

49 W BTL 4 Channel Audio Power Amplifier

This is a 49W - 4 Channel audio amplifier project that is built using TB2941HQ power Integrated Circuit which has a built-in four-channel BTL amplifier developed for car audio applications. The maximum output power is 49W using a pure complementary P-Ch and N-Ch DMOS output stage. In addition, a standby switch, a mute function and various protection features are included. The audio mute function is enabled when jumper J1 connected to 5V DC. The power supply can be turned ON or OFF via pin 4 (Stby). The threshold voltage of pin 4 is 2.2V to VCC (5V).

Amplifier is turned ON when standby pin is connected to 5V DC using Jumper CN10. Onboard 5V regulator provided for standby and Mute function. When the headroom voltage is suppressed by the low VCC, the TB2941HQ switches outputs voltage from VCC/2 to VCC/4 and reduces the audible pop noise and the sound cutting. The TB2941HQ can reduce the distortion which is generated by low VCC, because this amplifier circuit keeps the voltage gain of BLT outputs. In other words, if one side output of BTL has the voltage margin, its output can make up for clipped waveform of other side output.

Features

- Operating Power Supply 7.5V to 15V DC (VCC 15V = 49W output, VCC 13.7V=40W) THD 10%
- 49W Output with 4 Ohms Speaker
- 4XScrew Terminal Connector for Speaker Connections
- Screw Terminal Connector for Power Supply Input
- Female RCA Connector for Audio Inputs
- Voltage Gain GV 26dB
- Power LED
- High output power, low distortion, and low noise property
- Jumper for Mute Function
- Jumper for Standby Function
- Thermal Shutdown (Built in IC)
- Built-in various protection circuits over-voltage, short to VCC, short to GND, and output to output short)
- PCB Dimensions 79.06 x 51.44 mm



Thermal Shut Down

- Thermal shut down It operates when junction temperature exceeds 150°C (typ.).

Auto Muting Functions

- The TB2941HQ has two automatic mute function.
- Low VCC Mute
- Stand-by Off Mute

Low VCC Mute

- When the supply voltage became lower than 5.5V (Typ.), The TB2941HQ operates the mute circuit automatically. This function prevents the large audible transient noise which is generated by low VCC

Over-Voltage

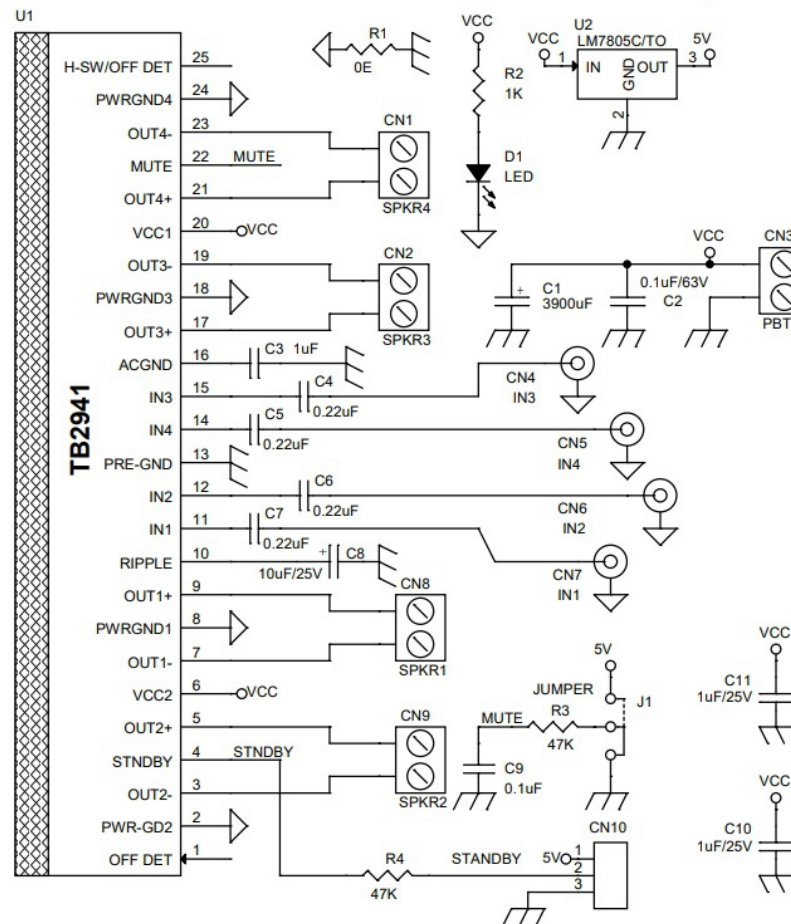
- Over-voltage It operates when voltage exceeding operating range is supplied to VCC pin. If voltage falls, it will return automatically. When it operates, all outputs bias and high-side switch are turned off and all outputs are intercepted. Threshold voltage is 23 V (Typ.)

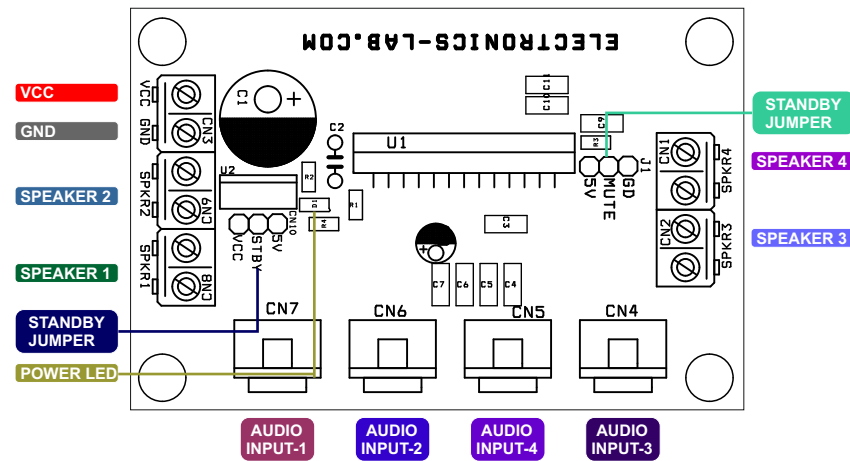
Standby-Off Mute

- The TB2941HQ operates the mute circuit during the standby-off transition. When the ripple voltage reached $VCC/5$, the standby-off mute is terminated. The external mute has to be ON till the internal mute-OFF

Short to VCC

- Short to VCC, Short to GND, Output to output short It operates when each output pin is in irregular connection and the load line goes over the SOA of power transistor (DMOS). When it operates, all outputs bias circuits are turned off and all outputs are intercepted. If irregular connection is cancelled, it will return automatically.

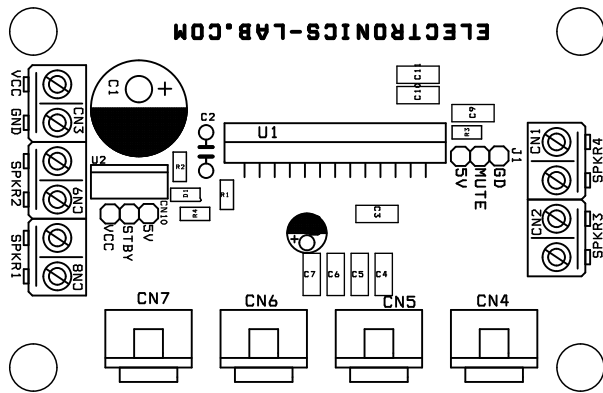




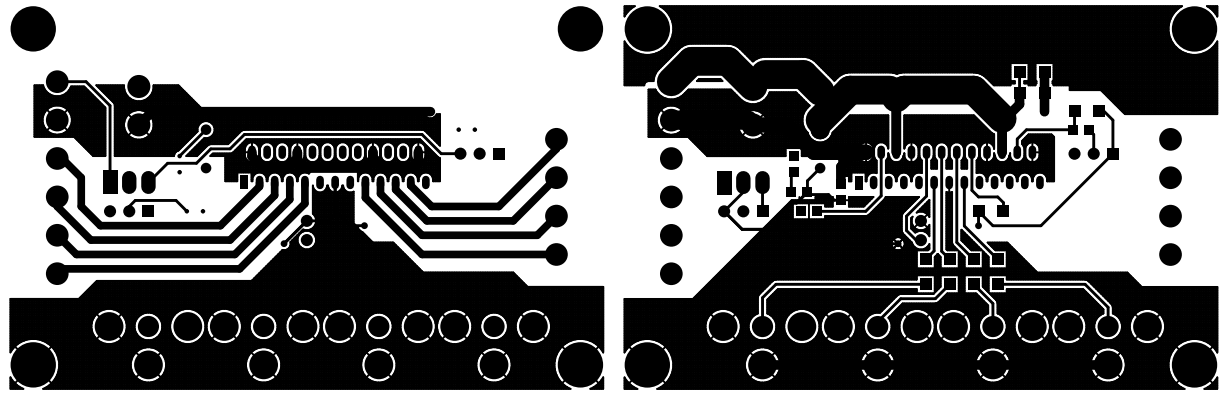


BOM						
NO	QNTY.	REF	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
2	1	CN2	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
3	1	CN3	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
4	1	CN4	RCA FEMALE	CUI DEVICE	DIGIKEY	CP-1405-ND
5	1	CN5	RCA FEMALE	CUI DEVICE	DIGIKEY	CP-1405-ND
6	1	CN6	RCA FEMALE	CUI DEVICE	DIGIKEY	CP-1405-ND
7	1	CN7	RCA FEMALE	CUI DEVICE	DIGIKEY	CP-1405-ND
8	1	CN8	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
9	1	CN9	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
10	1	CN10	3 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5316-ND
11	1	C1	3900uF/25V	UNITEC CHEMI-CON	DIGIKEY	565-3901-ND
12	1	C2	0.1uF/63V	EPCOS	DIGIKEY	495-B32529C1104M289TB-ND
13	1	C3	1uF/35V SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
14	4	C4,C5,C6,C7	0.22uF/35V SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
15	1	C8	10uF/25V ELECTROLYTIC	RUBYCON	DIGIKEY	1189-1300-ND
16	1	C9	0.1uF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
17	2	C10,C11	1uF/25V	MURATA/YAGEO	DIGIKEY	
18	1	D1	LED SMD SIZE 0805	LITE ON INC	DIGIKEY	160-1427-1-ND
19	1	J1	3 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5316-ND
20	1	R1	0E SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
21	1	R2	1K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
22	2	R3,R4	47K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
23	1	U1	TB2941	TOSHIBA	DIGIKEY	TB2941HQ-ND
24	1	U2	LM7805C/TO	TI	DIGIKEY	296-47192-ND
25	2	JMPR	SHUNT FOR JUMPPER	SULINS	DIGIKEY	S9001-ND





SILK SCREEN TOP



BOTTOM LAYER

TOP LAYER

PCB DIMENSIONS 79.06MM X 51.44MM