1 X 1500Watt Class-D Audio Amplifier Board- IRS2092 User's Guide

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NOTES:

Product Version : **Ver 1.0**

Document Version : **Ver 1.0**

1 X 1500WATT CLASS-D AUDIO AMPLIFIER BOARD– IRS2092 USER'S GUIDE

Chapter 1. Overview

1.1 Overview

Welcome to use this 1*1500W Class-D audio amplifier board series by Sure Electronics.

It integrates IR's high performance IRS2092 and IRFB4227 supporting single channel audio amplification. It is capable of outputting nominal power continuously. It's suitable for amplifier enthusiasts or hobbyists to finish a complete amplifier system.

Resistance and capacity components of high quality, including X7R ceramic capacitors, Metallized Polyester (PET) Film Capacitors and lower ESR electrolytic capacitors, high performance inductors are used to gain the perfect timber, finally realize high S/N ratio, low THD+N, wide frequency response range etc.

1.2 Accessories

We don't provide audio accessories together with this product. Please go to www.sure-electronics.com to choose what you need.

Note: The diagrams above are used for reference only.

1.3 Features

- A perfect "Class D" architecture
- Frequency response: 20Hz to 20KHz(±3dB)
- Four selectable, fixed gain settings of nominally 23.3 dB, 29.4 dB, 33.4 dB and 35.8dB.
- Single end audio signal input
- Under voltage protection
- Over current protection
- Short Circuit and Over Temperature Protection
- Speaker DC-Offset Protection
- Click & Pop Noise Reduction
- Auto adjustment of fan speed to temperature

Note:

1. When the temperature exceeds 55 ℃, the fan starts rotation to enhance heat dissipation.
2. If the fault condition persists, the protection circuit stays in shutdown until the fault is removed.
3. If the protection above functions, the output will be shutdown. Repower the amplifier and it will work again.

1.4 Applications

- Powered speakers
- Active sub-woofers
- P.A. systems
- Car audio amplifiers
- Musical Instrument amplifier
- Prototype for recording studios, post-production, live sound and hi-fi applications.

Custom service related with these applications is provided.

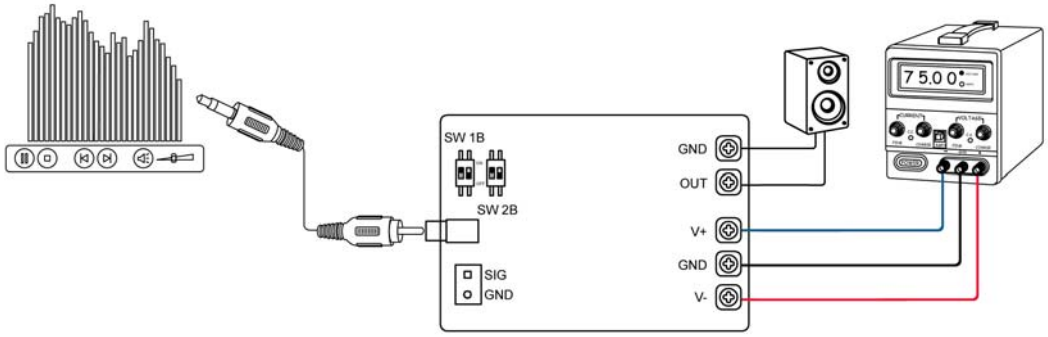
1.5 Benefits

- Mounting holes facilitate installation and fixing
- Several wiring methods facilitate connection: RCA Socket (Default),Terminal Block(Optional)
- Excellent heat dissipation eliminates the requirement of an extra heat sink.

1.6 Quick Start

Suggested connection is shown in figure 1-3. Before using PCB terminals to power the board, please make sure the polarity is correct. ±75V, 15A supply is required.

FIGURE 1-3 CONNECTION SCHEMATIC



Note: Please observe the following steps to complete verification so as to ensure the products are intact during transit.

1. Open the amplifier package and make sure the product is intact (No missing or damaged components and no deformation.
2. Please observe the connection schematics when connecting the amplifier board. Use a nearby sound source, such as MP3 or CD player to have a trial. This amplifier board can be deemed as qualified if you can hear the sound corresponding to that sound source
3. It's suggested to make sure the polarity of the wires first and then connect the audio cables, wires. Turn down the output to the lowest and then power the board.

Chapter 2. Hardware Detail

2.1 Power Connection

To power the amplifier board, use jack J10, J11, J12. Pay attention to the polarity when connecting power supply.

TABLE 2-1 POWER CONNECTION

Connector Mark			Description
Terminal Blocks	J10	+	PCB terminal for the positive of power supply
	J11	GND	Ground
	J12	-	PCB terminal for the negative of power supply

TABLE 2-2 Recommended Supply Voltage

Voltage Limitations	Current Requirement
±60 to ±80 V	15A

Note:
1. You're suggested to use AWG16 power cord. The length of power cord must be minimized. Increasing length of PSU cable is equal to increasing the distortion for the amplifier at high output levels and low frequencies.
2. A pair of 75V 15A switching power supplies is recommended. The symmetrical supplies must be applied and removed at the same time.
3. 20s interval is suggested before repower on to ensure that electricity from the board can completely discharge. Or unexpected sharp POP will come up from speaker.

2.2 Input Connections

You may use either the RCA connector J14 or terminal block J13 to input audio signal.

2.3 Output Connections

You can use PCB terminals J1 and J2 to connect speakers.

Note:
1. Never connect more than one group of speaker to the audio output
2. Refer to on-board descriptions for connection details.

2.4 Phase Setting and BTL connection

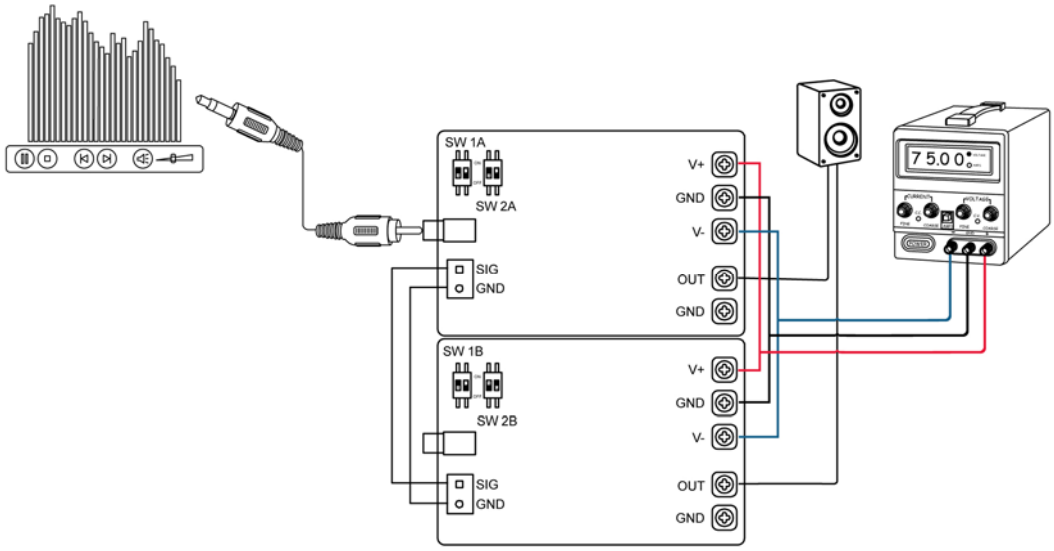
SW2 is used for setting output waveform – inverting or non-inverting. It's for BTL output of two amplifier boards.

TABLE 2-3 SW2 SETTING

K1	K2	Gain Status(dB)
ON	ON	-
OFF	ON	Inverting
ON	OFF	Non-inverting
OFF	OFF	-

Note:
1. Do not turn on K1 & K2 simultaneously; otherwise the U7 will be damaged.
2. Turning off both K1 & K2 makes the audio input disconnection.

FIGURE 2-1 BTL Connection Schematic



2.5 LED Indicators

The LED indicator D4 is on when low side gate driver signal is present. It helps judging whether the amp board works properly.

2.6 Gain Setting

You may also adjust the gain by setting the DIP switch SW1. The gain is factory pre-set to low. This can prevent chip from permanent damage caused by overheat when input signal amplitude is over range. On the other conditions of gain setting, it is recommended that the output signal amplitude is no larger than the power supply voltage once the input signal reaches the peak.

For example, the maximum amplitude of the input signal is no more than 887mV RMS when power supply voltage is ±75V, load impedance is 2 ohm and the gain is set at 35.8 dB. The other circumstances can be referred to the input sensitivity from **TABLE 3-1 ELECTRICAL CHARACTERISTICS**. Never adjust the gains when the amplifier is working, or IRFB4227 will be damaged because of the instantaneous voltage. The instantaneous energy will exceed the rated power of a speaker and damage it.

TABLE 2-8 DIP SWITCH SETTING

Switch	K1	K2	Gain Status(dB)
SW1	ON	ON	Weak
	OFF	ON	Low
	ON	OFF	Medium
	OFF	OFF	High

2.7 Notes

In order to protect amplifier board and extend its service lifetime, please read the following warnings carefully since warranties will be voided if you do not observe the following warnings:

Warning 1:

Quality-related issues caused by potentiometers installed by buyers.

Warning 2:

In order to achieve a better sound quality, please use stable power supply since a bad or unstable power supply may worsen the sound quality or even cripple the amplifier board.

Warning 3:

Never equip a pre-amplifier to the audio input since the amplifier itself has powerful amplification ability and a high signal input will burn out the amplifier chip.

Warning 4:

In order to protect amplifier and speaker, please turn the volume output to the minimum when hooking up the amplifier and you may readjust the volume when you are sure that the amplifier is functioning properly.

Chapter 3. Electrical Characteristics

Following table lists all typical data of the Amp board. For full specification, please refer to the data sheet of IR's IRS2092 and IRFB4227.

TABLE 3-1 ELECTRICAL CHARACTERISTICS

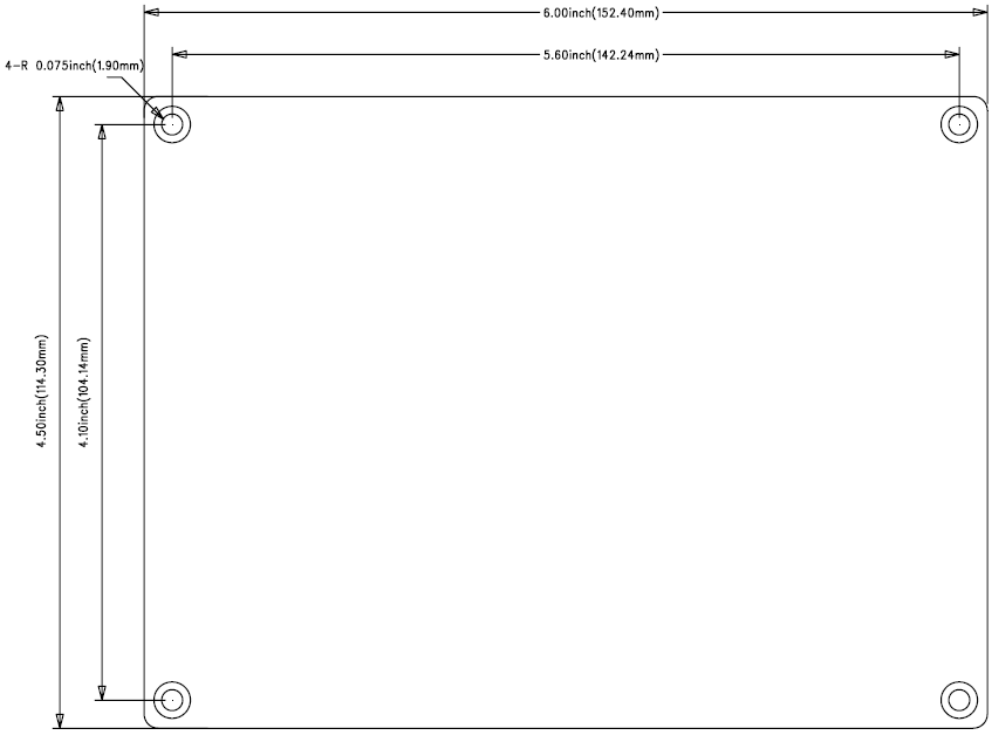
Parameter	Condition		Min.	Typ.	Max.
Supply Voltage	AA-AB31411		±60V	±75V	±80V
Quiescent Current （Powered by ±75V）	FAN OFF	+75V		45mA	-
		-75V		170 mA	
Input Sensitivity （AA-AB31411）	23.3dB		-	3726mV	-
	29.4dB			1863mV	
	33.4dB			1164mV	
	35.8dB			887mV	
Gain(SW1 Setting)	K1 ON, K2 ON		-	23.3dB	-
	K1 ON, K2 OFF		-	29.4dB	-
	K1 OFF, K2 ON		-	33.4dB	-
	K1 OFF, K2 OFF		-	35.8dB	-
Frequency Range	-		20Hz to 20KHz（±3dB）		
Oscillation frequency			330KHz		
Undervoltage protection			＜51V		
Overvoltage protection			＞82V		
Efficiency	1500W@2Ohm, ±75V		-	>90%	-
Input Impedance	-		-	10Kohm	-
Load	-		-	2ohm	-
Operating Temperature	-		0℃	20℃	50℃
Storage Temperature	-		-20℃	20℃	105℃
Thermal Shutdown	-		-	100℃	-

Note:

1. Stresses beyond the listed maximum power supply voltage may cause the permanent damage to components on board.
3. The input sensitivity values are calculated on the basis of 2 Ohm load.
4. Voltage protection is realized by monitoring the voltage of the positive power supply. Under-voltage protection prevents unwanted audible noise output from unstable PWM operation during power up and down. Over 60V operating voltage is suggested, or components will work unstable.
5. Fan will function only after the temperature from heatsink is over 55℃.
6. Avoid physical contact with heatsink surfaces when operating the board.
7. The board can output 54.7VRMS (rated voltage @2ohm, 1500W) waveform without distortion only when power by ±80V.

Chapter 4. Mechanical Drawing

FIGURE 4-1 MECHANICAL DRAWING



Chapter 5. Contact Us

Sure Electronics Co., Ltd.
East zone, 3F, Building 6
Jingang Technology Innovation Center
No.108 Ganjiabian Rd (ZIP: 210000)
Qixia District
Nanjing
P.R.China
Tel: +86-25-68154800-860
Fax: +86-25-68154891-832
Website: www.sure-electronics.com
Email: customerservice@sure-electronics.com