

5 W + 5 W Dual BTL Class-D Audio Amplifier

The project described here is a high-efficiency dual BTL class-D audio amplifier with single supply operations. The project was built using TDA7491LP13TR from ST. The low profile PCB design can fit in a small area, operating power supply 9-12V DC, Project supports single-ended or differential audio signal inputs. Jumpers are provided to set the various gains, standby, and mute functions.

Key Features

- 5W + 5W Continuous Output Power, 10% THD, (8 Ohms Speaker) at 9V DC
- Single Supply Operation 9V to 12V
- Four Selectable Fixed Gains Settings of nominally 20dB, 26dB, 30dB, 32dB Using Jumpers
- Differential Inputs Minimize Common-Mode Noise
- Jumper for Single Ended Inputs
- No "Pop" Sound at Turn-On/Off
- Thermal Over Load Protection
- Standby and Mute Features Using Jumpers
- PCB Dimensions 63.25MM X 32.39MM











Mode Selection

Three operating modes, defined bellow

- Standby mode: all circuits are turned off, very low current consumption
- Mute mode: inputs are connected to ground and the positive and negative PWM outputs are at 50% duty cycle.
- **Play mode:** the amplifiers are active

Jumper Setting Standby, Mute and Play Mod (Low=GND, High=3.3V)

- Standby Mode: Jumper J2 = Low, Jumper J1 (Don't Care Whether low or high)
- Mute Mode: Jumper J2=High, Jumper J1 Low
- Play Mode: Jumper J2 = High, Jumper J1 High

Audio Signal Input (Single Ended or Differential) Differential audio signal can be feed directly to CN1, PIN 1 to 4

- Pin 1 >> IA +Input A Channel, Pin 2>> AN -Input A Channel
- Pin 3 >> NB +Input B Channel, Pin 4>> BN -Input B Channel
- For Single Ended Input Solder Jumper J5 and J6 (Channel A Input Pin1 Signal and Pin 2 GND, Channel B Pin3 Signal and Pin 4 GND)

Gain Setting (PCB Solder Jumper J3 and J4)

The gain of the TDA7491LP is set by the two inputs, GAIN0 (pin 30) and GAIN1 (pin 31). Internally, the gain is set by changing the feedback resistors of the amplifier

- J3>>Low, J4>>Low = 20dB (High=3.3V, Low=GND)
- J3>>Low, J4>>High = 26dB (High=3.3V, Low=GND)
- J3>>High, J4>>Low=30dB (High=3.3V, Low=GND)
- J3>>High, J4>>High=32dB (High=3.3V, Low=GND)



















BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	4 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5317-ND
2	3	C1,C5,C28	10uF/25V SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
3	2	C2,C7	2.2uF/16V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
4	11	C3,C4,C6,C8,C10,C14,C17,C22,C24,C29,C30	0.1uF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
5	6	C9,C12,C15,C18,C19,C23	0.22uF/25V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
6	4	C11,C16,C20,C25	1KPF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
7	2	C13,C21	330PF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
8	2	C26,C27	1uF/25V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
9	1	C31	1000uF/16V ELECTROLYTIC	VISHAY	DIGIKEY	56-MAL217055102E3-ND
10	4	J1,J2	3 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5316-ND
11	2	J5,J6	PCB SOLDER JUMPER			
12	2	LS1,LS2	4 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5317-ND
13	4	L1,L2,L3,L4	33uH/1.4A	BOURNS	DIGIKEY	SRN6045-330MCT-ND
14	1	R1	220E 5% SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
15	2	R2,R3	33K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
16	1	R4	150E 5% SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
17	3	R5,R6,R9	22E 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
18	1	R7	39K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
19	1	R8	100K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
20	3	R10,R11,R13	FERRITE-BEAD SMD SIZE 0805	MURATA	DIGIKEY	490-18596-1-ND
21	1	R12	DNP			
22	1	U1	LM117-3.3V	TI	DIGIKEY	LM1117MP-3.3/NOPBCT-ND
23	1	U2	TDA7491LP13TR	ST	DIGIKEY	497-11056-1-ND
24	2	SHUNT FOR J1 AND J2	JUMPPER SHUNT	SULLINS	DIGIKEY	S9001-ND
25	2	J3, J4 SOLDER JUMPER	SOLDER JUMPER		DIGIKEY	



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PCB SILK SCREEN TOP

TOP LAYER

PCB DIMENSIONS 63.25MM X 32.39MM













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