# North South University
## Department of Electrical & Computer Engineering

# LAB REPORT

# Spring 2021

Course Code : EEE 111

Course Title: Analog Electronics - I

Section: 7

Experiment Number: 07

Experiment Name:

## Study of Switching Characteristics

Experiment Date:  27 / 04 / 2021

Date of Submission: 03 / 05 / 2021

Course Instructor: Syeda Sarita Hassan

Submitted To: Fatema Zahra

Name of experiment:

Study of switching Characteristics

Objective:

Study all of the switching characteristics.

Equipments And Components:

1) MOSFET ——— IRF 540 ——— 1 piece each

2) Resistor ——— 1 KΩ ——— 1 piece each

3) POT ——————————— 1 unit

4) Trainer Board ——————— 1 unit

5) DC Power Supply ——————— 2 unit

6) Digital Multimeter ——————— 1 unit

7) Chords & wire ——————— as required

(p.t.o)

## Theory:

MOSFET (Metal Oxide semiconductor Field Effect Transistors) belongs to the group of insulated gate field effect transistor. MOSFETs has three terminal gate (G), source (S) and drain (D).

There are two types of MOSFET

    i) DE-MOSFET

    ii) EN-MOSFET

A common application of MOSFET is switching in analog and digital circuits.

### Circuit Diagram:

$R_D = 1 k\Omega$

IRF540

$V_{RS}$

$V_D = 20V$
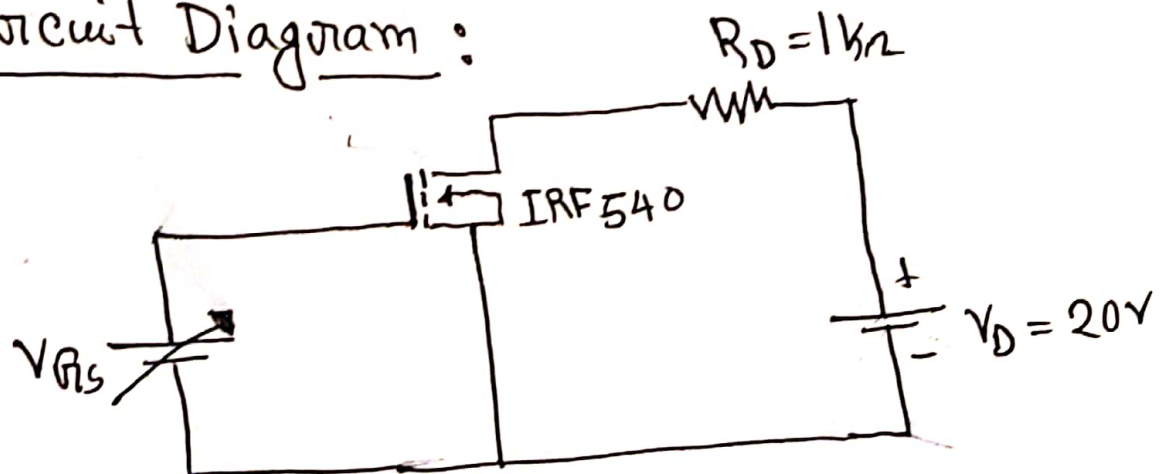
tables:

| | $V_{DD} = 20V$ | | | | $V_{DD} = 15V$ | | |
|---|---|---|---|---|---|---|---|
| $V_{GS}$ | $V_{DS}$ | $V_L$ | $I_D$ | $V_{GS}$ | $V_{DS}$ | $V_L$ | $I_D$ |
| 0 V | 20V | -20.13uV | 20.6mA | 0V | 15V | -15.1uV | 15.27 nA |
| 0.5 v | 20V | -20.131uV | 20.606 nA | 0.5 | 15V | -15.1uV | 15.27 nA |
| 1v | 20V | -20.132uV | 20.606 nA | 1V | 15V | -15.1uV | 15.27 nA |
| 2.5v | 7.145V | -12.85V | 12.58 mA | 2.5 | 2.41V | -12.58 | 12.58 mA |
| 3v | 0.24V | -19.75V | 19.75 mA | 3V | 0.17V | -14.82 | 14.82 mA |
| 4v | 0.12V | -19.87V | 19.87 mA | 4V | 0.09V | -14.09 | 14.02 mA |
| 5v | 0.09V | -19.90V | 19.90 mA | 5V | 0.06V | -14.93 | 14.93 mA |

Answer & Question:

① Ans: The simulation has been attached to the lab report.

Discussion:

In the experiment we have learned about the switching characteristics of MOSFET. We learned how increasing the gate voltage effects the circuit. The multisim simulation was easy. I didn't face any major difficulty.