EXPERIMENT 6: MOSFET CHARACTERISTICS

Objectives

The objective of this experiment is to obtain DC characteristics of a MOSFET and to learn the operation of a MOSFET practically.

Components Required:

DC Voltage Source

Multimeter

Transistor: BS108 transistor

Resistors: 1kΩ

Preliminary Work:

1. Find and examine the datasheet of the BS108 transistor on the Internet. Write the critical information for the experiment.
2. Research how to extract and use the MOSFET's input and output characteristics. Give brief information about this.
3. Can a MOSFET be used as a switch? Explain how it can be used as a switch.
4. What is the mean of 'threshold voltage (V_T)' for the MOSFETs?
5. Setup the circuit given in Figure 1 in OrCAD. You can refer to the Figure 2 to understand how to add the MOSFET in the circuit. Plot input characteristic of the transistor (VGS-ID). You can select the analysis type as 'DC Sweep' and options as 'Primary Sweep' with 'Secondary Sweep'. Primary Sweep input voltage (VGS) from 0 to 10V in steps of 0.1V. Secondary Sweep input voltage (VDS) from 0 to 5V in steps of 0.5V. Specify critical points on the plot and comment about your simulation result.
6. Setup the circuit given in Figure 1 in OrCAD. You can refer to the Figure 2 to understand how to add the MOSFET in the circuit. Plot output characteristic of the transistor (VDS-ID). You can select the analysis type as 'DC Sweep' and options as 'Primary Sweep' with 'Secondary Sweep'. Primary Sweep input voltage (VDS) from 0 to 10V in steps of 0.1V. Secondary Sweep input voltage (VGS) from 0 to 5V in steps of 0.5V. Specify critical points on the plot and comment about your simulation result.

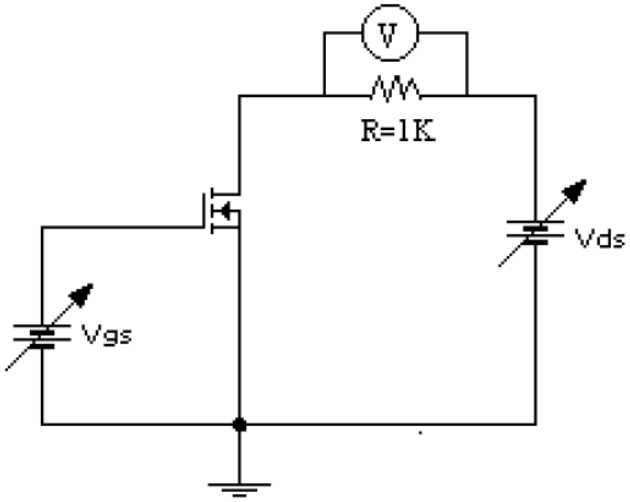

Figure 1

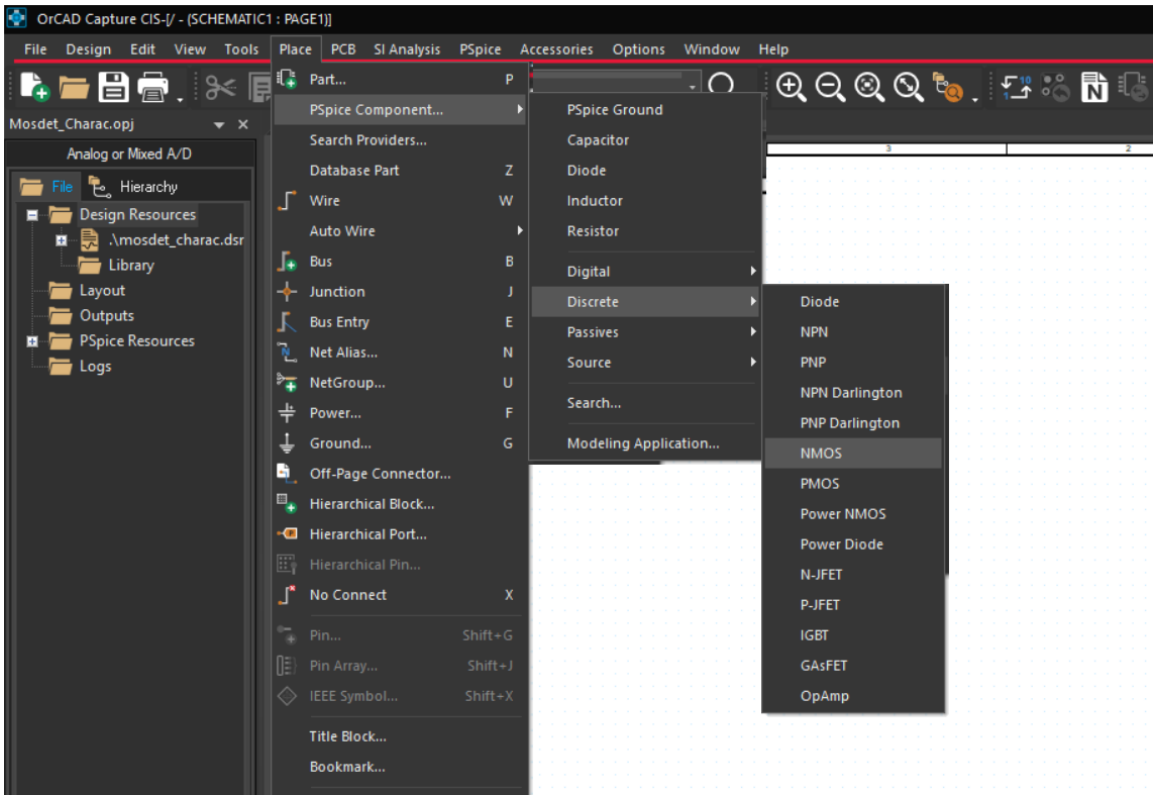

Figure 2