

DESIGN OF 3WATT AUDIO AMPLIFIER USING IC TDA 7056

Vinay Raj.B.R¹, P.Vikram Reddy², Ashwath kiran.D³, Bharath Kumara⁴

¹ Student, Dept. of ECE, Ramaiah University of applied sciences, Bangalore, India

² Student, Dept. of ECE, Ramaiah University of applied sciences, Bangalore, India

³ Student, Dept. of ECE, Ramaiah University of applied sciences, Bangalore, India

⁴ Asst.professor, Dept. Of ECE, Ramaiah University of applied science, Bangalore, India

ABSTRACT

Generally the audio we hear have some noise in it, in the same way the previous work progressed on this methodology had some distortion in it like humming problems (thus may be because of Turntables which effects at high power levels) and Ground loops., so This paper reports the design and implementation of a 3 Watt audio amplifier using TDA 7056 and try to get the clear audio (humming less audio output). 3 Watt audio amplifier TDA7056 only requires two capacitors for biasing and one potmeter the circuit analysis is presented and procedures for implementation are described. Before implementation, circuit simulation was carried to ensure that simulated results corresponded with the analysis already carried out this satisfactory result. We get good overall stability with gain of 40 DB. It has two section namely power supply and amplifier. This also agreed with design specifications and analysis. The overall result obtained indicates a satisfactory performance.

Keyword: - Melody generator, Bridge tied load (BTL), Multiplexer, Pot meter, Humming, Ground loop, PSSR, Stereo, TDA7056.

1. INTRODUCTION

Audio amplifier is used to increase the signal power so as to drive a load, such as output speakers. Similar to pre amps, audio amps have fixed gain in terms of signal amplitude so that designers can focus on high-power gain and the power handling challenges that typically result. Electronic amplifier is used to amplify low power electronic audio signals. These are found in our daily life when we are using any type of sound systems such as home audio systems, speakers and in musical instruments like guitar amplifiers. IC TDA7056 for 3W audio amplifier. It is a mono output amplifier which contains 9 pin medium power packages. This device is designed for battery fed portable mono recorders, radios and televisions. It doesn't need any peripheral components because it makes use of bridge tied load principle. This load can be short circuited in all directions. Each pin have each function and vary according to the manufacturer's design. In order to make the circuit fully operative, the pins in the IC must be used for supply voltage, input and output connections, and also some external components according to the needs of the manufacturer.

2. RELATED WORK

The one of the present related works going on 3W audio amplifier is "Guitar profiling technology in metal music production". Is carried out by Christopher reuter (a famous musicology) university of Vienna, musicology faculty member. This work concludes by discussing the consequences of profiling technology regarding issues such as democratization of production tools, changes in professional services, creative potentials and future applications of the technology that may radically change metal music production.

These 3W audio amplifiers are using with stereo headphone drive and input mux. This work concludes that the MAX9777/MAX9778 combine a stereo 3W bridge-tied-load(BTL) audio power amplifier, stereo single ended(SE) headphone amplifier, headphone sensing, and a 2:1 input multiplexer all in a 28 pin thin QFN package. These

devices operate from a single 4.5v to 5.5v supply and feature an industry-leading 100dB PSSR, allowing the devices to operate from noisy supplies without the addition of a linear regulator.

3. PROPOSED METHODOLOGY

The IC TDA7056 is used in 3w audio amplifier because of its IC features. Bridge tied load working principle with a power supply of 6v it can output 1watt power into 8 ohm load. And with a 12v power supply it can output 3watt power into a 16-ohm load. And the IC TDA7056 has a supply voltage ranges from 3v to 18v with a gain of 40dB. And another good feature of this IC is that it has overall good performance and stability. No other external components are being used because it makes use of bridge tied load (BTL) and there are no switches on and switch off clicks. The total amount of power consumed by this is low when compared to other and has a good stability. And more over it is short circuit proof and ESD is protected at all Pins. These features like good stability, low power consumption, short circuit proof, ESD protection all these features makes this IC is being preferred in this 3W audio amplifier.

3.1 FUNCTIONAL DISCRPTION

IC TDA7056 is a 9 pin mono output amplifier, which is designed for battery fed portable radios and equipment such as TV. There is a trend that in order to decrease space the number of external components should be decreased. For portable applications also there is a trend that even after decreasing the number of battery cells there should be a reasonable power output. In such cases the important features listed above makes the IC TDA7056 to full fill both of those requirements(less space by decreasing components, reasonable output with less battery). This IC do not need any other components (peripheral components) because it makes use BTL (bridge tied load) principle.in which it has same supply voltage compared to a conventional Single Ended output stage. As stated with a power supply of 6v it can output 1 watt power into 8 ohm load. And with a 12v power supply it can output 3watt power into a 16-ohm load without need any external components like heat sink. And gain is fixed with 40db. Special attention is given to switch-on/off click suppression, and it has a good overall stability. The load can be short circuited at all input condition.

3.2 BLOCK DIAGRAM

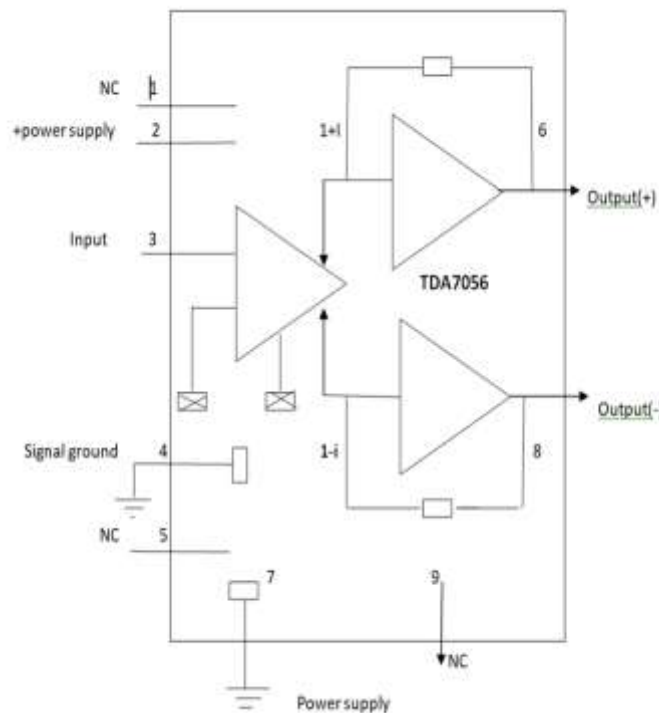


Figure 1: block diagram

3.3 PIN DIAGRAM

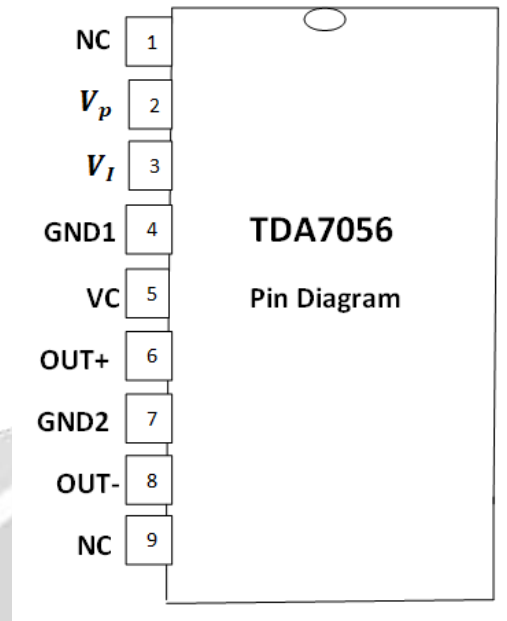


Figure 2: Pin diagram

Table 1: IC PIN DESCRIPTION

PIN NUMBER	PIN NAME	PIN FUNCTION
1	NC	NOT USED
2	VCC	Connect to 3 to 18 v DC supply with external capacitors of 220 μ Fs to 100nF for biasing.
3	Input	Input terminal for connecting audio signal. Which is connected through a pot or fixed resistor (5K)
4	Signal ground	Connect with audio signal ground.
5	NC	NOT USED
6	Output 1	Output terminal 1
7	Supply ground	Connected from supply to ground for biasing.
8	Output 2	Output terminal 2 (which connects a load between the two output terminals 1 and 2)
9	NC	NOT USED

3.3 CIRCUIT DIAGRAM

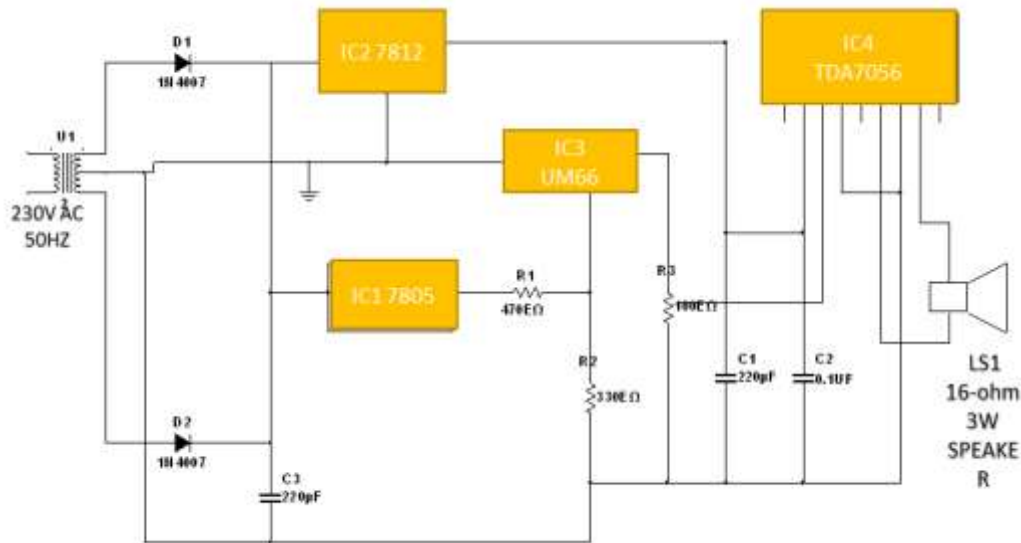


Figure 3:circuit daigram

3.4 DESIGN AND WORKING

The mentioned Figure 3 shows circuit of the 3W audio amplifier using TDA7056 IC. This process have two componential operations involved; Power supply, Here the AC power supply is stepped down using transformer X1, and rectified by a full wave rectifier comprising diodes D1(positive half rectification) and D2(negative half rectification), filtered by capacitor C1 and fed to 5V voltage regulator 7805 (IC1) and 12V voltage regulator 7812 (IC2) to maintain constant +5V DC supply for melody generator (UM66) and +12V DC power supply for audio amplifier TDA7056 (IC), respectively. Amplifier, the amplifier block is constructed using two chips: melody generator (UM66) and audio amplifier TDA7056. Melody generator chip UM66 is used to provide audio input to the amplifier. It requires around 3V input. So we use a voltage divider network using resistors R1 and R2 are used to derive 3V from 5V output of the power supply. The output of melody generator (UM66) is connected to the positive input of TDA7056 through a 100-ohm Potmeter (used as voltage dividers, variable resistance) used for volume control. The Vcc pin of TDA7056 is connected to 12V power supply along with two capacitors as shown in Figure 3.

4. RESULT AND DISCUSSION

The 3Watt, 16-ohm loudspeaker is connected to output pins 6 and 8 of IC4 (TDA7056) which gives amplified 3Watt audio output. The TDA7056 is a mono output amplifier designed for battery-fed portable radios and mains-fed equipment such as television it fulfills both the requirements where it can give reasonable output power even though we decrease the number of cells. It needs no peripheral components, because it makes use of the Bridge-Tied-Load (BTL) principle. Consequently it has, at the same time supply voltage, a higher output power compared to a conventional single ended output stage so, When you switch on the power supply the UM66 (melody generator) chip gets activated and it generates a melody tone, which is attached to TDA7056 (IC4) through potmeter, there the TDA7056 chip amplifies the melody sound to around 3 Watt, which can be heard from the speaker clearly. By varying the potmeter we can adjust the volume of the output tone. TDA7056 is integrated with DC volume control so input audio signal connects directly to an input stage and that makes sound cleaner and accurate.

5. CONCLUSION

In this paper, Audio amplifiers circuits commonly use single chip audio ICs. But these circuits look very easy to design and assemble but so many components like resistors, capacitors and sometime inductors are required. So in this 3W audio amplifier we will use a single chip audio amplifier using TDA7056. This only requires two capacitors for biasing. Here you also need to connect a 3W, 16-ohm (or 1W, 8-ohm) speaker at the output of the circuit. So when an audio signal is applied to the input, you can hear the amplified output from the speaker. Therefore we have

designed and implemented circuit diagrams to perform the proposed methodology and have designed the 3Watt audio amplifier using the integrated circuit (TDA7056) with overcoming the Humming and Ground loop problems. Here we are not performed any other research in advanced progressing of audio amplifiers .all those advancements have been mentioned in the Related works section.

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