Experiment:-7

Objective:- Plot transfer characteristics(I_D Vs V_{GS}) of Mosfet and Develop its applications as a switch.

The acronym MOSFET stands for Metal Oxide Semiconductor Field Effect Transistor. MOSFET are circuit elements that allow the flow current by applying a control voltage. It is primarily used in switching circuits as on/off switch and as an amplifier. This experiment will focus on its switching applications.

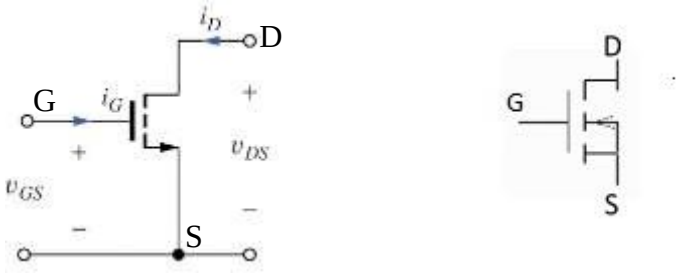

Figure 1. Circuit symbols and nomenclature for an n-channel enhancement MOSFET.

There are three terminals indicated on the circuit symbol: D = drain, S = source, and G = gate. Sometimes a fourth terminal is provided which provides contact to the substrate, or body of the device. When only three terminals are shown, it is assumed that the body is internally connected to the source.

Equipment Required:- 1RFZ44n MOSFET, Power Supply, Resistance 1 kΩ, Multimeter.

Threshold Voltage calculation

Obtain 1RFZ44n MOSFET, identify the drain, gate, and source terminals. Use the circuit shown in Fig. 2

1. Connect the DMM to measure drain current in series with 1 k**Ω** resistance.
2. Set the Variable DC source to the Minimum position.
3. Increase the Variable DC source slowly, until I_D = 1 mA ± 0.05 mA.
4. Measure the V_{GS} (Gate to source voltage) with help of Multimeter.
5. Plot I_D vs V_{GS} characteristics.

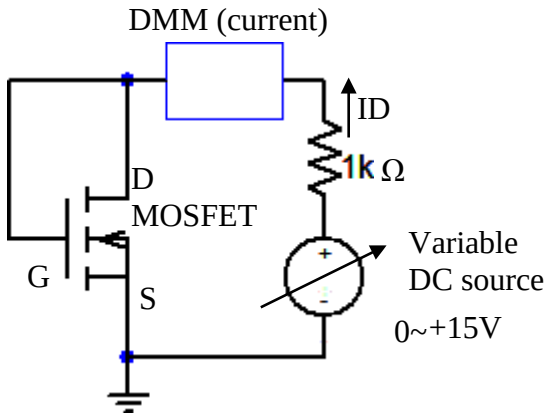

Figure 2. Circuit for determining the threshold voltage, V_{TN}.

Table-1

S.No.	V_{DD}	V_{GS}	I_D
1			
2			
3			
4			
5			

Mosfet as a switch

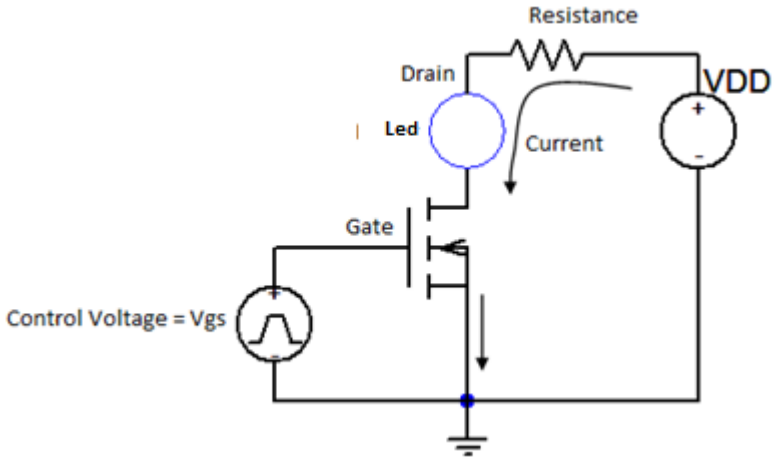

Figure 3. MOSFET as switching circuit.

1. Connect the circuit diagram as shown in figure 3.
2. When the control voltage exceeds the threshold voltage, the given Mosfet is work as short circuit. The current will flow in the circuit and Led glow.
3. When the control voltage is less the threshold voltage, the MOSFET is OFF (work as open circuit).
4. Keep V_{DD} as fixed supply voltage.

Table-2

S.No.		V_{DD} (fixed)	V_{GS}	V_{TN}	Led
1	$V_{GS} > V_{TN}$				
2	$V_{GS} < V_{TN}$				