PAM8304-EV board User Guide

AE Department

1. Revision Information

Date	Revision	Description	Comment
2013/5/31	V1.0	Initial release	

2. Key Features

- Supply Voltage from 2.8V to 6.0V
- 3.0W@10% THD Output with a 4Ω Load at 5V Supply
- High Efficiency up to 90% @1W with an 8Ω Speaker
- Shutdown Current <1mA
- Superior Low Noise without Input
- Short Circuit Protection
- Thermal Shutdown

3. EV Board Schematic

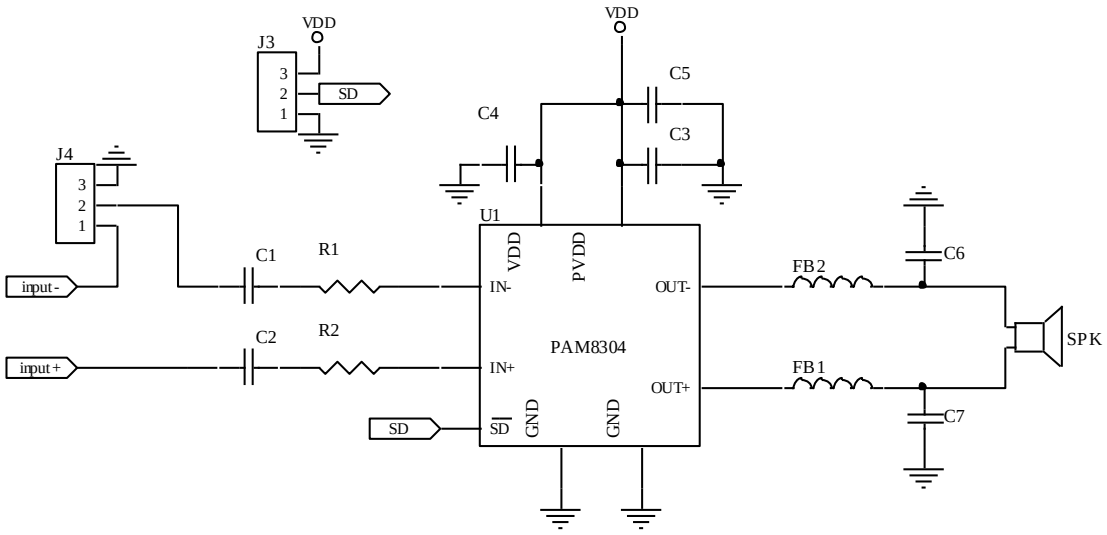
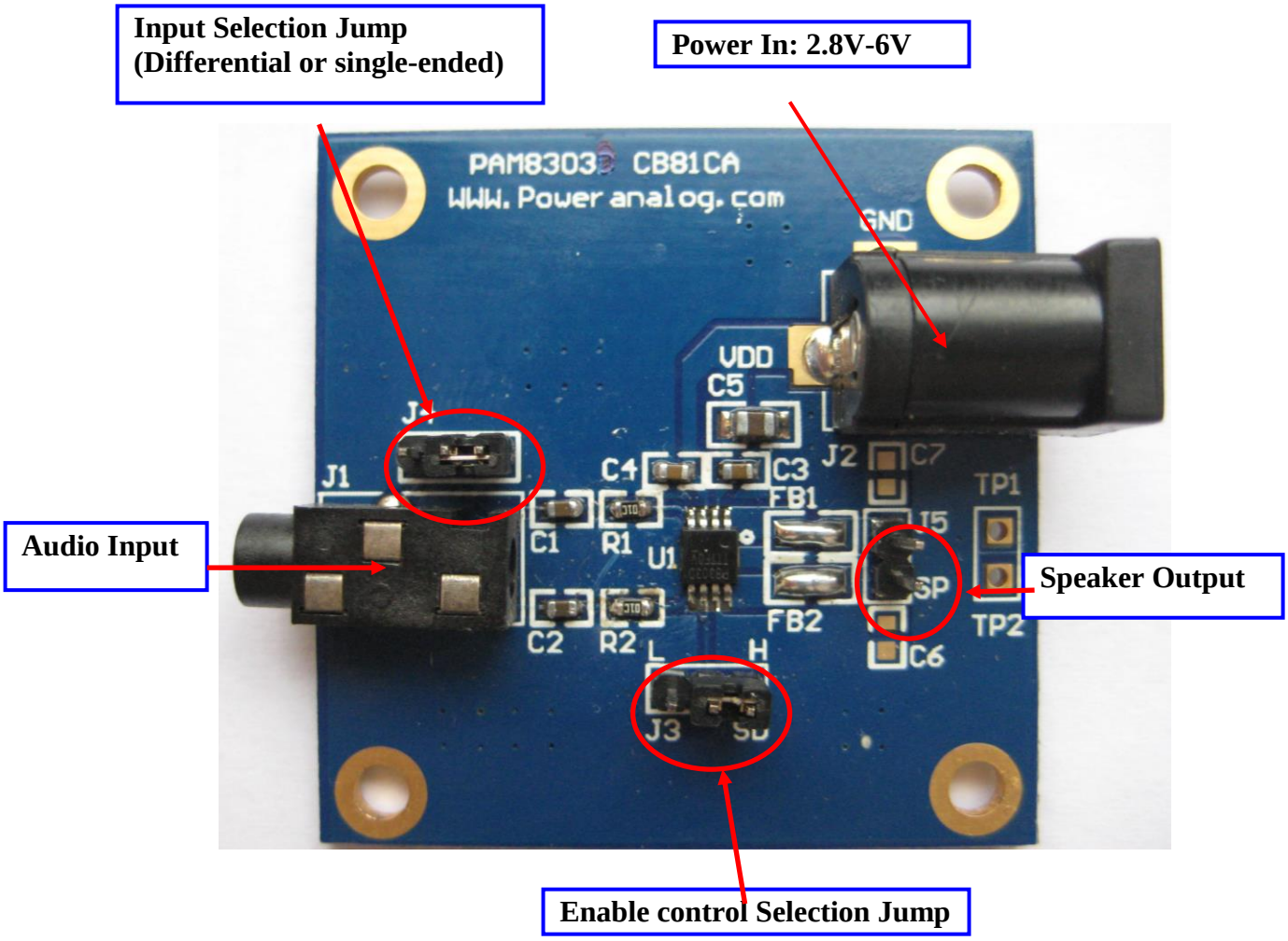


Figure 1

4. PAM8304 CB81CA Description

The PAM8304 is a mono filter-less class-D amplifier with high SNR and differential input that eliminate noise, The filter-less architecture requires no external output filter, fewer external components, less PCB area and lower system costs, and simplifies application design.
The PAM8304 features short circuit protection and over temperature protection.

5. EV Board View



EV board operational sequence:

a. Preset the power supply to between 2.8V and 6V.
b. Turn off the power supply.
c. Connect power supply to EV board power.
d. Connect audio input from audio input jack.
e. Connect the Speaker to the output jack
f. Turn on the power supply

6. EV Board BOM List

Item	Value	Type	Rating	Description	Vender and port
C1,C2	0.1uF	X5R/X7R, Ceramic/0603	10V	Input coupling CAP	Taiyo Yuden HMK107BJ104KA-T
C3	1uF	X5R/X7R, Ceramic/0603	16V	PVDD decoupling CAP	Taiyo Yuden EMK107B7105KA-T
C4	1uF	X5R/X7R, Ceramic/0603	16V	VDD decoupling CAP	Taiyo Yuden EMK107B7105KA-T
C5	10uF	X5R/X7R, Ceramic/0805	10V	PVDD decoupling CAP	Taiyo Yuden LMK107BBJ106MALT
R1，R2		0603		Input coupling resistance	
IC1		PAM8304			PAM

7. External Components Selection

Input Capacitors (C1,C2)

(1). Form a high pass filter with Ri, and the cut off frequency is $fc=1/2\Pi Ri*Ci$

(2). Have a tolerance of 10% or better for matching: any mismatch in capacitance causes an importance mismatch at the corner frequency.

(3). Low leakage current needed, 0.1uF, X5R/X7R ceramic

Power Supply decoupling Caps (C3, C4)

(1). Low ESR for good THD, PSRR

(2).C3,C4, Additional 1uF or greater for low frequency noise filtering and serves as a local storage capacitor for supplying current during large signal transients on the amplifier outputs

(3).Need place very closed to the IC

8. PCB Layout Guidelines

Grounding

(1). Use plane grounding or separate grounds.

(2). Do not use one line connecting power GND and analog GND

(3). Output noise grounds must tie to system ground at the power in exclusively.

(4). Signal currents for the inputs need to be returned to quite ground. This ground only ties to the signal components and the GND pin.

Power Supply

(1) VDD and PVDD need to be separated and tied together at the system power supply.

(2) Recommend that the all the trace could be routed as short and thick as possible.

(3) Any barricade placed in the trace could result in the bad performance of the amplifier.

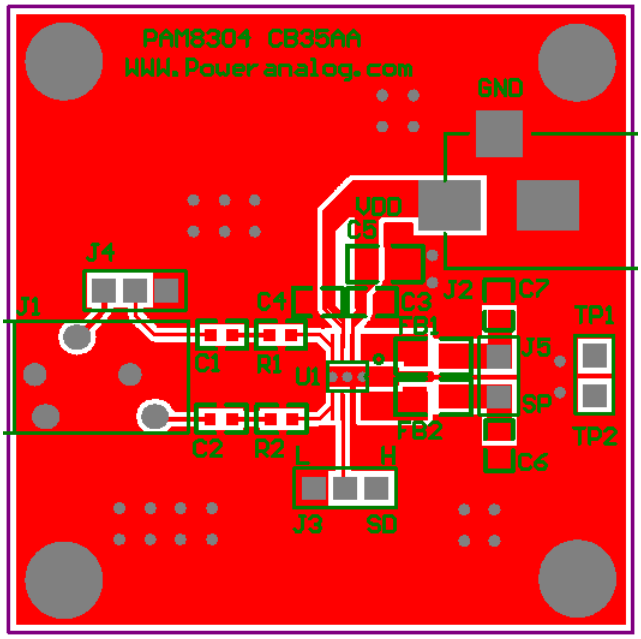
Components Placement

(1). The power supply capacitors (C3,C4) need to place very close to the PAM8304's pins.

(2). Input capacitors (C1,C2) place closed to input pin as near as possible

8. PCB Layout Example

Top Layer



Bottom Layer