Experiment #6   Common Drain and common gate JFET Amplifier

Objective

To implement and analyze common Drain and common Gate JFET amplifier

Equipment

Function generator with probes
DMM
Dc supply
Oscilloscope
Capacitor (1uF 47uF)
JFET Transistor
Resistor

Theory

Amplification is the process of increasing strength of signal. Amplifier is a device that provides amplification without appreciably altering the original signal. JFETs are frequently used as amplifier. JFETs are voltage-controlled devices. They have Low power consumption than BJTS. They have very input impedance. They are unipolar and have very high switching speed.

JFET Common Drain Amplifier

The common Drain amplifier is like common collector configuration of BJT's. Common Drain amplifiers are also known as Buffer circuit. It is called common Drain amplifier. Because Drain terminal is common. The input signal is applied at gate-drain junction and output is taken from source to drain junction.
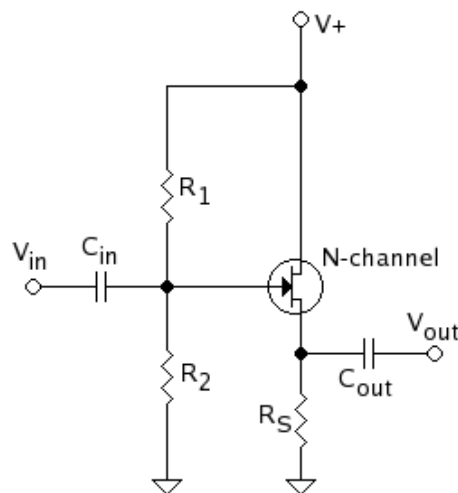

Figure 6.1: Common Drain Amplifier

Buffer Circuit

A voltage buffer amplifier is used to transfer a voltage from one circuit having high output impedance level to a second circuit having low input impedance level It prevents the second circuit from loading first circuit. As characteristics of buffer amplifier is same as common Drain amplifier that's why we call it buffer amplifier.

Common gate amplifier

It is similar to common base amplifier in BJTs. It is called common gate amplifier because gate is common between both Drain and source terminals. The input is applied between Drain-gate junction and output is taken from source-gate junction.

These types of amplifier are used to provide low input impedance or high insulation between input and output to step oscillations.
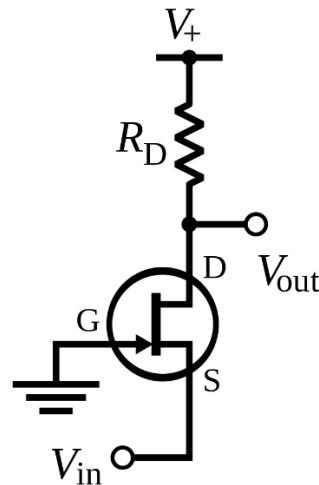

Figure 6.2: Common Gate Amplifier

Isolation

Common gate amplifier provides very low input impedance and a very high output impedance. As gate is grounded, this act as a barrier between input and output providing high level of isolation preventing feedback, especially at high frequency.

Output

Its output is approximately same as input. Its output is also in phase with input.
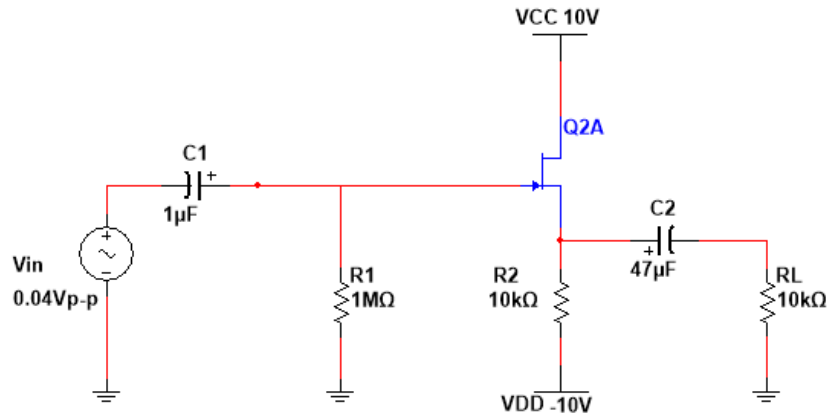
Circuit Diagram (Common Drain)

Figure 6.3: Circuit Diagram Common Drain Amplifier
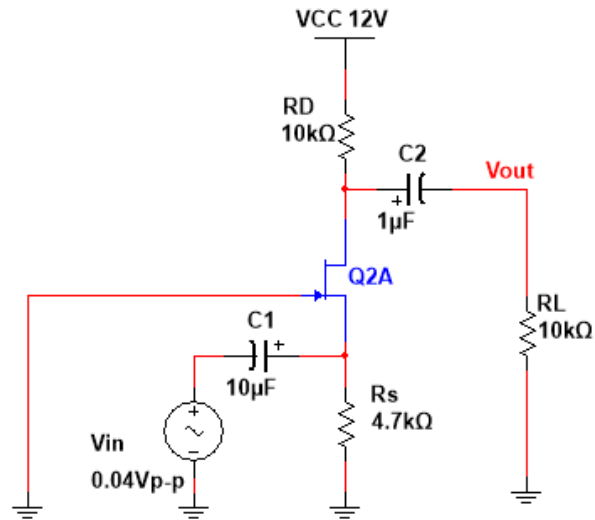
Circuit Diagram (Common Gate)

Figure 6.4: Circuit Diagram Common Gate Amplifier

Procedure

1. Collect the components required for the experiment.
2. Connect circuits according to given diagrams in Figure 6.3 and Figure 6.4.
3. Analyze the common Drain amplifier to find DC and AC parameters.
4. Apply DC voltages From DC power supply and measure the DC parameters of JFET common Drain amplifier.
5. Apply the AC signal using function generator and measure the AC parameters and record the values in table.

6. Analyze the common Drain amplifier to find DC and AC parameters..
7. Apply DC voltages From DC power supply and measure the DC parameters of JFET common gate amplifier.
8. Apply the AC signal using function generator and measure the AC parameters and record the values in table.

Observations (Common Drain JFET)

Sr. No.	Parameter	Values
1	V_G	
2	V_D	
3	V_S	
4	I_D, I_s	
5	I_G	
6	V_o (Yin=50mV)	

Observations (Common Gate JFET)

Sr. No.	Parameter	Values
1	V_G	
2	V_D	
3	V_S	
4	I_D, I_s	
5	I_G	
6	V_o (Yin=50mV)	

Conclusion

_____

_____

_____

_____