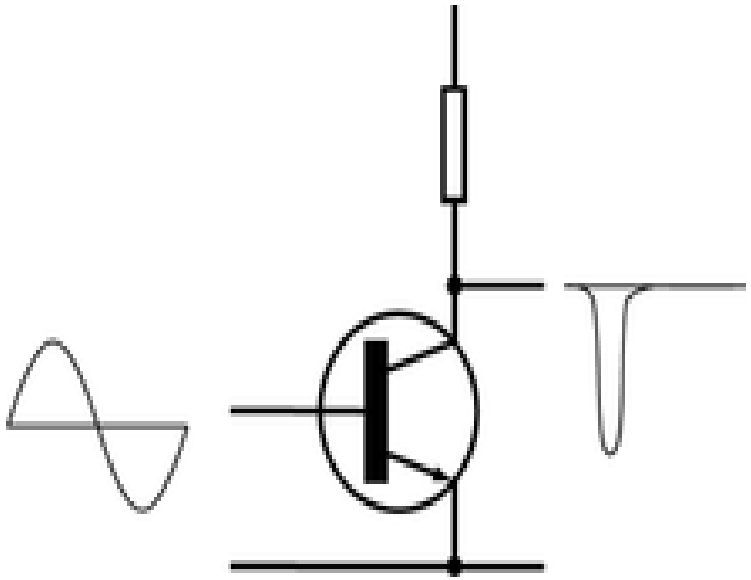
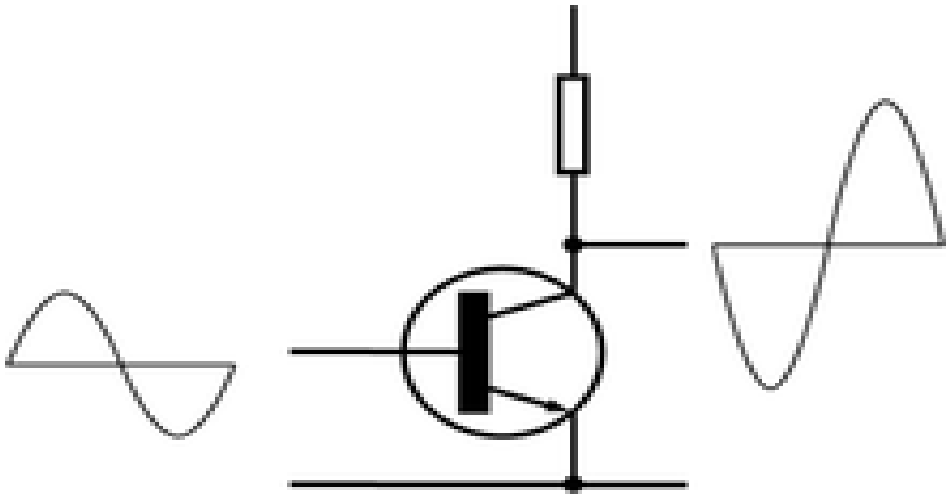
100W MOSFET POWER AMPLIFIER





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➢ ***INTRODUCTION***

An **electronic amplifier** is a device for increasing the power of a signal.

It does this by taking energy from a power supply and controlling the output to match the input signal shape but with a larger amplitude. In this sense, an amplifier may be considered as modulating the output of the power supply.

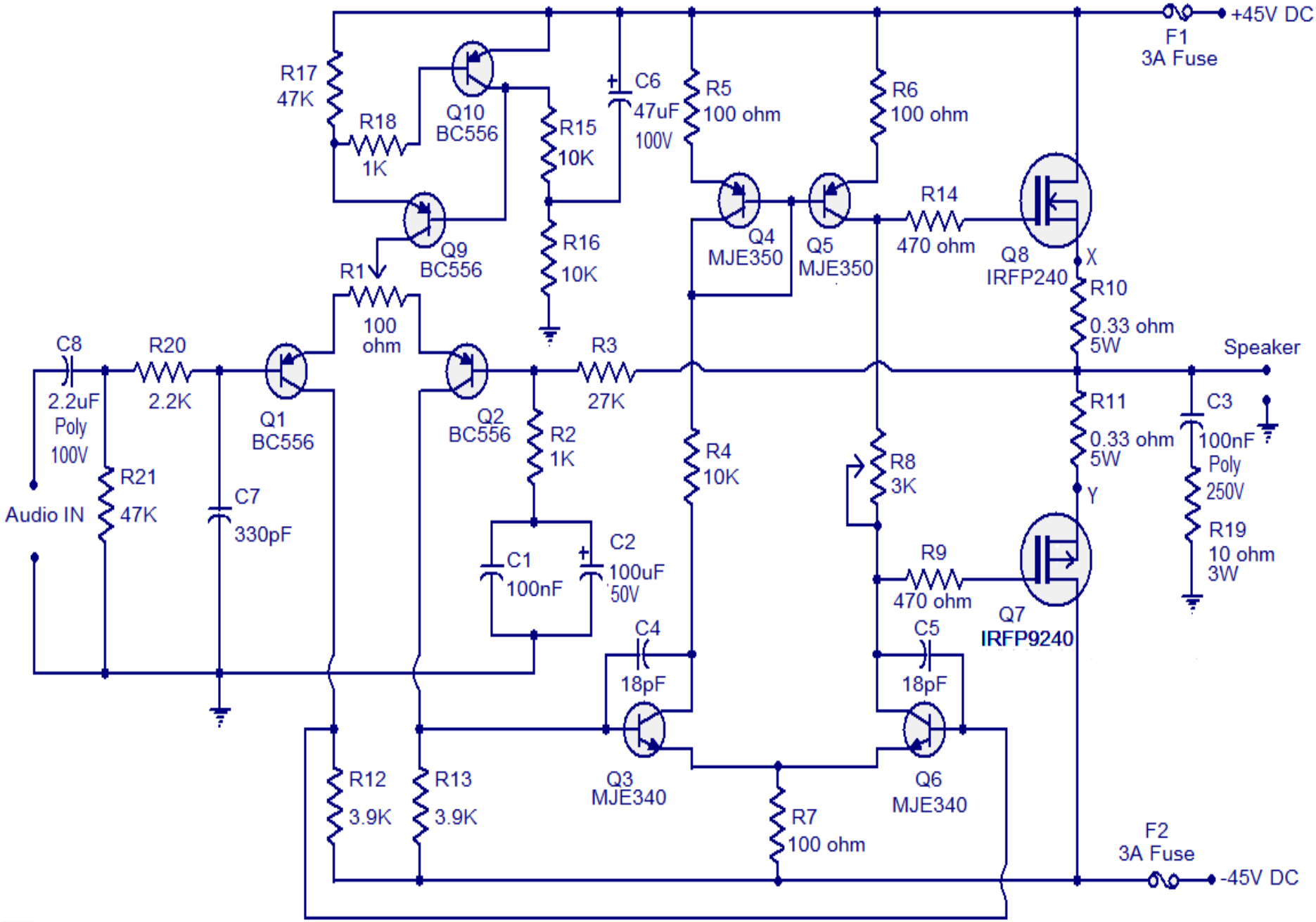
- POWER AMPLIFIER

The term *power amplifier* is a relative term with respect to the amount of power delivered to the load and/or sourced by the supply circuit. In general a power amplifier is designated as the last amplifier in a transmission chain (the *output stage*) and is the amplifier stage that typically requires most attention to power efficiency.

➢ ***OUR AIM***

A 100W MOSFET power amplifier circuit based on IRFP240 and IRFP9240 MOSFETs is shown here. The amplifier operates from a +45/-45 V DC dual supply and can deliver 100 watt rms into an 8 ohm speaker and 160 watt rms into a 4 ohm speaker.

- Also we will do a full analysis of the circuit using PSPICE simulation software. The basic reason behind this step is by using pspice simulation we will be able to understand the working of each and every component used in the circuit . This simulation will enhance our knowledge about how different components of the circuit behave when different parameters controlling their operation are varied.



100W MOSFET amplifier

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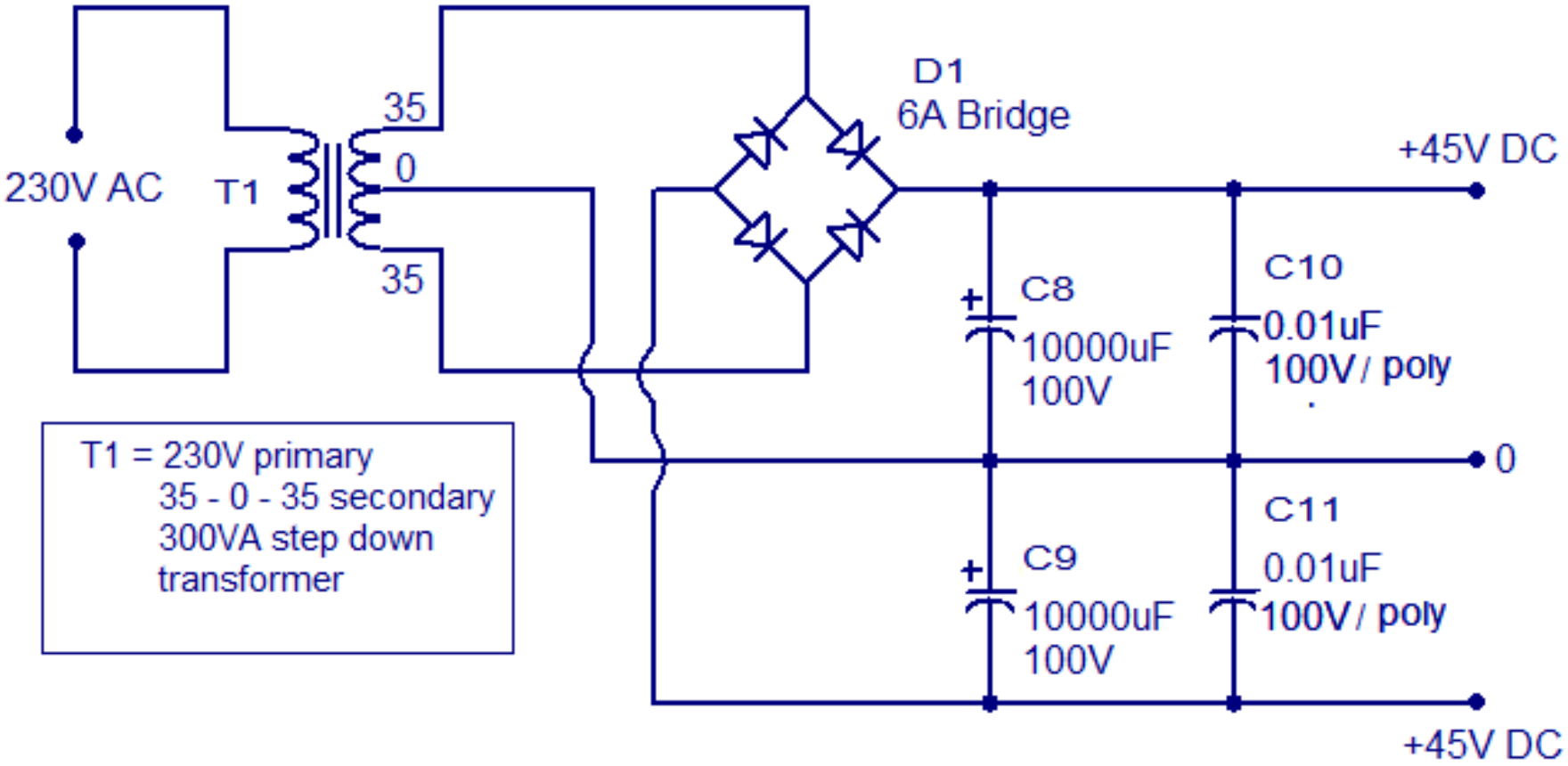
ABOUT CIRCUIT

Capacitor C8 is the input DC decoupling capacitor which blocks DC voltage if any from the input source. IF unblocked, this DC voltage will alter the bias setting s of the succeeding stages. Resistor R20 limits the input current to Q1 C7 bypasses any high frequency noise from the input. Transistor Q1 and Q2 forms the input differential pair and the constant current source circuit built around Q9 and Q10 sources 1mA. Preset R1 is used for adjusting the voltage at the output of the amplifier. Resistors R3 and R2 sets the gain of the amplifier. The second differential stage is formed by transistors Q3 and Q6 while transistors Q4 and Q5 forms a current mirror which makes the second differential pair to drain an identical current. This is done in order to improve linearity and gain. Power amplification stage based on Q7 and Q8 which operates in the class AB mode. Preset R8 can be used for adjusting the quiescent current of the amplifier. The network comprising of capacitor C3 and resistor R19 improves high frequency stability and prevents the chance of oscillation. F1 and F2 are safety fuses.

Power supply for the 100W MOSFET power amplifier



+45/-45 dual supply for 100W MOSFET amplifier

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A basic dual power supply is used for the amplifier circuit. If 6A ampere bridge will not be available, then we will make one using four 6A6 diodes.C10 and C11 are high frequency bypass capacitors. Filter capacitors C8 and C9 must be at least 10000uF, higher the value lesser the ripple. Optional 3A fuses can be added to the +45 and -45 lines. Transformer T1 can be a 230V primary, 35-0-35 V secondary, 300VA step down transformer.

❖***APPLICATIONS***

1) This Hi-Fi amplifier circuit is suitable for a lot applications like general purpose amplifier, guitar amplifier, keyboard amplifier
2) The amplifier can be also used as a sub woofer amplifier but a subwoofer filter stage has to be added before the input stage

➢ ***ADVANTAGES***

- ❖ The amplifier has a low distortion of 0.1%, a damping factor greater than 200, input sensitivity of 1.2V and the bandwidth is from 4Hz to 4 KHz.