

PAM8403H-EV Board User Guide

AE Department

1. Revision Information

Date	Revision	Description	Comment
2008/03/24	V1.0	Initial Release	
2012/07/31	V1.1	Update PCB	

2. PAM8403H General Description

The PAM8403H is a 3W, class-D audio amplifier. It offers low THD+N, allowing it to achieve high-quality sound reproduction. The new filter less architecture allows the device to drive the speaker directly, requiring no low-pass output filters, thus to save the system cost and PCB area.

With the same numbers of external components, the efficiency of the PAM8403 is much better than that of class-AB cousins. It can extend the battery life, ideal for portable applications.

3. Key Features

- 3W Output at 10% THD with a 4Ω Load and 5V Power Supply
- Filter less, Low Quiescent Current and Low EMI
- Low THD+N
- Superior Low Noise
- Efficiency up to 90%
- Short Circuit Protection

- Thermal Shutdown
- Few External Components to Save the Space and Cost
- Pb-Free Package



4. EV Board Schematic

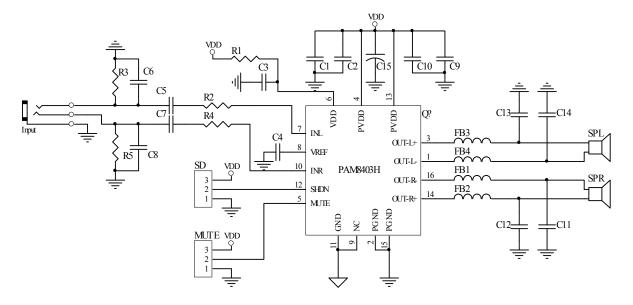


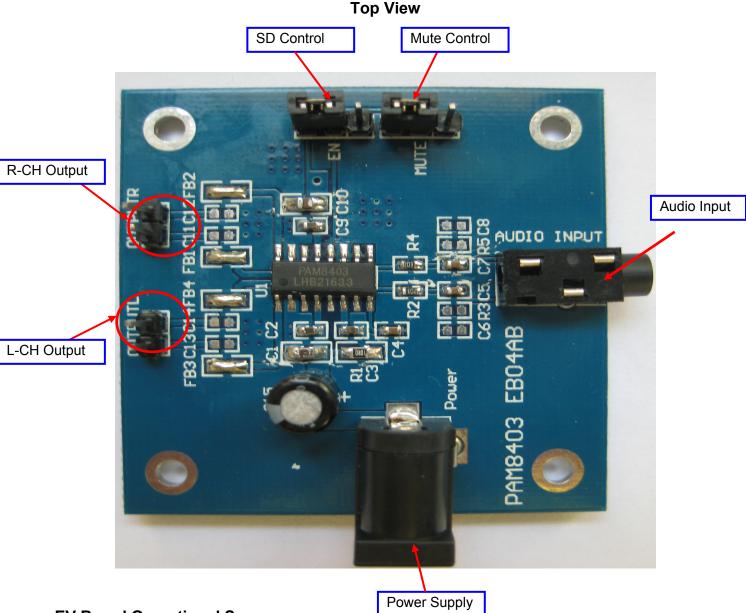
Figure 1

5. PAM8403 EB04AB EVB Description

PAM8403 EB04AB is an evaluation board for the PAM8403H, a stereo class-D audio power amplifier. The board is targeted to be used in providing a simple and convenient evaluation environment for the PAM8403H. Requires parts, the standard RCA jacks for audio inputs, pin jacks for power supply and signal outputs etc. on the board make it easy to be evaluated.



6. EV Board View and Jack Description



EV Board Operational Sequence:

- a. Connect SD to a high for normal operation
- b. Connect audio input from audio input jack
- c. Connect the loading (speaker or power resistor) to the output jack
- d. Power on: 2.5V to 5.5V DC power supply



7. EV Board BOM List

Item	Value	Type	Rating	Description	Vender and port
C5,C7	0.47µF	X5R/X7R, Ceramic/0603	25V	Input coupling CAP	TMK107B7474KA-TR
C2,C9	1µF	X5R/X7R, Ceramic/0603	25V	VDD coupling CAP,	TMK107B7105KA-T
C1,C10	10μF	X5R/X7R, Ceramic/0805	25V	VDD main coupling CAP,	TMK316AB7106KL-T
C4	0.1µF	X5R/X7R, Ceramic/0603	25V	VREF CAP	UMK212B7104KG-T
С3	1µF	X5R/X7R, Ceramic/0603	25V	Decoupling CAP	TMK107B7105KA-T
C15	220µF		10V	Decoupling CAP	
R1, R2	20K		1%	Input Resistor	
R3, R5		NC			
C6,C8		NC			
FB1,FB2, FB3,FB4	330Ω	0805	2A	For EMI eliminate	Wurth 724 792 037
C11,C12, C13,C14	1nF	0603	25V	components form a FB-CAP filter	TMK063B7102KP-F

8. External Components Selection

Input Capacitors (C5, C7)

- (1) Form a high pass filter with Ri, and the cut off frequency is fc=1/2*Π*Ri*Ci
- (2) Have a tolerance of 10% or better for matching: any mismatch in capacitance causes an importance mismatch at the corner frequency and below
- (3) Low leakage current needed, 0.47µF, X5R/X7R ceramic recommend

Input Resistors (R2, R4)

- (1) Limit the closed-loop gain
- (2) Form a high pass filter with Ci, and the cut off frequency is fc=1/2*Π*Ri*Ci
- (3) 1% tolerance needed for resistor matching to improve CMRR, PSRR

Power Supply decoupling Caps (C2, C3, C9, C1, C10)

- (1) Low ESR for good THD, PSRR
- (2) 1uF ceramic for higher frequency transients, spikes, or digital hash on the line of PVDD/VDD
- (3) Additional 10µF 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
- (4) Need place very closed to the IC

VREF Capacitor (C4)

- (1) 1µF, X5R/X7R ceramic recommended
- (2) Place very closed to the device

EMI Eliminate Filter (FB1, FB2, FB3 and FB4)

- (1) High impedance at high frequency and very low impedance at low frequency
- (2) The current rating is higher than 2A



9. 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.

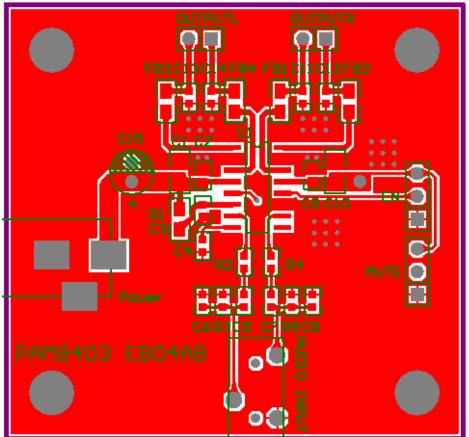
Power Supply

Others

- (1) The power supply capacitors (C2, C3, C9, C1, C10) need to place very close to the PAM8003's pins.
- (2) Input capacitors (C5, C7) place closed to input pin as near as possible

10. PCB Layout Example

Top Layer





Bottom Layer

