

Common Source JFET Amplifier

Equipment

1. DC Power Supply and Function Generator
2. Multimeter and Oscilloscope

Materials

1. 2N5458 JFET Transistor
2. (1) 1.5 k Ω , (1) 4.7 k Ω , (1) 10 k Ω , (1) 100 k Ω Resistors
3. (2) 10 μ F and (1) 100 μ F Capacitors

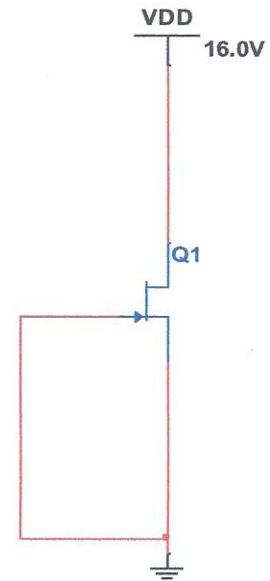


Figure 9-1

Procedure

1. First create the circuit shown in **Figure 9-1**, and measure and record I_{DSS} . (Remember I_{DSS} occurs when $V_{GS} = 0V$)

$$I_{DSS} = \underline{4.6322 \text{ mA}}$$

2. To measure $V_{GS(off)}$, create the circuit in **Figure 9-2** and place an ammeter in series to measure I_D , and vary V_{GG} until I_D becomes zero. This is the value of $V_{GS(off)}$ for your transistor.

$$V_{GS(off)} = \underline{-2.2}$$

3. Measure and record the value of all resistors in **Figure 9-3** (next page).

4. On a breadboard, construct the dc portion of the circuit shown in **Figure 9-3** (next page) and measure I_D and V_{GS} .

$$I_D = \underline{2.4230 \text{ mA}}$$

$$V_{GS} = \underline{-1.2048 \text{ V}}$$

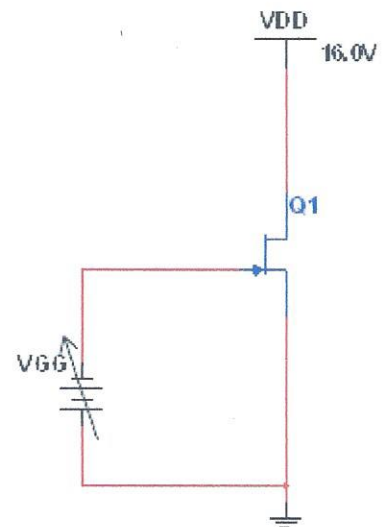


Figure 9-2

5. Add the ac portion of the amplifier in **Figure 9-3** and measure voltage gain (Oscilloscope: Vin – Channel 1 and Vout – Channel 2) and take a screenshot.

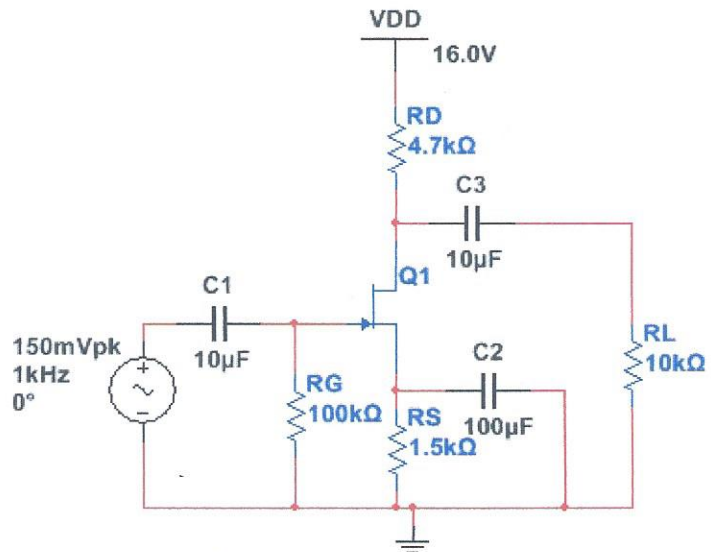


Figure 9 – 3

Data Analysis:

1. Using the data recorded above, theoretical knowledge, and EXCEL (or graphing equivalent software), create the Universal Transfer Characteristic Curve (look in your book/notes if you do not remember what this is) for your transistor and plot your dc load line.
2. Calculate the voltage gain of your circuit and compare it to measured gain.

Submittal:

1. **Lab Cover Sheet** (filled in appropriately)
2. **Title Page**
3. **Objective – be original and thorough**
4. **Procedure – this may be completed in steps**
5. **DATA** section including:
 - a. **Circuits – do not use the instructor's drawings**
 - b. **Calculations**
 - c. **All measured data from this lab (table or as you see fit)**
 - d. **Graph**
6. **DISCUSSION**
7. **CONCLUSION**