



# SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution)

**19EET202 / ANALOG ELECTRONICS**

**II YEAR / III SEMESTER**

**UNIT-2: MULTI JUNCTION DEVICES**

**1**

**MOSFET**





# What We'll Discuss



## TOPIC OUTLINE

What is MOSFET

Symbols

Classification

Structure and operation

Applications

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# MOSFET

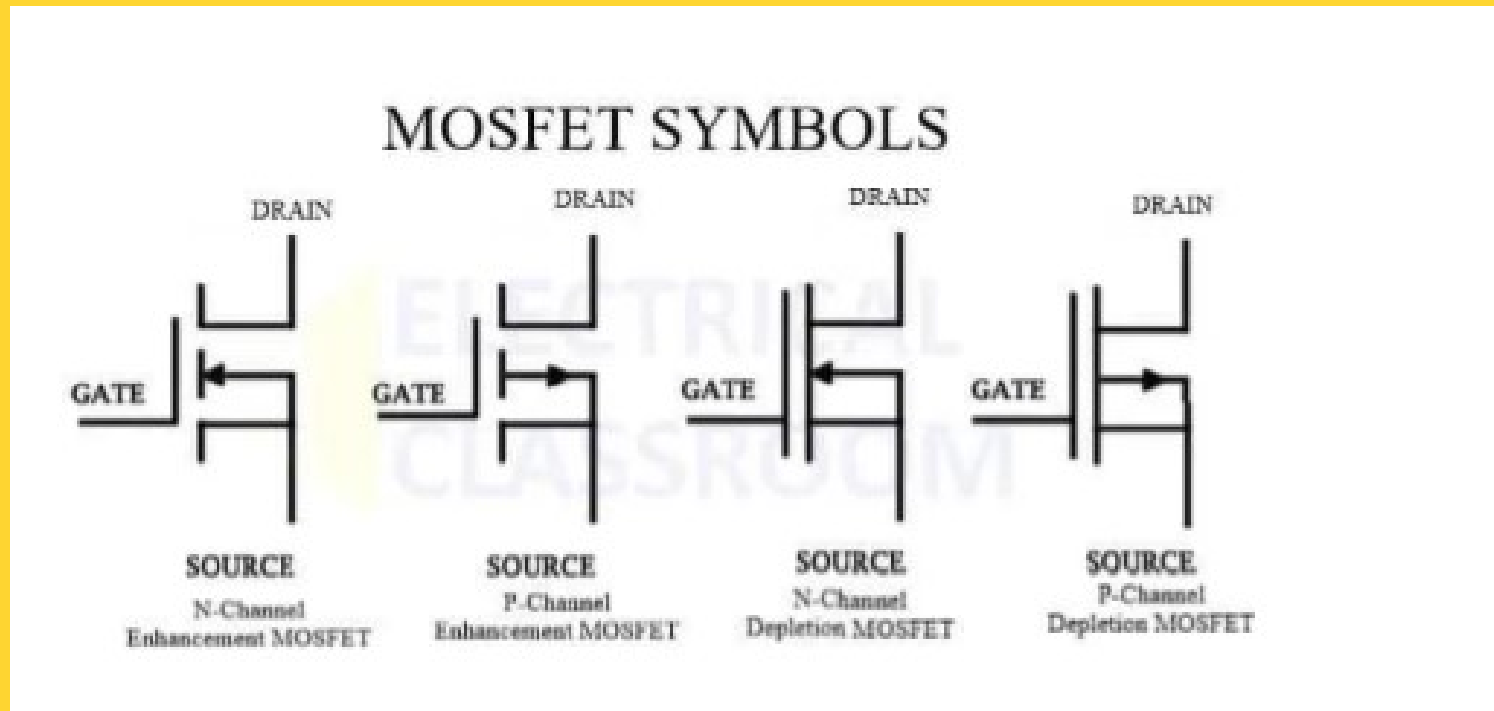


- Metal Oxide Semiconductor Field Effect Transistors
- IGFET
- These are voltage controlled devices, in which the current flowing between source and drain is proportional to the provided input voltage.
- MOSFET has a smaller value of capacitance and its input impedance is much more than that of FET due to small leakage current.
- It finds application widely in switching and amplification of electronic signals because of its ability to change conductivity with the applied voltage.

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# Symbol





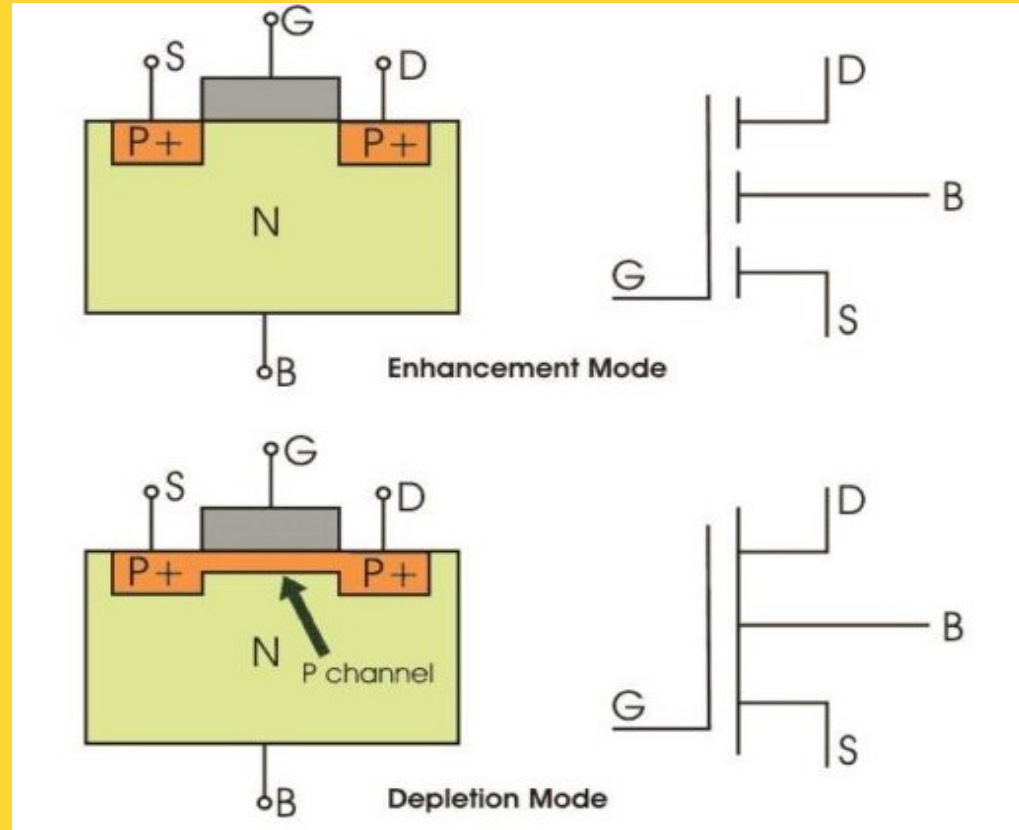
# Classification



- MOSFET works in two modes-
- **1. Depletion Mode:** The transistor requires the Gate-Source voltage ( $V_{GS}$ ) to switch the device “OFF”. The depletion-mode MOSFET is equivalent to a “Normally Closed” switch.
- **2. Enhancement Mode:** The transistor requires a Gate-Source voltage ( $V_{GS}$ ) to switch the device “ON”. The enhancement mode MOSFET is equivalent to a “Normally Open” switch.
- Now with respect to the working principle, MOSFET is classified as follows:
- [P-Channel Depletion MOSFET](#)
- [P-Channel Enhancement MOSFET](#)
- [N-Channel Depletion MOSFET](#)
- [N-Channel Enhancement MOSFET](#)

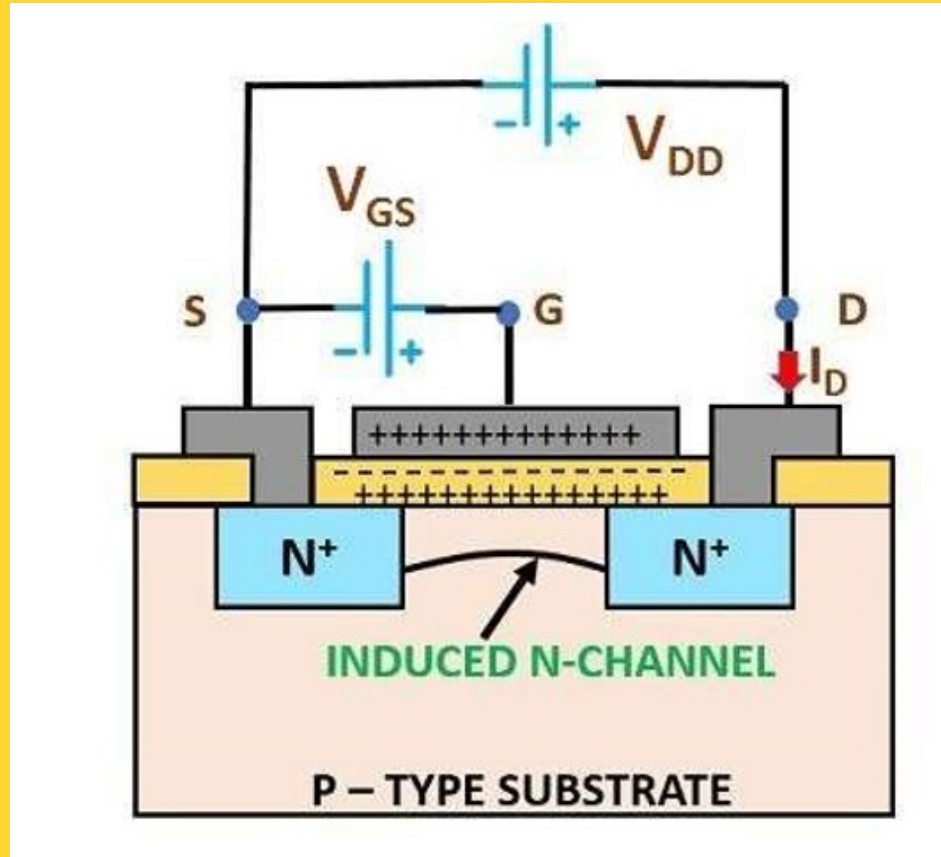


# P-Channel MOSFET



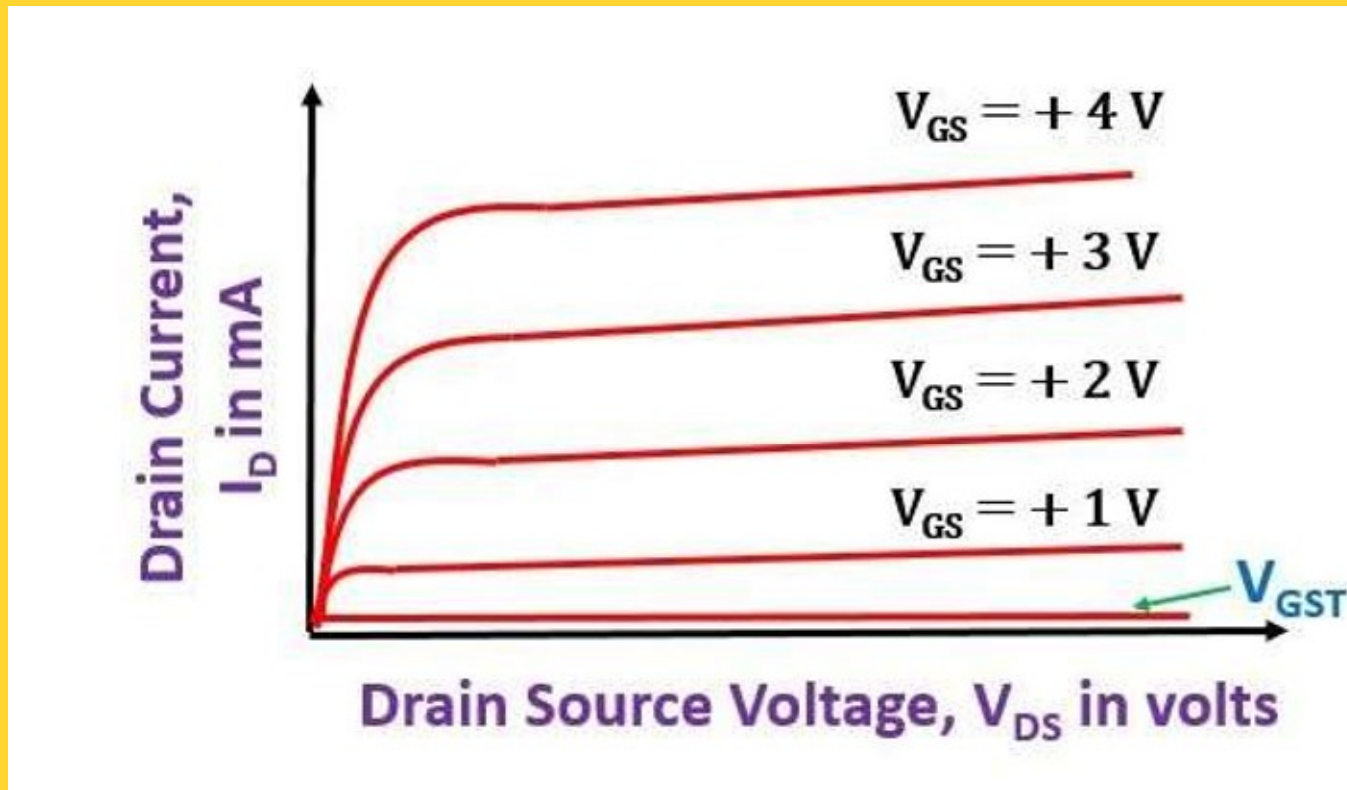


# Working of a Enhancement-type MOSFET





# Characteristic Curve of Enhancement MOSFET







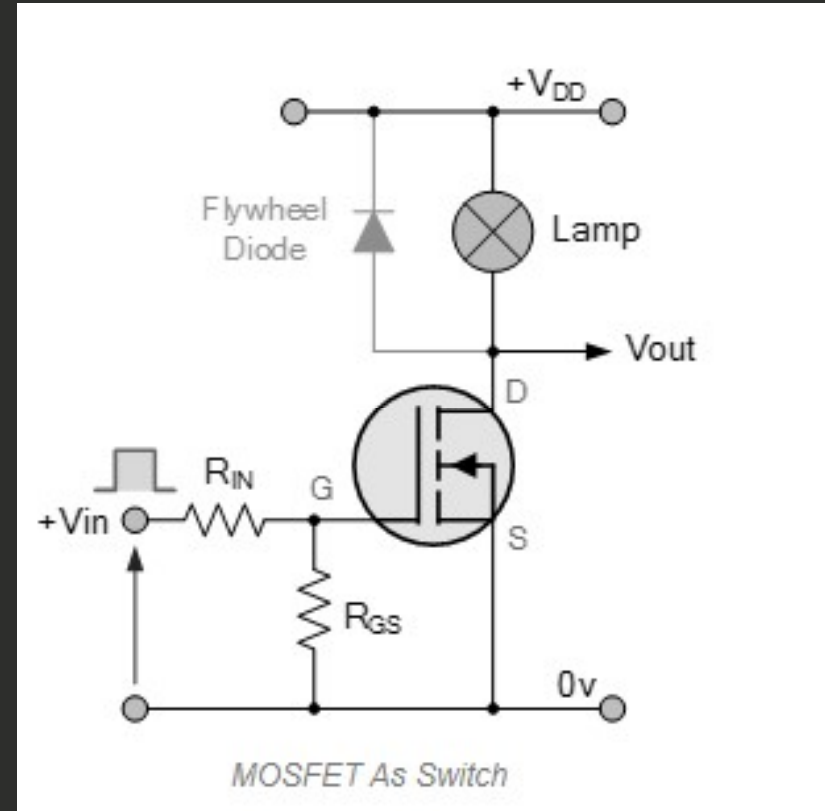
# Comparison between BJT, FET and MOSFET

TERMS	BJT	FET	MOSFET
Device type	Current controlled	Voltage controlled	Voltage Controlled
Current flow	Bipolar	Unipolar	Unipolar
Terminals	Not interchangeable	Interchangeable	Interchangeable
Operational modes	No modes	Depletion mode only	Both Enhancement and Depletion modes
Input impedance	Low	High	Very high
Output resistance	Moderate	Moderate	Low
Operational speed	Low	Moderate	High
Noise	High	Low	Low
Thermal stability	Low	Better	High



## Applications

- Amplifiers
- Regulation for DC Motors
- Constructions of Chopper Amplifiers
- Switching and Amplifying Signals
- Example of MOSFET as a Switch





## ASSESSMENT



1.If a MOSFET is to be used in the making of an amplifier then it must work in

- a) Cut-off region
- b) Triode region
- c) Saturation region
- d) Both cut-off and triode region can be used

Answer: c

Explanation: Only in the saturation region a MOSFET can operate as an amplifier.

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2. For MOSFET is to be used as a switch then it must operate in

- a) Cut-off region
- b) Triode region
- c) Saturation region
- d) Both cut-off and triode region can be used

Answer: d

Explanation: In both regions it can perform the task of a switch.



# THANK YOU