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# **1 X 300Watt Class-D Audio Amplifier Board -TAS5613 User's Guide**

# 1 X 300Watt Class-D Audio Amplifier Board – TAS5613

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**Note:**

Please read this manual carefully before you use the product. To keep the product in a best working condition and having a long service time, please operate it according to the relevant steps. The warranty lapses if the product is damaged because of incorrect use and your negligence.

Please read this manual carefully before you use the product and check if the product is a good one. DC36V is recommended to be used to power the product for one hour. Please make sure there's space for heat dissipation since this product outputs high power and don't touch the heat sink with your hand. Never use this product in an extreme condition.

**Warning:** Never immerse the product in the rain or any other humid environment to prevent the fire or electric shock.

**Safety Precautions:**

1. 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.
2. Avoid metal objects. Protect this product well and move away metal objects from this product.



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## **NOTES:**

**Product Version** : Ver 1.0

**Document Version** : Ver 1.0

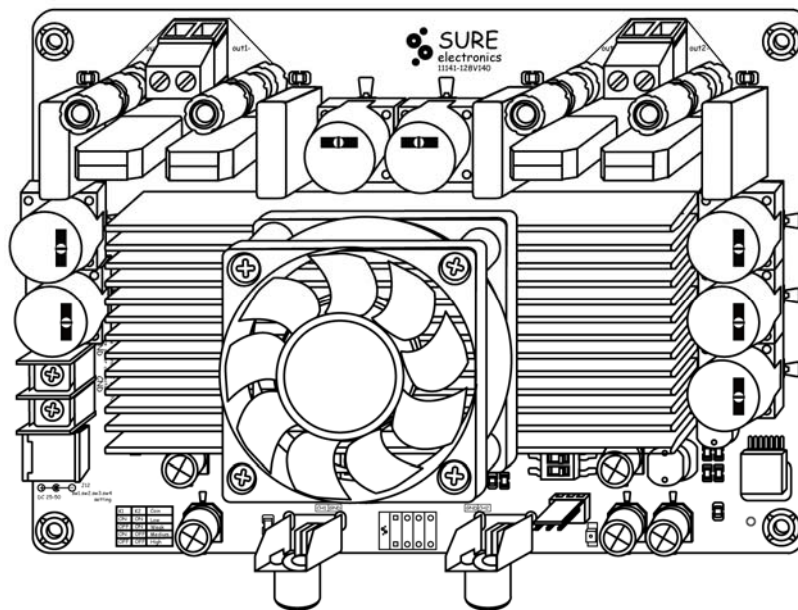
## Chapter 1. Overview

### 1.1 Overview

Welcome to use this 1\*300W Class-D audio amplifier board series by Sure Electronics. It integrates TI's high performance TAS5613 supporting dual channel audio amplification. Both of channels are capable of outputting nominal power simultaneously and 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) 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.

**FIGURE 1-1 FRONT VIEW**



### 1.2 Accessories

We don't provide audio accessories together with this product. Please go to [www.sure-electronics.com](http://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( $\pm 3$ dB)
- Four selectable, fixed gain settings of nominally 21 dB, 27dB, 31 dB and 33dB.
- Single end audio signal input
- Under voltage protection
- Over current protection

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- Short Circuit and Over Temperature Protection
- Click & Pop Noise Reduction
- 2 speed Fan

**Note:**

1. When the temperature exceeds 125 °C, the fan will speed up 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

- AV receivers
- Powered speakers
- Sub-woofers
- Musical Instrument amplifiers
- PA System
- External Car Speaker System
- Background Music Systems
- Home DIY
- Prototype for recording studios, post-production, live sound and hi-fi applications.

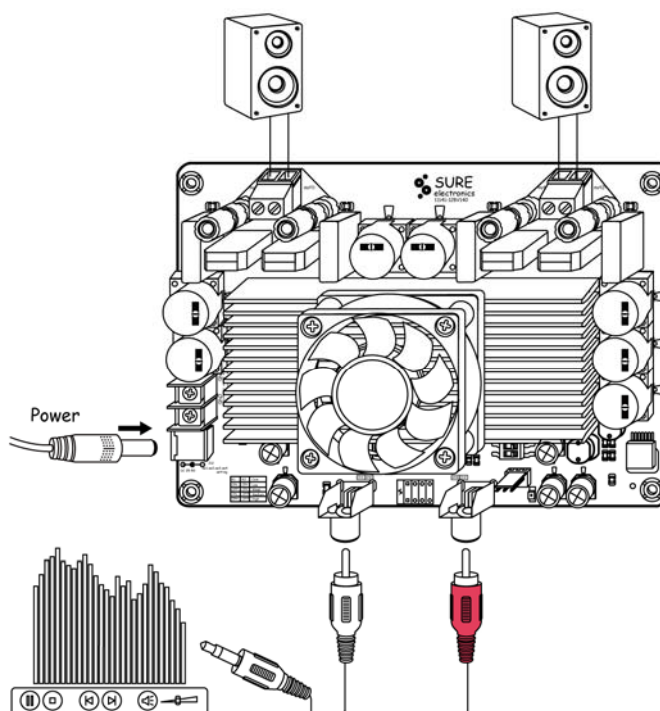
## 1.5 Benefits

- 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 RJ135T terminal blocks to power the board, please make sure the polarity is correct. A 36V, 12.5A supply with negative outside and positive inside is required.

### **FIGURE 1-2 CONNECTION SCHEMATIC**



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

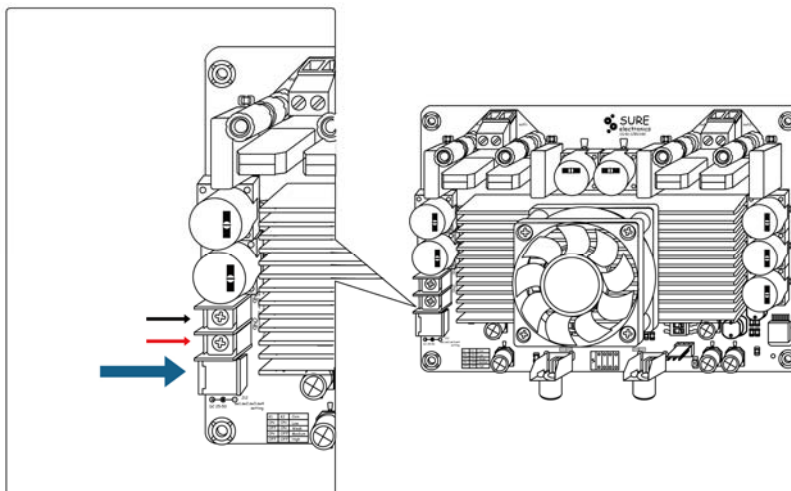
1. Open the amplifier package and make sure the product is intact (No missing or damaged components and no deformation).
2. Please observe the connection schematics when connecting the amplifier board. Use a nearby sound source, such as MP3 or CD player to have a trial. This amplifier board can be deemed 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 either jack J12 or terminal blocks J11. Pay attention to the polarity when connecting power supply.

**FIGURE 2-1 POWER CONNECTION**



**TABLE 2-1 POWER CONNECTION**

Connector Mark		Description
Jack	J12	DC power supply socket
Terminal Blocks	J11	VCC The positive of power supply socket
		GND The negative of power supply socket

**TABLE 2-2 RECOMMENDED SUPPLY VOLTAGES**

Voltage Limitations	Maximum Current Requirement
20 to 36 V	12.5A

48V 12.5A switching power supply is recommended for common applications.

**Note:**

1. You are allowed to use only one way to power the amplifier board at a time.
2. 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.
3. 36V 12.5A switching power supply is recommended if you just use this product to listen to the music.

### 2.2 Input Connections

You may use RCA connectors to input audio signal.



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FIGURE 2-2 INPUT CONNECTION

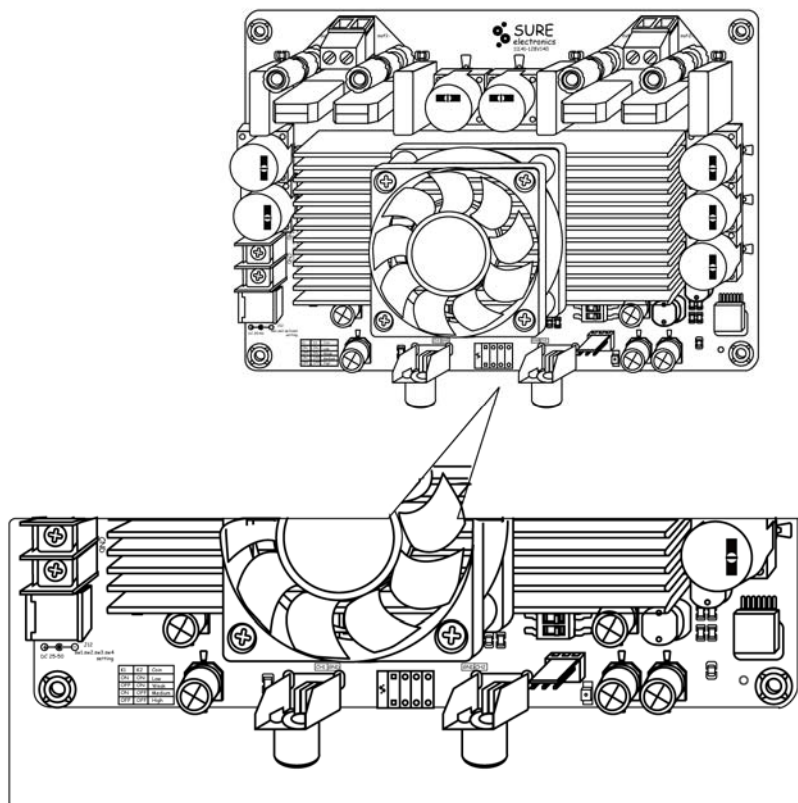


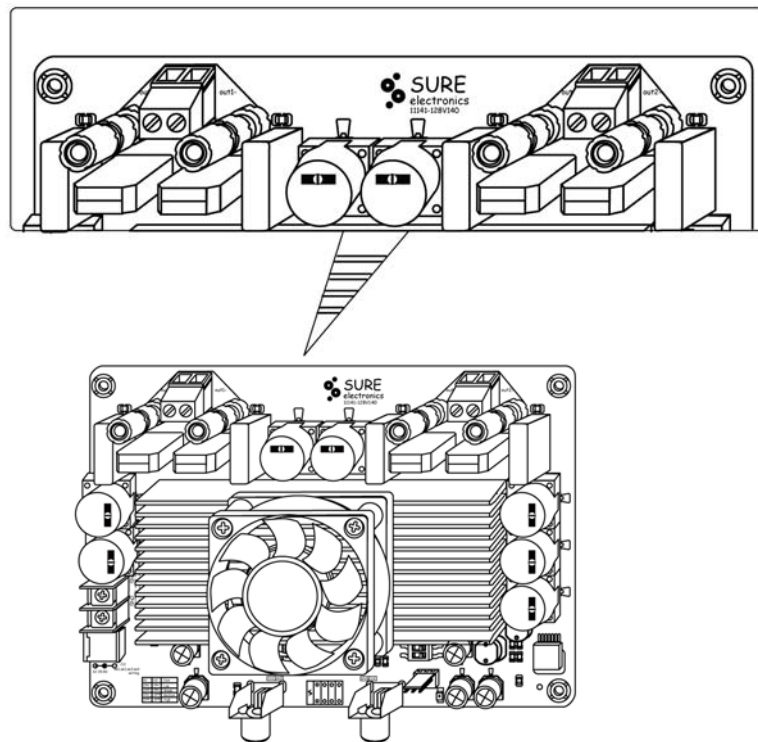
TABLE 2-3 INPUT CONNECTION

TABLE 2: PIN-OUT CONNECTION		
Connector Mark		Channel Description
RCA connector	J1	Channel 1 Input
	J8	Channel 2 Input
Terminal Blocks (Optional)	J4	Channel 1 Input
		GND
		GND
		Channel 2 Input
<b>Note:</b> You are allowed to feed only one group (dual channel) of audio signal to the amplifier board at a time.		

## 2.3 Output Connections

You can use either terminal blocks or banana connectors(optional) to output audio signal.

FIGURE 2-3 OUTPUT CONNECTION



**TABLE 2-4 OUTPUT CONNECTION**

Connector Mark		Description
Banana Connectors	J5	Negative Output of Channel 1
	J2	Positive Output of Channel 1
	J9	Negative Output of Channel 2
	J6	Positive Output of Channel 2
Terminal blocks*	J3	Output of Channel 1
	J7	Output of Channel 2

**Note:**

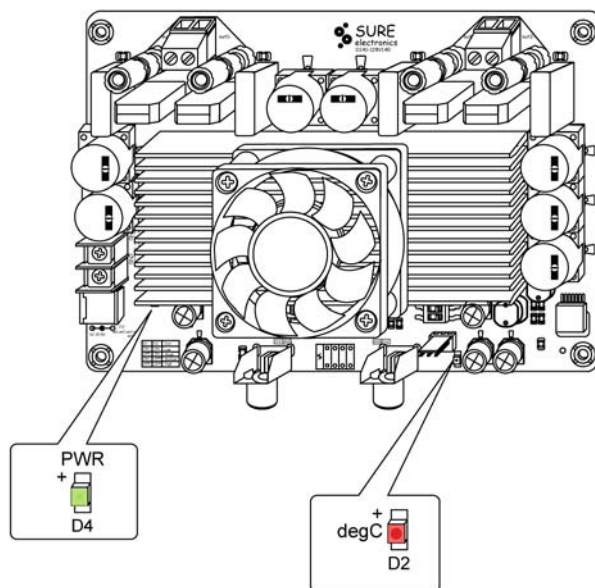
1. Never connect more than one group of speaker to the audio output
2. Never connect CH1\_OUT- , CH2\_OUT- together since they belong to different NETs.
3. Refer to on-board descriptions for connection details.
4. Both positive and negative speaker outputs are floating and may not be connected to ground (e.g., through an oscilloscope).

## 2.4 LED Indicators

This amplifier has two LED indicators which is marked as “PWR (D4)” and “125 degree C (D2) “. “Power (D4)” will be illuminated in green when power-up. “125 degree C (D2)” will be illuminated once the temperature of TAS5613 reaches up to 125 degrees centigrade, at the same time the fan speeds up.

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FIGURE 2-4 LED INDICATORS

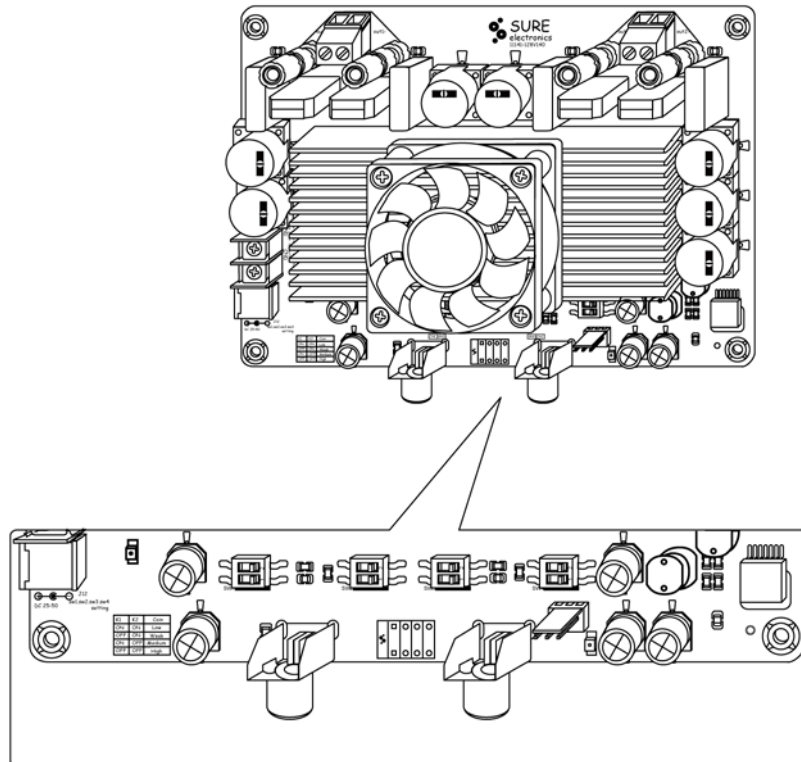


## 2.5 Gain Setting

You may also adjust the gain by setting the DIP switch SW1, SW2, SW3 and SW4. The gain is factory pre-set to weak. 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 570mV RMS when power supply voltage is 36V, load impedance is 4 ohm and the gain is set at 33 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 TAS5613 will be damaged because of the instantaneous voltage. The instantaneous energy will exceed the rated power of a speaker and damage it. When adjust gain, please set SW1, SW2, SW3 and SW4 in the same way to make sure the same gains.

FIGURE 2-5 VOLUME CONTROL



**TABLE 2-5 DIP SWITCH SETTING**

Switch	K1	K2	Gain Status(dB)
SW1, SW2, SW3, SW4	ON	ON	Weak
	OFF	ON	Low
	ON	OFF	Medium
	OFF	OFF	High

## 2.6 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 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 TI's TAS5613 chip.

**TABLE 3-1 ELECTRICAL CHARACTERISTICS**

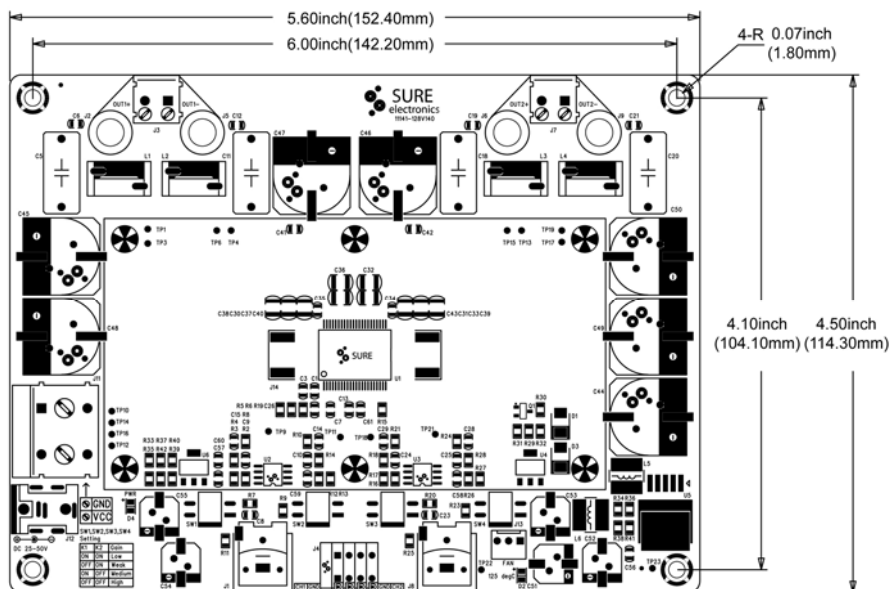
Parameter	Condition	Min.	Typ.	Max.
Supply Voltage	AA-AB31191	20V	36V	38V
Quiescent Current (Powered by 50V)	FAN ON	-	150mA	-
Input Sensitivity (AA-AB31191)	21dB	-	2260mV	-
	27dB		1130mV	
	31dB		710mV	
	33dB		570mV	
Gain(SW1 Setting)	K1 ON, K2 ON	-	23	-
	K1 ON, K2 OFF	-	29	-
	K1 OFF, K2 ON	-	33	-
	K1 OFF, K2 OFF	-	35	-
Frequency Range	-	20Hz to 20KHz (±3dB)		
Efficiency	Both channels output rating power.	-	>90%	-
Input Impedance	-	13Kohm	-	16.7Kohm
Load	-	3.5	4ohm	-
Operating Temperature	-	0℃	20℃	50℃
Storage Temperature	-	-20℃	20℃	105℃
Thermal Shutdown	-	-	155℃	-

**Note:**

1. Stresses beyond the listed maximum power supply voltage may cause the permanent damage to components on board.
2. The input sensitivity values are calculated on the basis of 4 Ohm load.

## Chapter 4. Mechanical Drawing

FIGURE 4-1 MECHANICAL DRAWING





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## Chapter 5. Contact Us

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