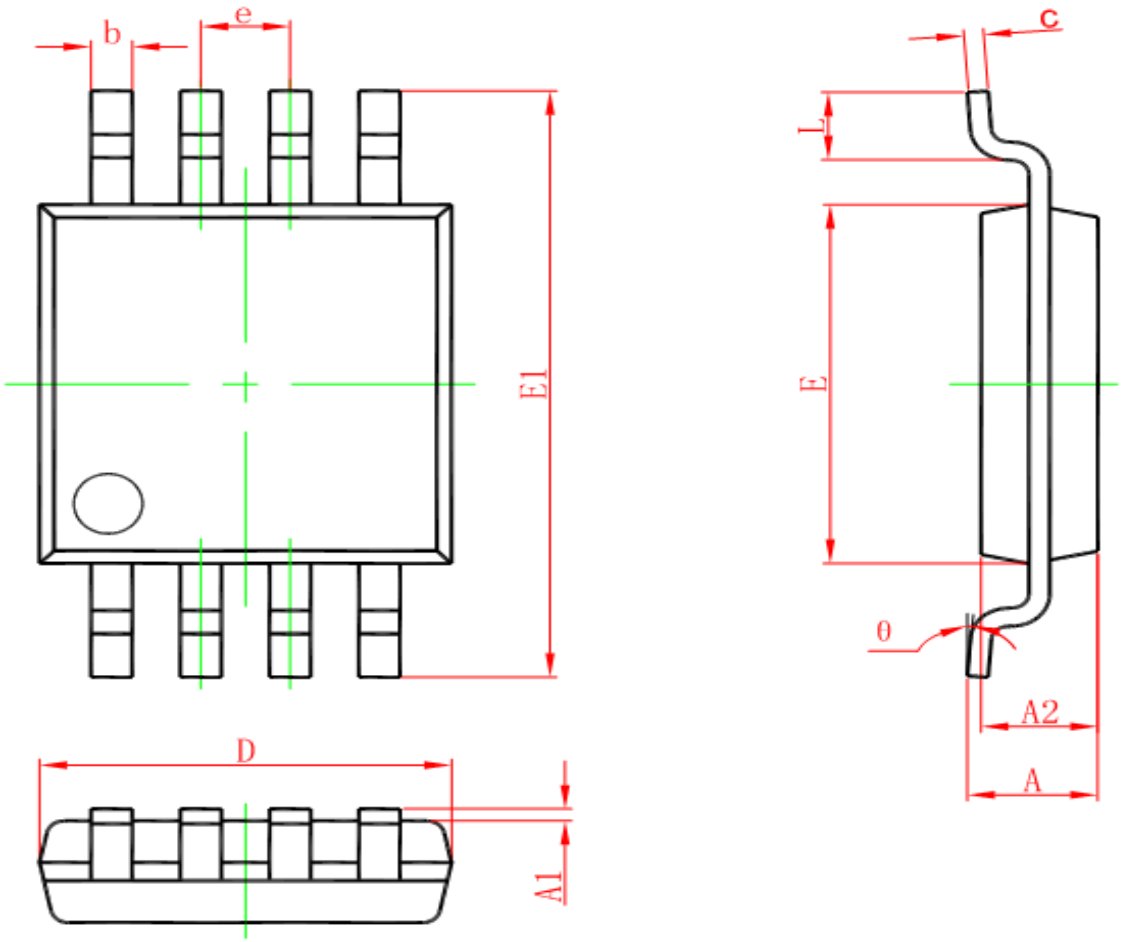
■ Package Information

- **SOP-8**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

- **MSOP-8**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°