

## Experiment #5

## Common Source Amplifier using JFET

### Objective

To implement and analyze the common source JFET amplifier

### Equipment

Function generator with probes

DMM

Dc supply

oscilloscope

Capacitor (10uF, 47uF, 100uF)

FET transistor

Resistor

### Theory

Amplification is the process of increasing strength of a signal. Amplifiers are devices that provide amplification without altering the original signal JFETs are frequently used as amplifier. They are voltage-controlled devices. They have low power consumption than BJTs. They have very high input impedance. They are unipolar and have fast switching speed.

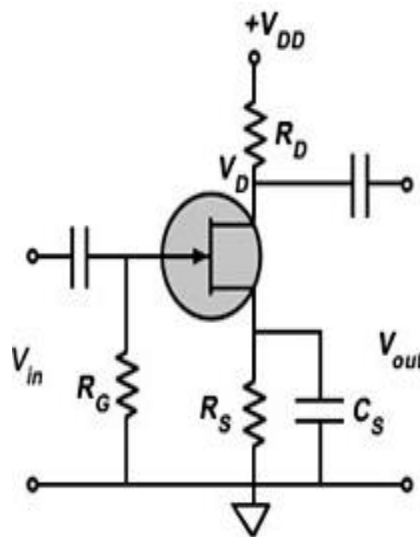


Figure 5.1: Common Source Amplifier

### Common source Amplification configuration

Common source JFET amplifier uses junction field effect transistor as its main active device offering high input impedance characteristics. We used N-type JFET but we can also use N-channel D-MOSFET. In this configuration input is applied between gate and source junction and output is taken from drain to source junction.

## Operation of common source Amplifier

The amplifier circuit consist of an N Channel JFET. The JFET gate voltage  $V_g$  are biased through voltage divider circuit setup by  $R_1$  and  $R_2$  and is biased to operate within saturation region of BJT. JFET takes no input gate current allowing gate to be treated as open circuit. Since JFET is normally ON a negative voltage with respect to source are required to modulate  $I_d$ . This negative voltage is given by separate power supply or self-biased arrangement. In given circuit the input signal produces a voltage fall at gate and as well as voltage rises gate with sinusoidal signal.

## Circuit Diagram

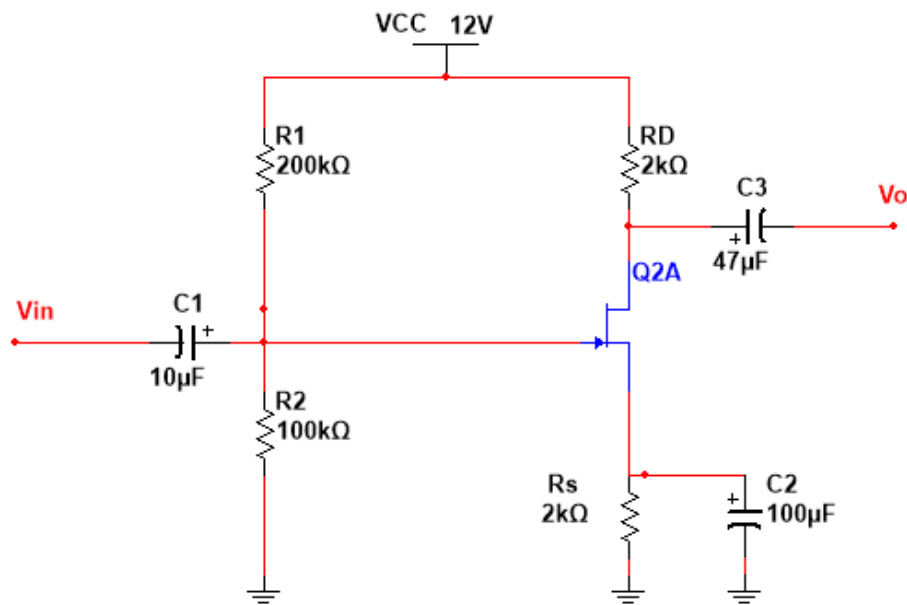


Figure 5.2: Circuit Diagram Common Source Amplifier

## Procedure

1. Collect the components required for the experiment.
2. Connect the circuit according to given circuit shown in Figure 5.2.
3. Apply DC voltages From DC power supply to base transistor.
4. Apply the AC signal using function generator.
5. Measure the output voltages  $V_o$  of common source JFET Amplifier using oscilloscope.
6. Measure the AC parameters.
7. Calculate the input and output impedance  $Z_{in}$  and  $Z_{out}$  respectively.
8. Calculate voltage gain of amplifier.
9. Calculate the theoretical values and compare with practical values.

### Observations

Sr. no.	Parameters	Theoretical Values	Practical Values
1	$V_G$		
2	$V_{GS}$		
3	$V_S$		
4	$I_D$		
5	$V_O$		

### Conclusion

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