EAST WEST UNIVERSITY
Department of Computer Science and Engineering

Lab-report:06

Course Name: Electronic Circuits
Course Code: CSE 251
Section No: 01

Name of experiment: Measurement of Parameters and I-V characteristics of an N-channel MOSFET.

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Date of submission: 08-05-2022

Objectives:

1. To measure the threshold voltage Vt and the process transconductance Kn of an N-channel enhancement type MOSFET.
2. To measure the I-V characteristics (ID vs. VDS) of an N-channel enhancement type

MOSFET.

Theory:

MOSFET is a metal oxide semiconductor that is under the category of the field-effect transistor (FET). These transistors are widely used under the varieties of the applications relating to the amplification and the switching of the devices. Because of its fabrications MOSFET's are available in smaller sizes.

N-channel MOSFET:

N-channel MOSFET is a type of metal oxide semiconductor field-effect transistors (FET). MOSFET transistor operation is based on the capacitor. This type of transistor is known as an insulated gate field-effect transistor (IGFET).

Circuit Diagram:

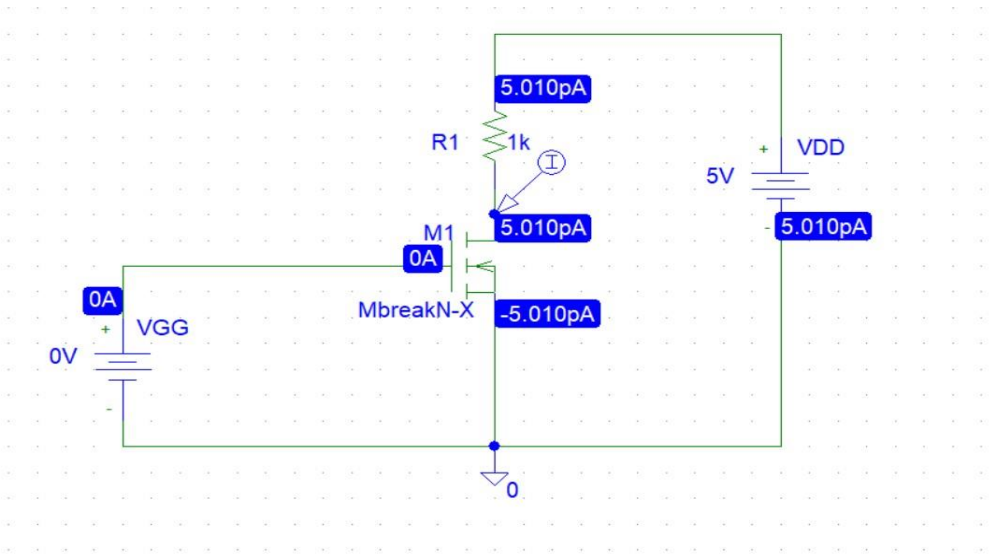


Figure 01: N-channel MOSFET

ID-VGS Characteristics:

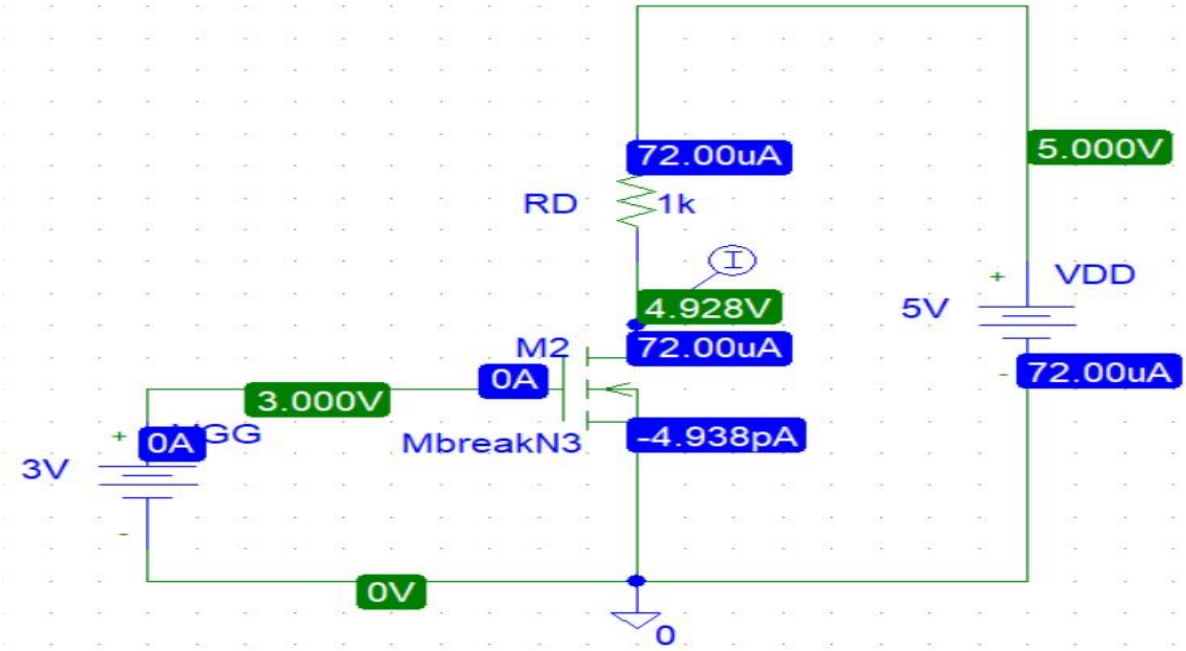


Figure 02: N-channel MOSFET

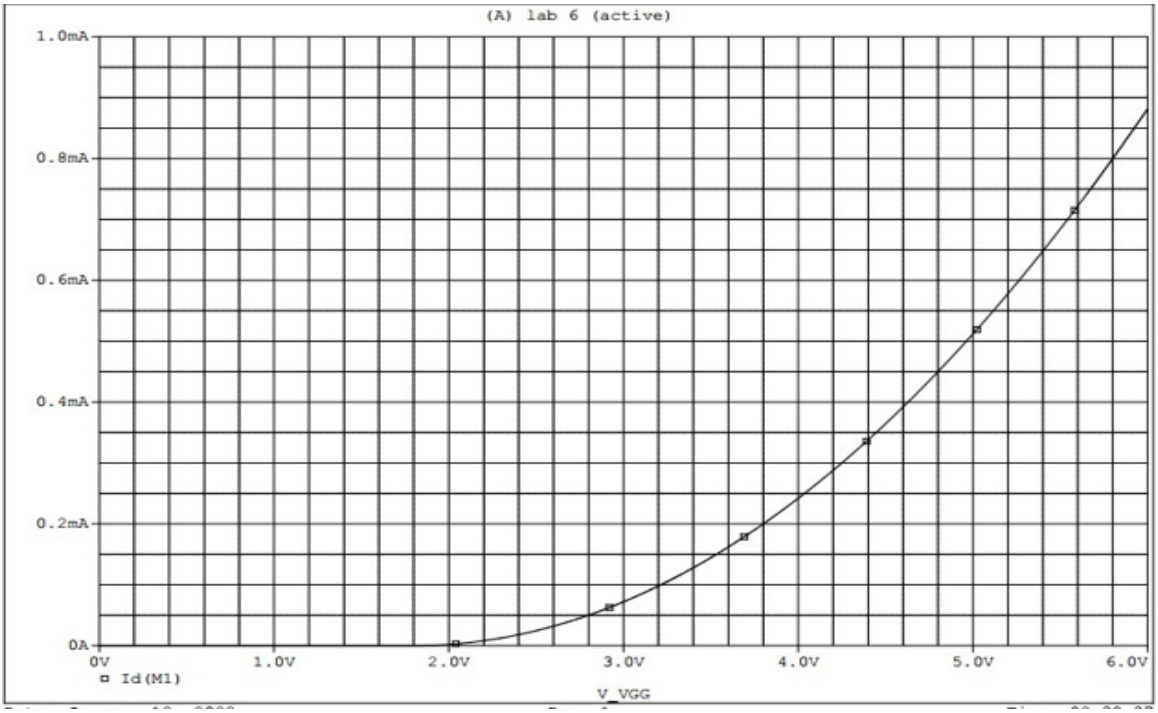


Figure 03: ID-VGS Characteristics

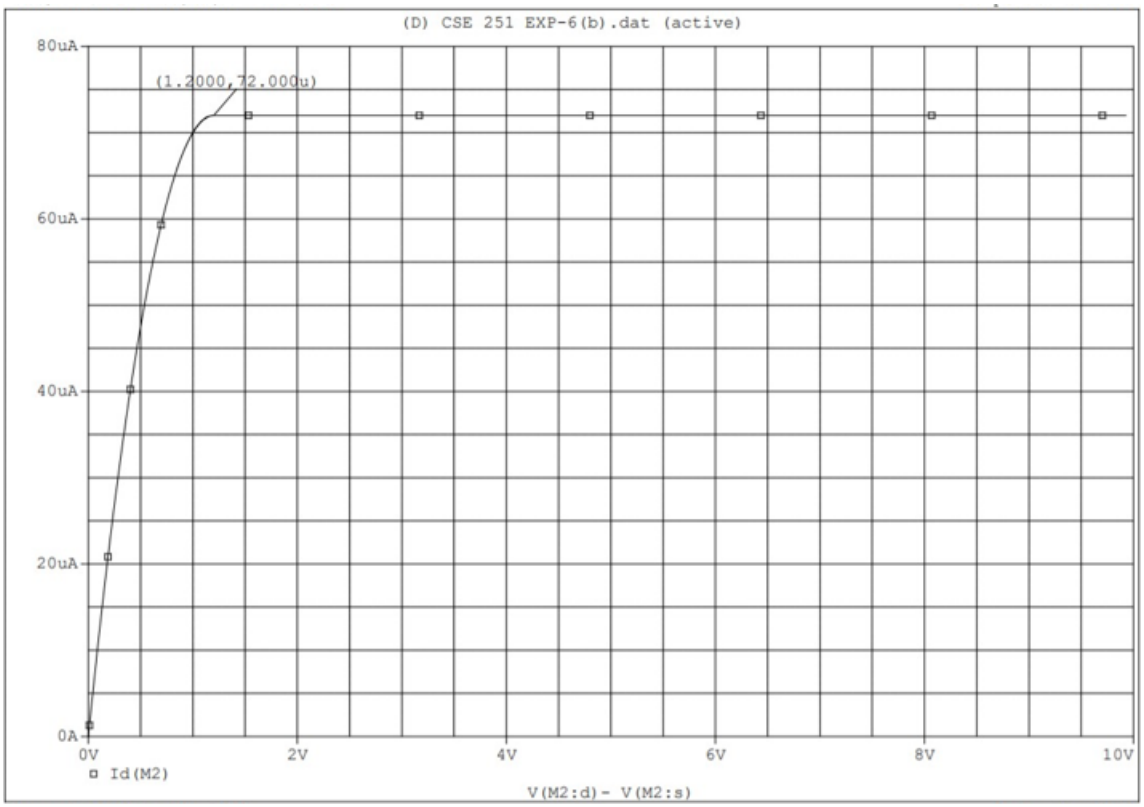


Figure 04: ID-VGS Characteristics

Here, Edge of saturation is 1.2;

If the transition is greater than 1.2 it will operate in saturation region

And, If the transition is less than 1.2 then it will operate in triode region.

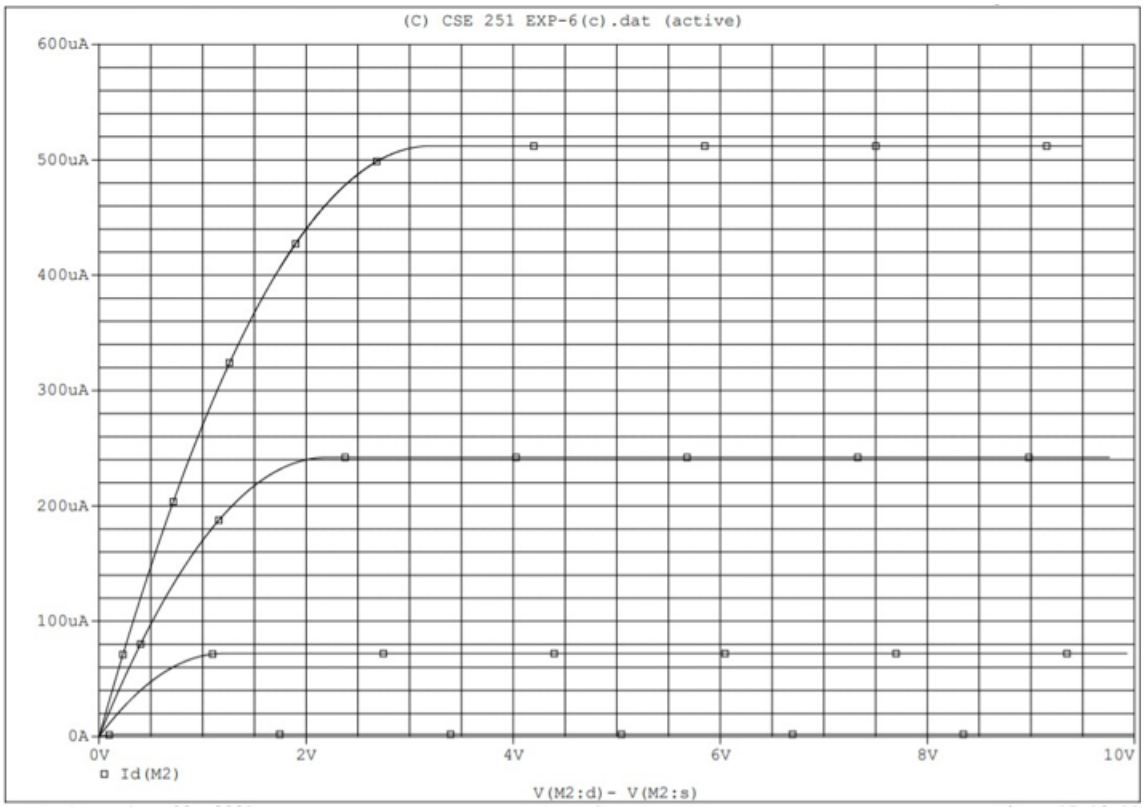


Figure 05: ID-VDS Characteristics for multiple VGS

Equipments and Components needed:

1.Digital trainer board

2.DC power supply

3.Digital multimeter

4.DC voltmeter

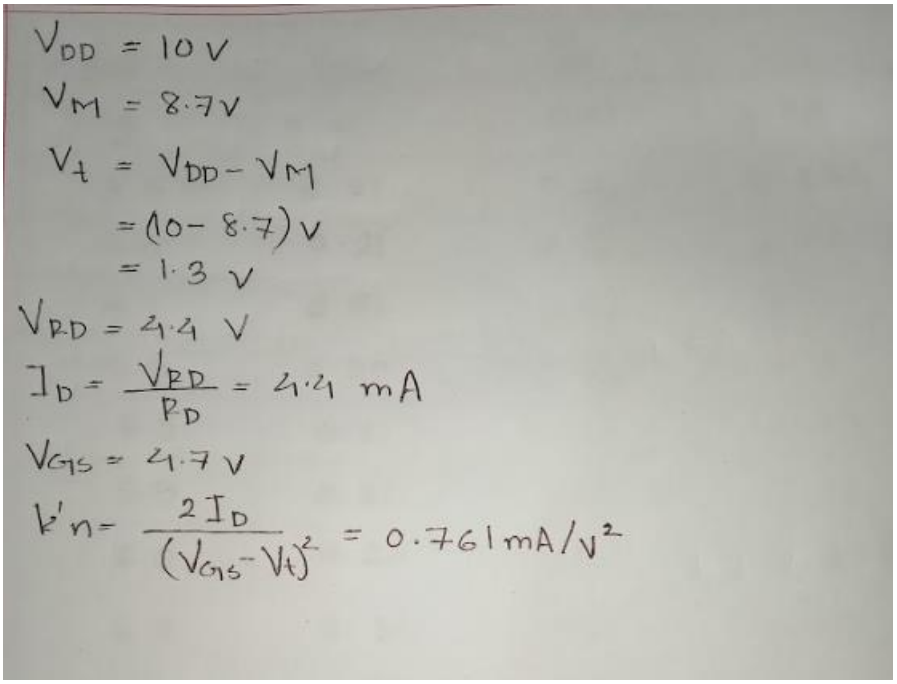
5.CD4007C IC (1 PC)

6.Resistor (1 kΩ 1 pc)

7.Breadboeard

8.Connecting wires

Physical experiment:



V_{DD}	V_{RD}	I_D	V_{DS}
3	0.21	0.21	2.75
3.5	0.21	0.21	3.286
4.0	0.21	0.21	3.77
4.1	0.91	0.91	4.11
4.5	0.20	0.20	4.2
5.0	0.21	0.21	4.75
5.5	0.21	0.21	5.26
6.0	0.22	0.22	5.73
6.3	0.24	0.24	5.911
6.5	0.26	0.26	6.271
6.7	0.28	0.28	6.44
6.8	0.29	0.29	6.61
7.0	0.22	0.22	6.703
7.2	0.24	0.24	7.102
7.4	0.28	0.28	7.43

Discussion:

This experiment is carried out both in a physical laboratory and in a virtual environment using PSpice. Because the magnitudes were not interrupted in PSpice, the trials were considerably easier to carry out. As a result, the predicted and experimental values were similar. However, there is a discrepancy while the experiment was carried out physically