EXPERIMENT- 9

Objective: To study class-B power amplifier

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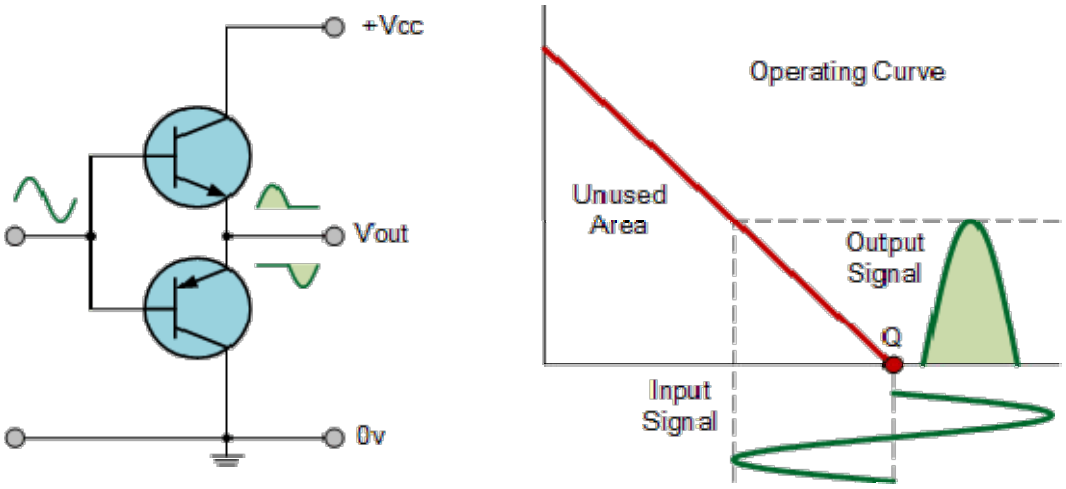
Resources Required: Trainer kit of class-B power amplifier

Theory:

Class B amplifiers were invented as a solution to the efficiency and heating problems associated with the previous class A amplifier. The basic class B amplifier uses two complimentary transistors either bipolar of FET for each half of the waveform with its output stage configured ina "push-pull" type arrangement, so that each transistor device amplifies only half of the output waveform.

In the class B amplifier, there is no DC base bias current as its quiescent current is zero, so that the dc power is small and therefore its efficiency is much higher than that of the class A amplifier. However, the price paid for the improvement in the efficiency is in the linearity of theswitching device.



When the input signal goes positive, the positive biased transistor conducts while the negative transistor is switched "OFF". Likewise, when the input signal goes negative, the positive transistorswitches "OFF" while the negative biased transistor turns "ON" and conducts the negative portion of the signal. Thus the transistor conducts only half of the time, either on positive or negative half cycle of the input signal.

Then we can see that each transistor device of the class B amplifier only conducts through one half or 180 degrees of the output waveform in strict time alternation, but as the output stage has devices for both halves of the signal waveform the two halves are combined together to produce the full linear output waveform.

This push-pull design of amplifier is obviously more efficient than Class A, at about 50%, but theproblem with

the class B amplifier design is that it can create distortion at the zero-crossing point of the waveform due to the transistors dead band of input base voltages from -0.7V to
+0.7.

We remember from the transistor tutorial that it takes a base-emitter voltage of about 0.7 voltsto get a bipolar transistor to start conducting. Then in a class B amplifier, the output transistor isnot “biased” to an “ON” state of operation until this voltage is exceeded.

This means that the the part of the waveform which falls within this 0.7 volt window will not bereproduced accurately making the class B amplifier unsuitable for precision audio amplifier applications.

Circuit Diagram:

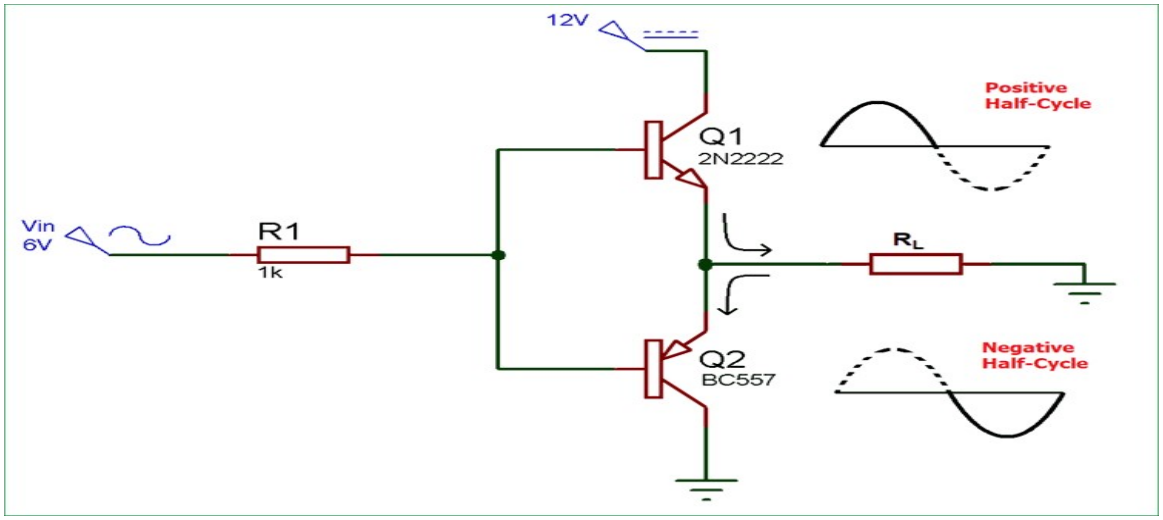


Fig: Class B Amplifier

Procedure:

1. We should take all the components for this experiment.
2. Make the connection as per circuit diagram.
3. Switch ON the kit using ON/OFF toggle switch
4. The input signal is applied with the function generator.
5. Connect the output to the CRO.
6. Now very the amplitude and frequency of the signal by their respective points.
7. See the output on CRO and verify the difference between input and output.
8. Then observe the wave form.

Result: From the above experiment, we learnt about the class of amplifier