

BERZIET UNIVERSITY

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ENEE 3102

Electronics Laboratory

Experiment.5 Prelab

**The Field-Effect Transistor**

Abdallateef Wahdan   
ID:1183005

Supervised by:

Dr. Mohammad Jehad Al JuBeh

Teacher assistance:

Bilal Ismail

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**I. CHARACTERESTICS OF AN N-CHANNEL JFET*.***



**VGS**





**Vgs=-0 V**

****

**Vgs=-0.5V**

****

**Vgs=-1V**

****

**Vgs=-1.5V**

****

**Vgs=-2V**

****

**Vgs=-2.5V**

****

Vgs=-0 V When SET=1



Vgs=-0.5V When SET=0.809756



Vgs=-1V When SET=0.619512



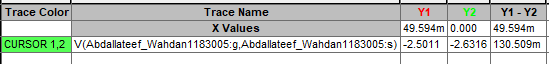
Vgs=-1.5V When SET=0.429268



Vgs=-2V When SET=0.239837



Vgs=-2.5V When SET=0.049594



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID( mA) for VDS=(V)** | | | | | | |  |
| 15 | 10 | 5 | 2 | 1 | 0.5 | 0 | Vds  Vgs |
| 400u | 400u | 400u | 400u | 200.631u | 100u | 0 | -0 |
| 224.807u | 224.807u | 224.807u | 224.807u | 112.618u | 56.53u | 0 | -0.5 |
| 99.743u | 99.743u | 99.743u | 99.743u | 50.158u | 24.921u | 0 | -1 |
| 24.808u | 24.808u | 24.808u | 24.808u | 12.492u | 6.2461u | 0 | -1.5 |
| 17.019p | 12.010p | 7.0186p | 4.0104p | 3.0186p | 2.5145p | 2.0104p | -2 |
| 17.520p | 12.509p | 7.5208p | 4.5111p | 3.5187p | 3.0143p | 2.5100p | -2.5 |

**B-**



**So IG=-12.65pA**

**II. A JFET AMPLIFIER*.***



**VDS=10 When SET=0.597581**









**Voltage gain =3.812/0.997=3.823**

**III. COMMON DRAIN AMPLIFIER.**





**The gain voltage=150.936m/199.934m=0.7549  
The phase shift = 0**



**Zin = Vin / Iin =199.934m/20.556u=9.726k  
Zo = Vo / Io =150.936m/6.8609=21.999k**

**III. CONSTANT CURRENT SOURCE.**



**RL VS VL**

****

**RL VS IL**



|  |  |  |
| --- | --- | --- |
| **VL(V)** | **ID(mA)** | **RL(kΩ)** |
| 1.20 | 12.003 | 0.1 |
| 2.630 | 11.966 | 0.22 |
| 3.997 | 11.937 | 0.33 |
| 5.60 | 11.889 | 0.47 |
| 6.6471 | 11.862 | 0.56 |
| 11.730 | 11.730 | 1 |
| 13.440 | 8.9599 | 1.5 |
| 13.901 | 6.9506 | 2 |
| 14.302 | 4.7673 | 3 |

**The END**