3.0W Stereo Audio Power Amplifier With Advanced DC Volume Control

General Description

The FH4872 is a stereo audio power amplifier that drives 3W/ channel of continuous RMS power into a 3Ω load.

Advanced DC volume control minimizes external components and allows BTL (speaker) volume control and SE (headphone) volume control. Notebook and pocket PCs benefit from the integrated feature set that minimizes external components without sacrificing functionality.

To simplify design, the speaker volume level is adjusted by applying a DC voltage to the VOLUME terminal. Likewise, the delta between speaker volume and headphone volume can be adjusted by applying a DC voltage to the SEDIFF terminal. To avoid an unexpected high volume level through the headphones, a third terminal, SEMAX, limits the headphone volume level when a DC voltage is applied. Finally, to ensure a smooth transition between active and shutdown modes, a fade mode ramps the volume up and down.

Features

- Advanced DC Volume Control With 2-dB Steps , From -40dB to 20dB
  - ¤ Fade Mode
  - ¤ Maximum Volume Setting for SE Mode
  - ¤ Adjustable SE Volume Control
- Referenced to BTL Volume Control
- 3W Into 3Ω Speakers
- Stereo Input MUX
- Differential Inputs

Package

- TSSOP-24/PP

Applications

- Notebook PC
- LCD Monitors
- Pocket PC

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

Symbol	Parameters	Test Conditions	Min.	Typ.	Max.	Unit
$\|V_{OO}\|$	Output Offset Voltage	V_{DD}=5.5V,Gain=0dB,SE/ $\overline{BTL}$ =0V			30	mV
		V_{DD}=5.5V,Gain=20dB,SE/ $\overline{BTL}$ =0V			50	
PSRR	Power Supply Rejection Ratio	V_{DD}=PV_{DD}=4.0V to 5.5V	-42	-70		dB
$\|I_{IH}\|$	High-level input current	V_{DD}=PV_{DD}=5.5V, V_I=V_{DD}=PV_{DD}			1	μA
$\|I_{IL}\|$	Low-level input current	V_{DD}=PV_{DD}=5.5V,V_I=0V			1	μA
$I_{(SD)}$	Shutdown Current	$\overline{SHUTDOWN}$ =0V		1	20	μA
I_{DD}	Supply current, no load	V_{DD}=PV_{DD}=5.5V,SE/ $\overline{BTL}$ =0V, $\overline{SHUTDOWN}$ =2V	6.0	7.5	9.0	mA
		V_{DD}=PV_{DD}=5.5V,SE/ $\overline{BTL}$ =5.5V, $\overline{SHUTDOWN}$ =2V	3.0	5	6	mA
I_{DD}	Supply current, max power into a 3Ω load	V_{DD}=PV_{DD}=5.5V,SE/ $\overline{BTL}$ =0V $V_{\overline{SHUTDOWN}}$ =2V， R_L=3Ω		1.5		ARms

Ordering Information

Part Number	Packaged	SPQ	
FH4872TS24	TSSOP-24/PP	2500PCS	Tape Reel

■ Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V_{DD}	-0.3– 6.0	V
Input Voltage	V_{IN}	-0.3– V_{DD}+0.3	V
Operating Temperature	T_A	-40—85	℃
Junction Temperature	—	-45—150	℃
Storage Temperature	Tstg	-65—150	℃
ESD Su sceptibility	-	2000	V

■ Typical Application Circuit (01)

- Typical FH4872 application circuit using single-ended inputs and input MUX

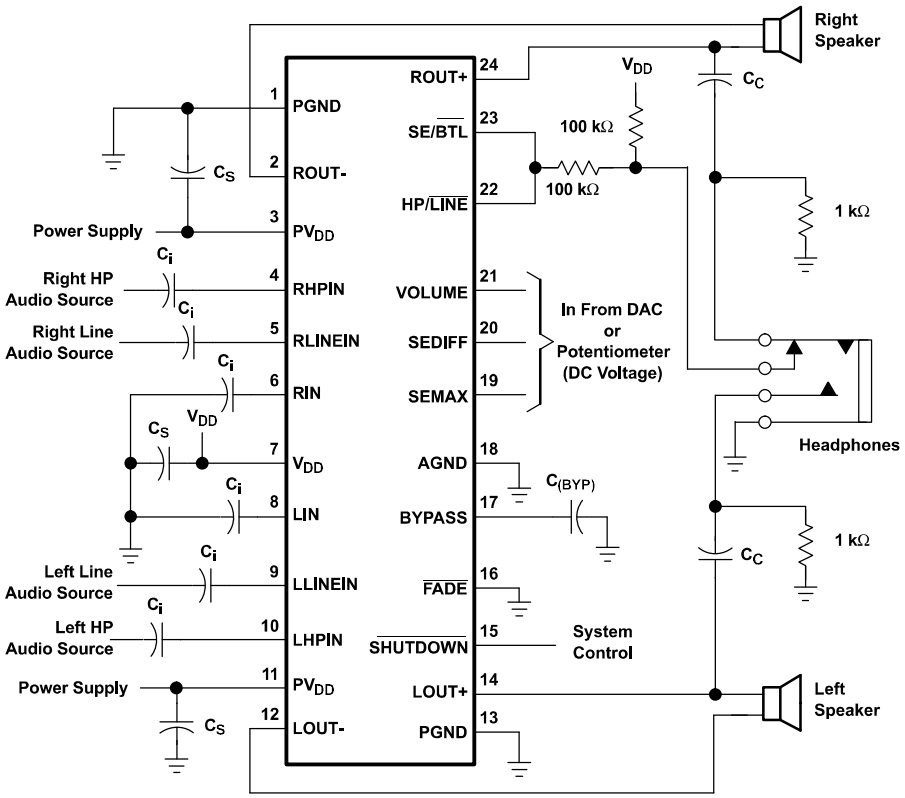


Figure 1.

NOTE:

0.1 μF ceramic capacitor should be placed as close as possible to the IC. For filtering lower -frequency noise signals, a larger electrolytic capacitor of 10 μF or greater should be placed near the audio power amplifier.

■ Typical Application Circuit (02)

- Typical FH4872 application circuit using differential inputs

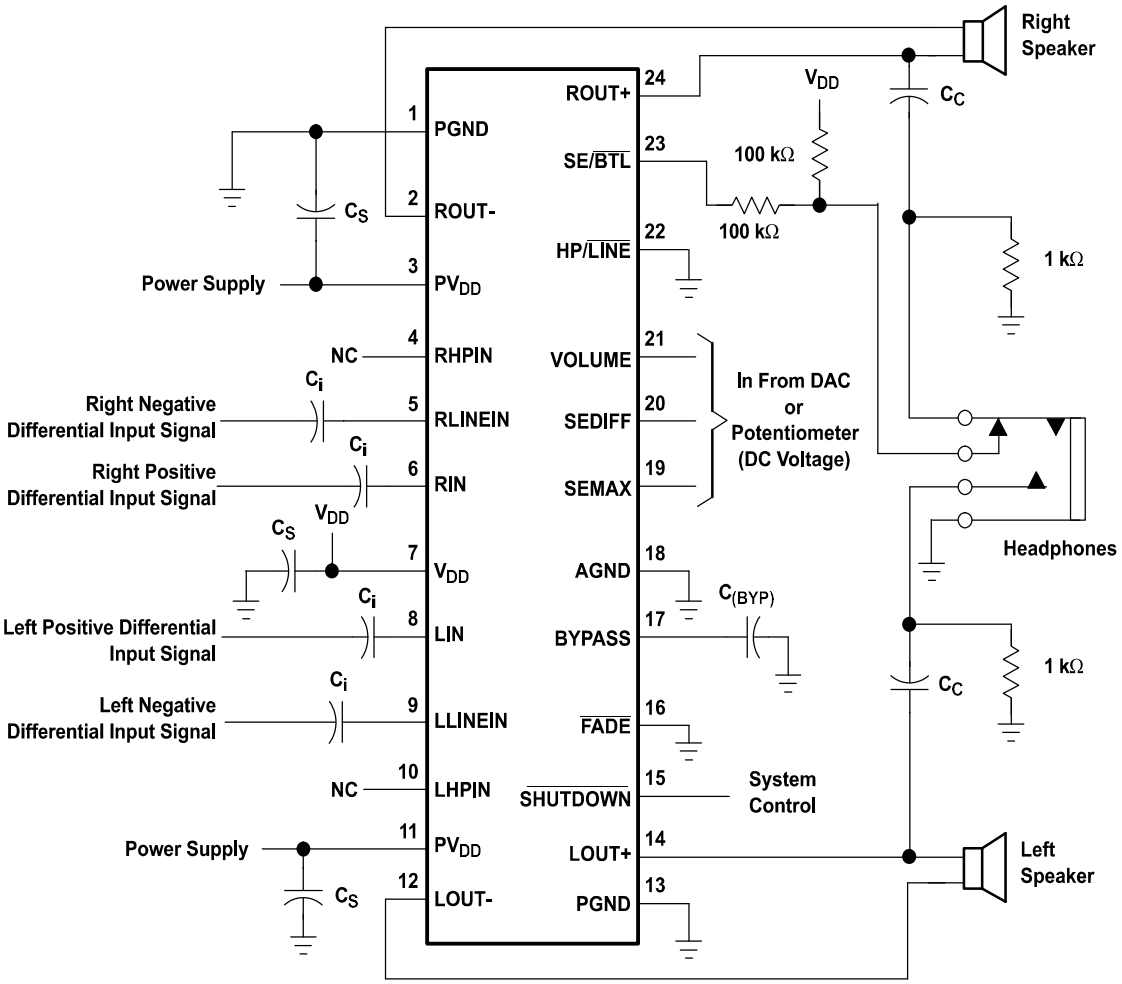
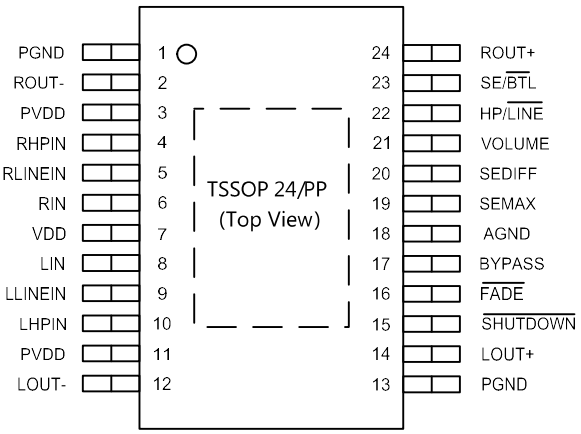


Figure 2.

NOTE:

0.1 µF ceramic capacitor should be placed as close as possible to the IC. For filtering lower-frequency noise signal, a larger electrolytic capacitor of 10µF or greater should be placed near the audio power amplifier.

■ Pin Configuration

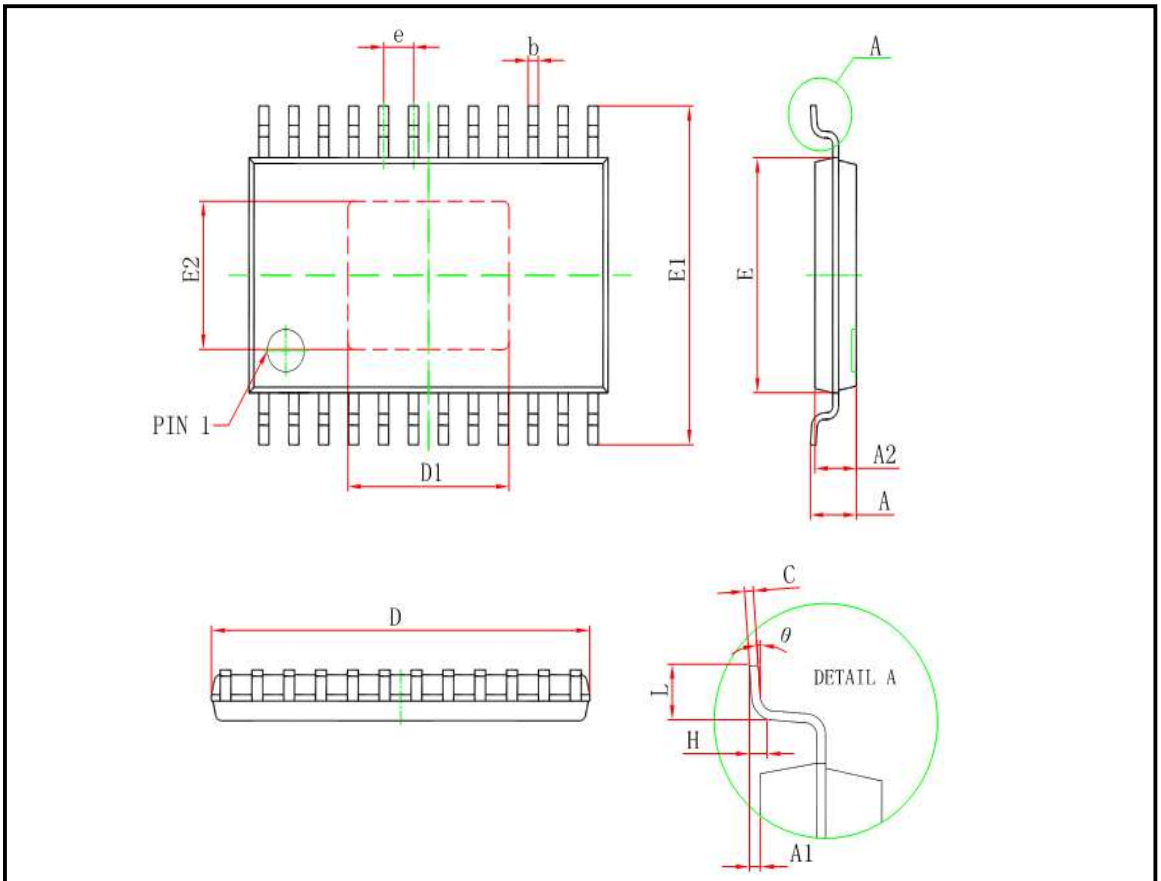


■ Pin Function Description

Pin Name	No.	I/O	Function Description
PGND	1,13	-	Power ground
LOUT-	12	O	Left channel negative audio output
PV_{DD}	3,11	-	Supply voltage terminal for power stage
LHPIN	10	I	Left channel headphone input,selected when HP/ $\overline{LINE}$ is held high
LLINEIN	9	I	Left channel line input,selected when HP/ $\overline{LINE}$ is held low
LIN	8	I	Common left channel input for fully differential input. AC ground for single-ended inputs.
V_{DD}	7	-	Supply voltage terminal
RIN	6	I	Common right channel input for fully differential input. AC ground for single-ended inputs.
RLINEIN	5	I	Right channel line input, selected when HP/ $\overline{LINE}$ is held low
RHPIN	4	I	Right channel headphone input, selected when HP/ $\overline{LINE}$ is held high
ROUT-	2	O	Right channel negative audio output
OUT+	14	O	Right channel positive audio output
$\overline{SHUTDOWN}$	15	I	Places the amplifier in shutdown mode if a TTL logic low is placed on this terminal
$\overline{FADE}$	16	I	Places the amplifier in fade mode if a logic low is placed on this terminal; normal operation if a logic hplaced on this terminal
BYPASS	17	I	Tap to voltage divider for internal midsupply bias generator used for analog reference
AGND	18	-	Analog power supply ground
SEMAX	19	I	Sets the maximum volume for single ended operation. DC voltage range is 0 to VDD .
SEDIFF	20	I	Sets the difference between BTL volume and SE volume. DC voltage range is 0 to VDD .
VOLUME	21	I	Terminal for dc volume control. DC voltage range is 0 to VDD.
HP/ $\overline{LINE}$	22	I	Input MUX control. When logic high, RHPIN and LHPIN inputs are selected. When logic low, RLINEIN and LLINEIN inputs are selected.
SE/ $\overline{BTL}$	23	I	Output MUX control. When this terminal is high, SE outputs are selected. When this terminal is low, BTL outputs are selected.
LOUT+	14	O	Left channel positive audio output
ROUT+	24	O	Right channel positive audio output
$\overline{SHUTDOWN}$	15	I	Places the amplifier in shutdown mode if a TTL logic low is placed on this terminal
$\overline{FADE}$	16	I	Places the amplifier in fade mode if a logic low is placed on this terminal; normal operation if a logic h placed on this terminal

■ Package Information

- **TSSOP-24/PP**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	7.700	7.900	0.303	0.311
D1	3.400	3.600	0.134	0.138
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
e	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
E2	2.700	2.900	0.106	0.122
A		1.100		0.043
A2	0.800	1.000	0.031	0.039
A1	0.020	0.150	0.001	0.006
e	0.65 (BSC)		0.026 (BSC)	
L	0.500	0.700	0.02	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°	7°	1°	7°