BIRZEIT UNIVERSITY

Faculty Of Engineering and Technology

Electrical and Computer Engineering Department

CIRCUITS AND ELECTRONICS LABORATORY

ENEE 2103

Experiment #: 8

The Field-Effect Transistor

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Section: 4

Date: 8/24/2023

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1.CHARACTERESTICS OF AN N-CHANNEL JFET

In this part, the circuit was connected as shown in Figure1.1, using 10K potentiometer and DC sweep (from 0 to 20).

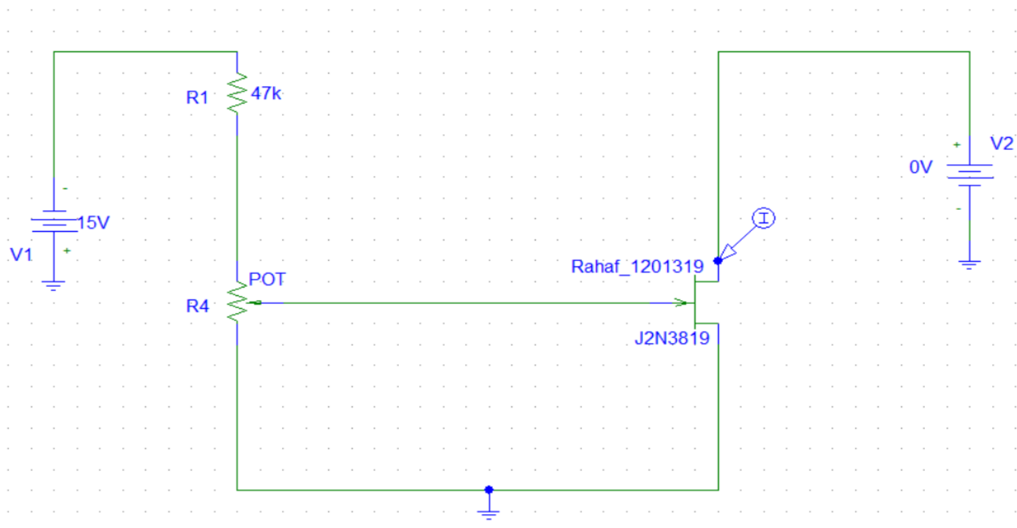

Figure1.1: JFET circuit

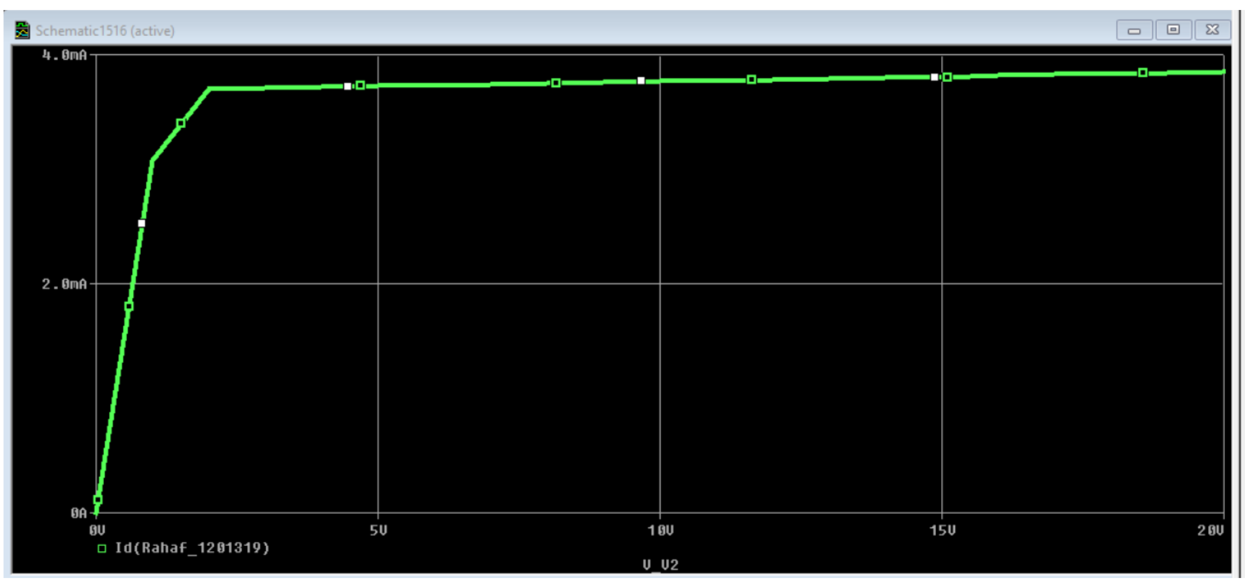

Figure1.2: Ids as a function of Vds

Questions:

-From your graph, above which values of VDS is ID almost unaffected by VDS when VGS=0?

after Vds ≈ 2 volt, Ids almost unaffected by Vds.

-For a given value of VDS , (say 10 V),do equal changes of VGS cause equal changes of ID?

No, equal changes in VGS do not cause equal changes in ID because when VGS changes, Vp and IDSS also change. Therefor, the value of ID remains the same without any change.

-Can you measure IG or is it too small?

It is too small

-From your graph, estimate the change in ID for 0.5 change in VGS when VDS =10 V ,

and VGS -1.0 V ,then find the transconductance of the transistor(gm).

gm = (2*IDSS/VP)*(1-VGS/VP)=((2*(3.7m))/2)*(1-(-1V)/(2V)) = 5.6mv

2. COMMON DRAIN AMPLIFIER

In this part, the circuit was connected as shown in figure 2.1, by using an input of 0.4 volts peak-to-peak and 1KH frequency.

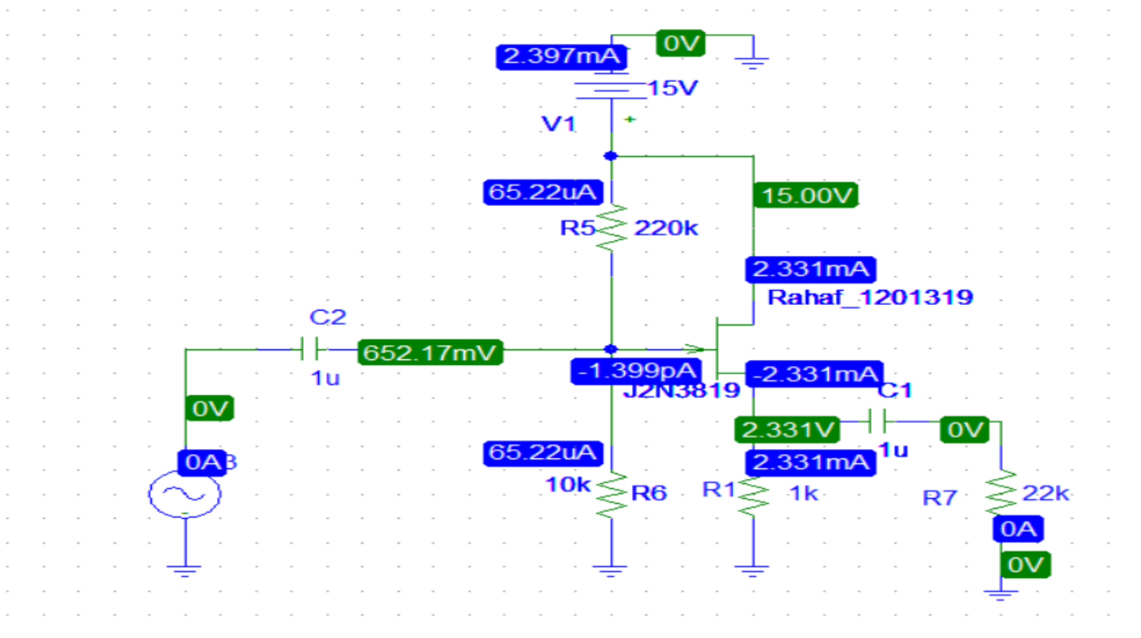

Figure 2.1: common drain amplifier circuit

1)VG=652.17 mv

2)VS=2.331v

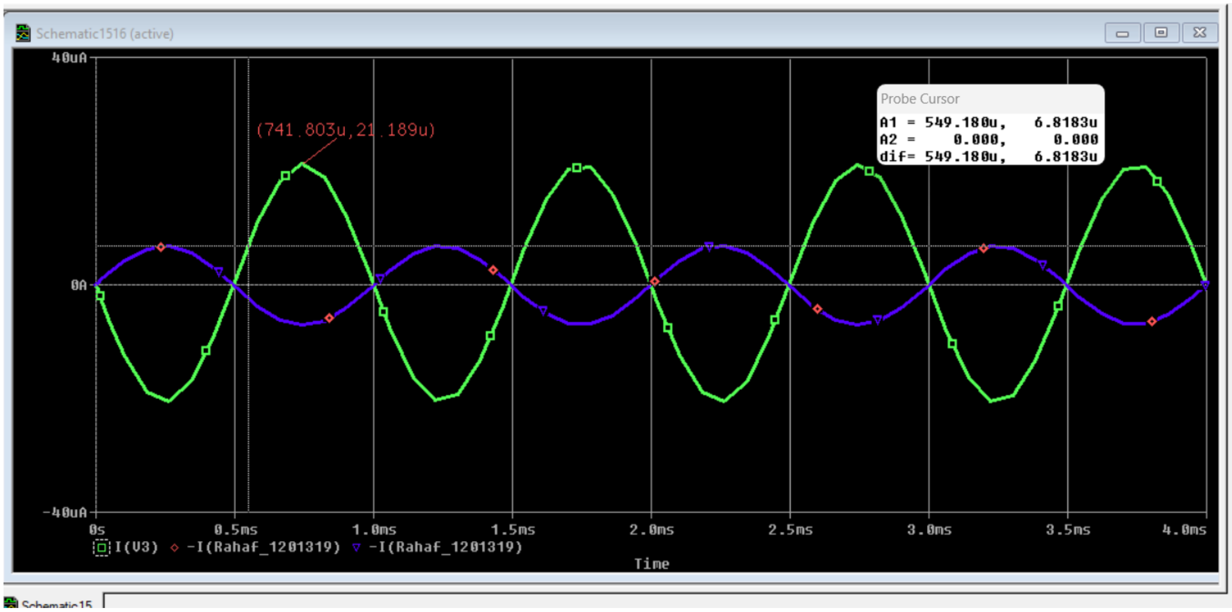

Figure 2.2: Io and Iin

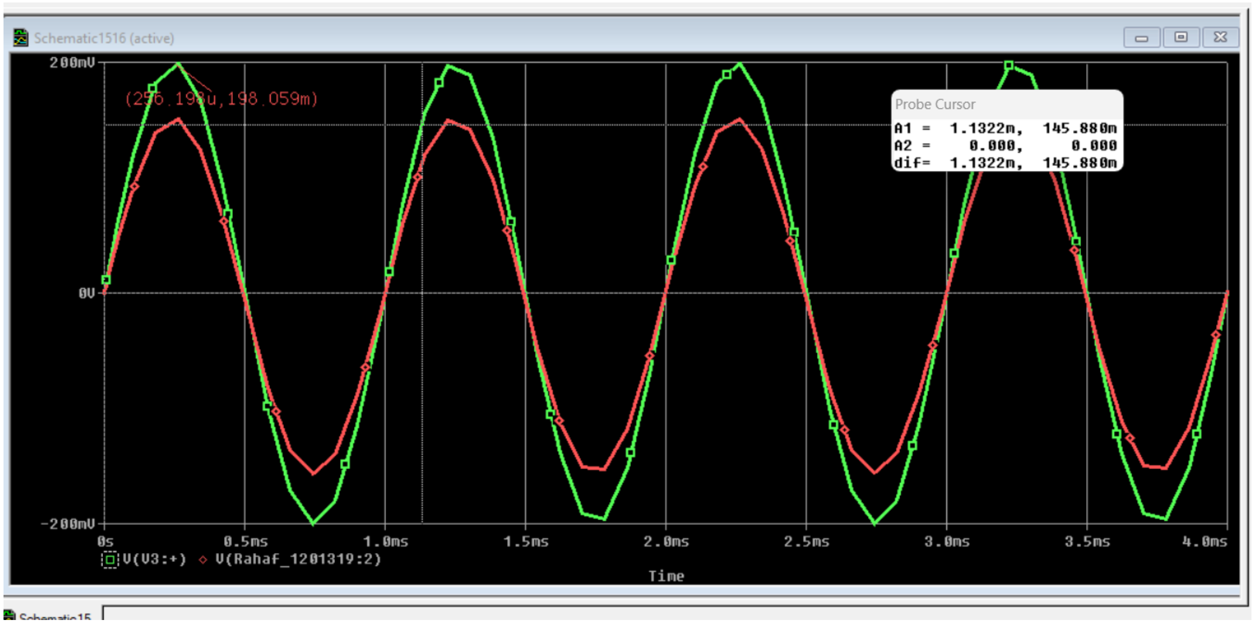

Figure 2.3: Vout and Vin

1) Voltage gain -> Av = Vo / Vin = 145.880m/198.05m=0.736

2) There is no phase shift, the phase shift is zero

3) Zin= Vin/Iin=198.05m/21.189u=9.3 Kohm

4) Zout= Vout/Iout=145.880m/6.818u=21.4 Kohm

Quantity	Value
gm	5.6mV
VG	652.17mV
VS	2.331V
AV	0.736
Zi	9.3 kohm
Zo	21.4 kohm

Table1: values of quantities