



# **SNS COLLEGE OF TECHNOLOGY**

**(An Autonomous Institution)**



**COIMBATORE-35**

**Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai**

**DEPARTMENT OF BIOMEDICAL ENGINEERING**

**COURSE NAME: 19EIB201/ ELECTRONIC DEVICES**

**II YEAR / III SEMESTER**

**Unit 1 – Transistors**

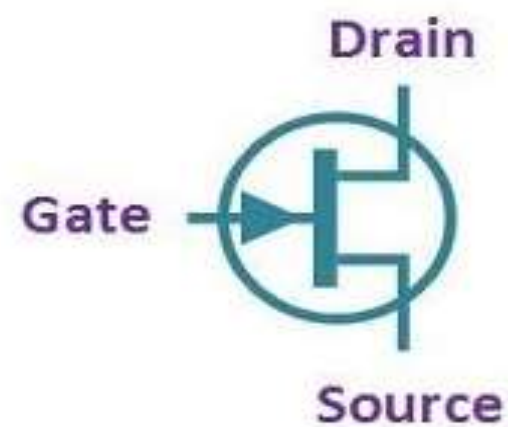
**Topic 2: JFET**



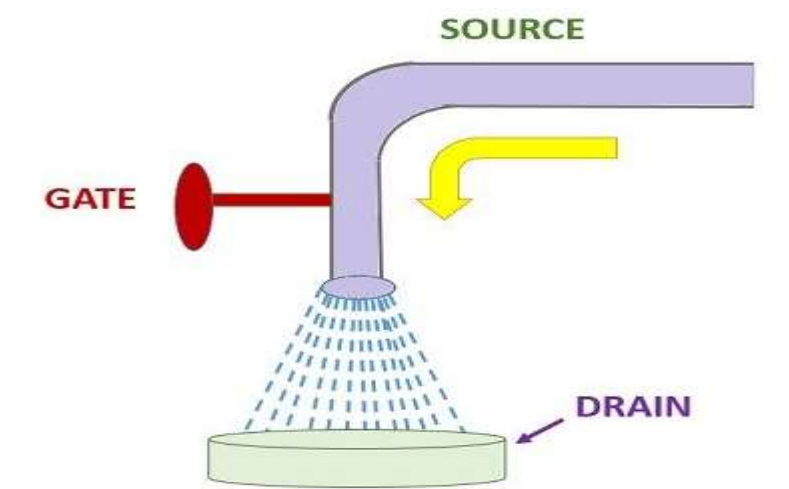


# FET

- FET is an acronym used for “field effect transistor”. It is a three terminal unipolar device in which conduction is manipulated with the help of applied electric field.
- It is also referred as a voltage controlled device in which only majority charge carriers are involved in the conduction mechanism. It comprises of three terminals, i.e. source, gate, and drain.



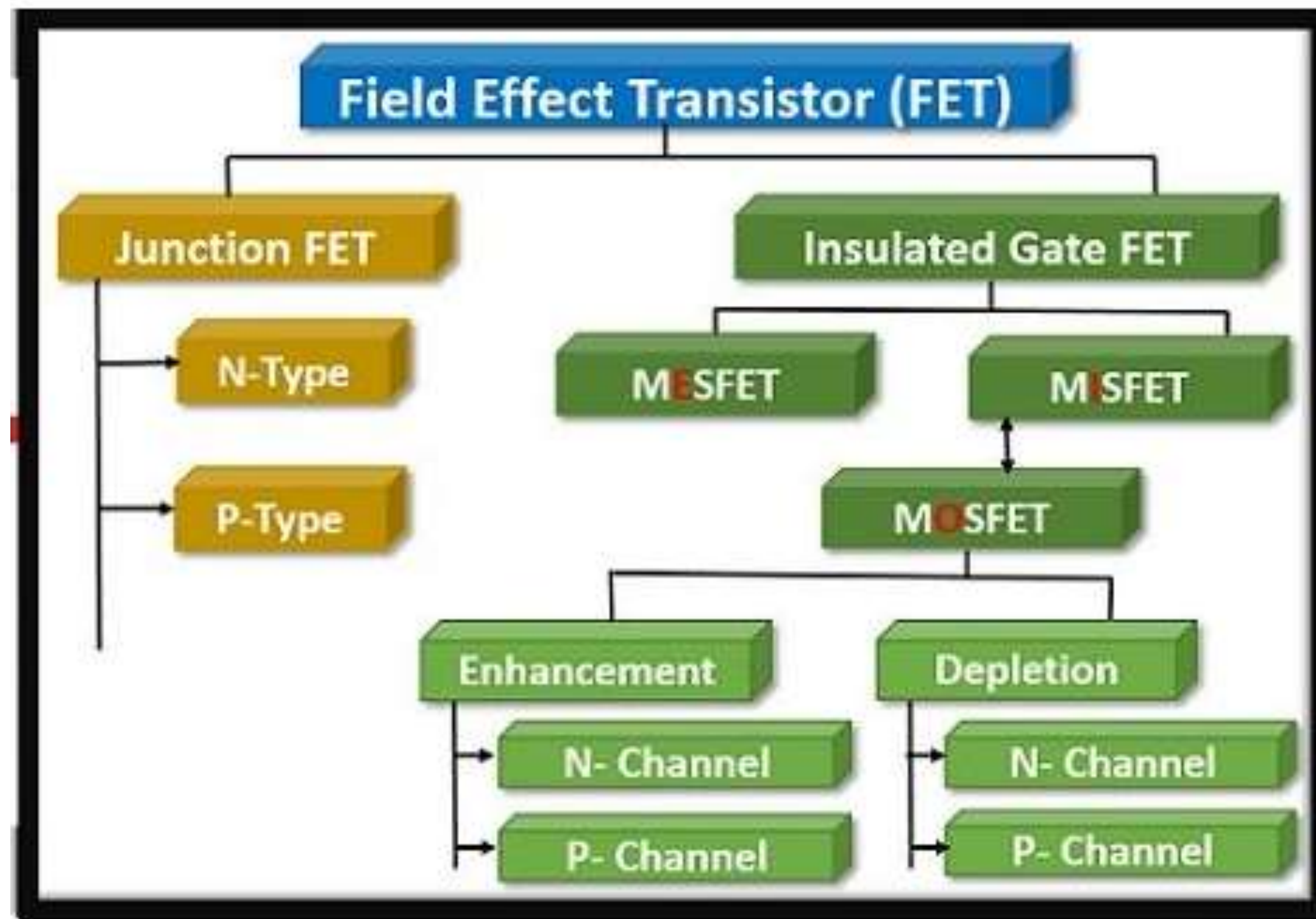
FET Circuit Symbol



Water Analogy for Understanding FET



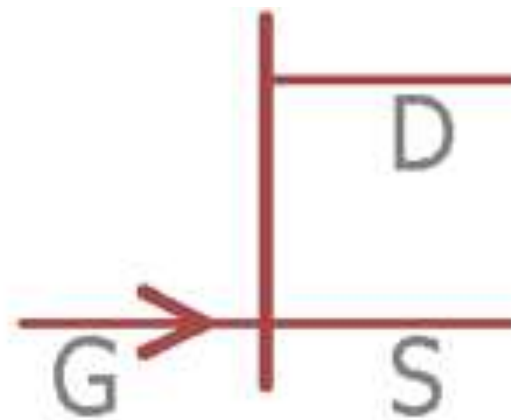
# FET



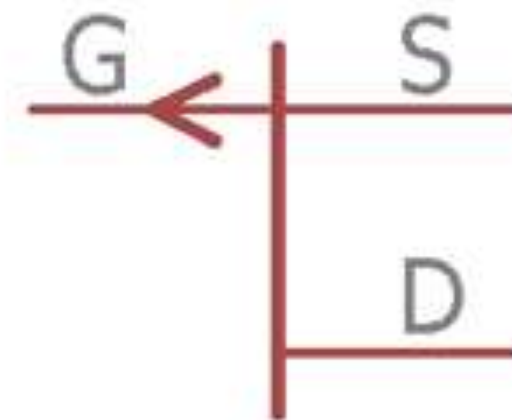


# JFET

- **JFET is Junction gate field-effect transistor.** Normal transistor is a current controlled device which needs current for biasing, whereas JFET is a voltage controlled device.



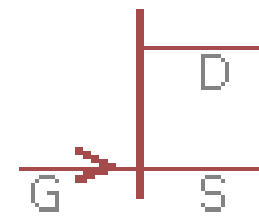
N-Channel JFET



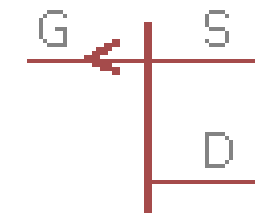
P-Channel JFET



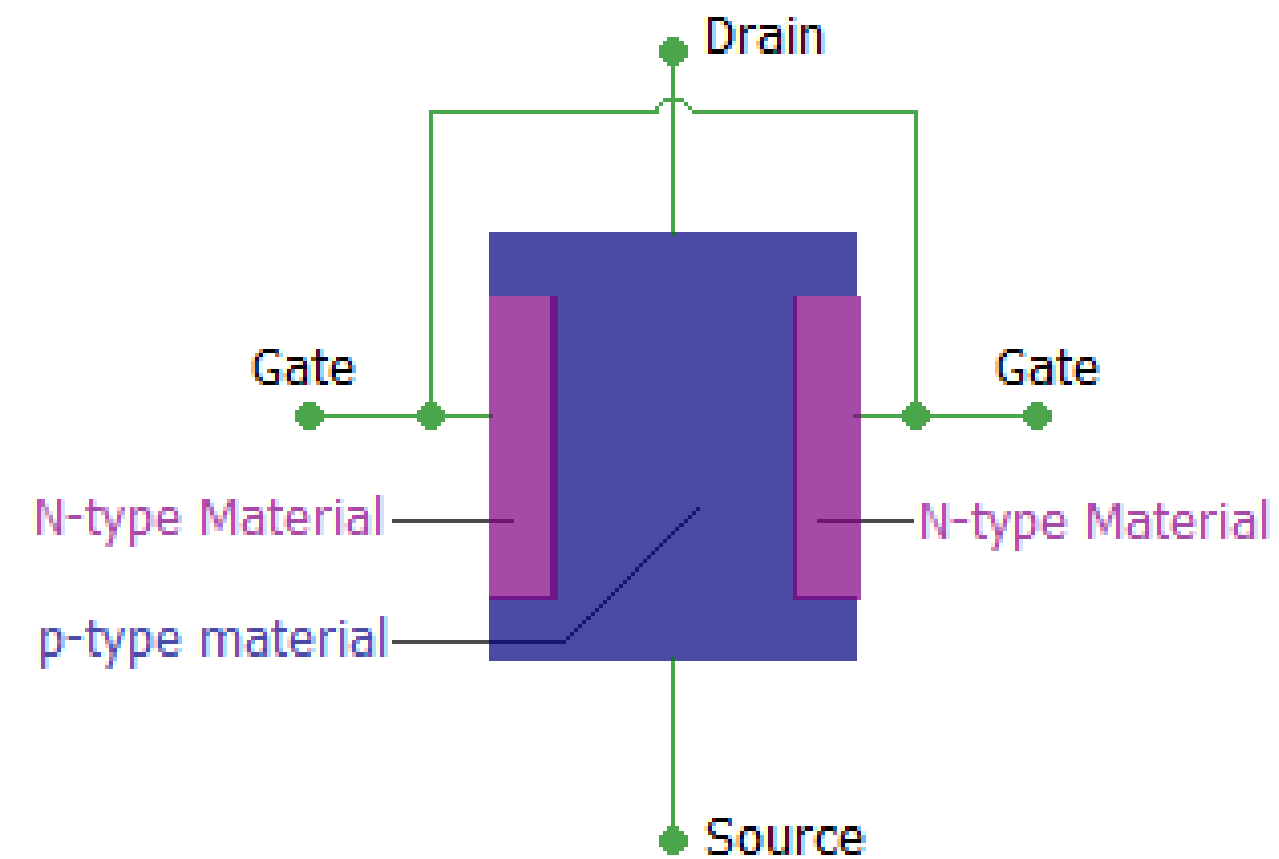
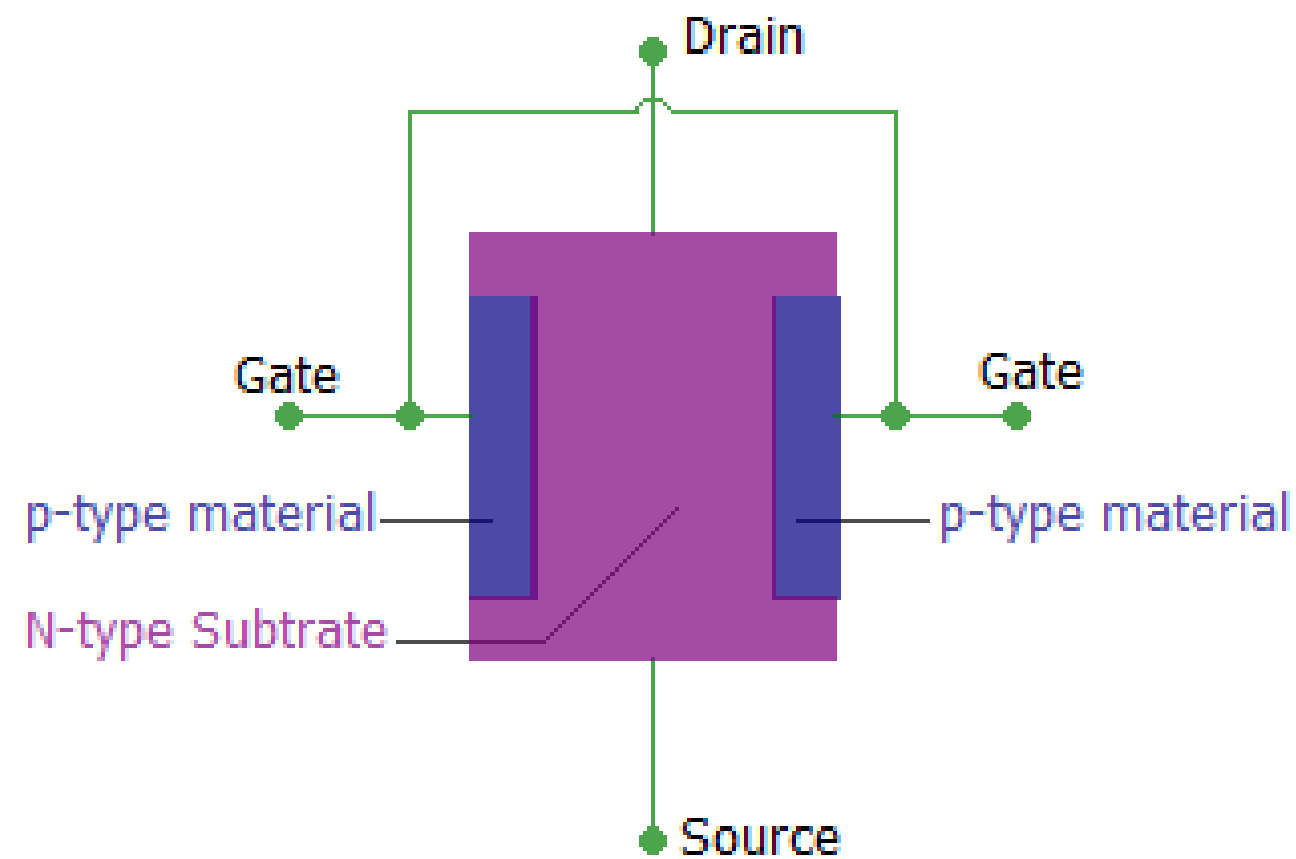
# Construction



N-Channel JFET

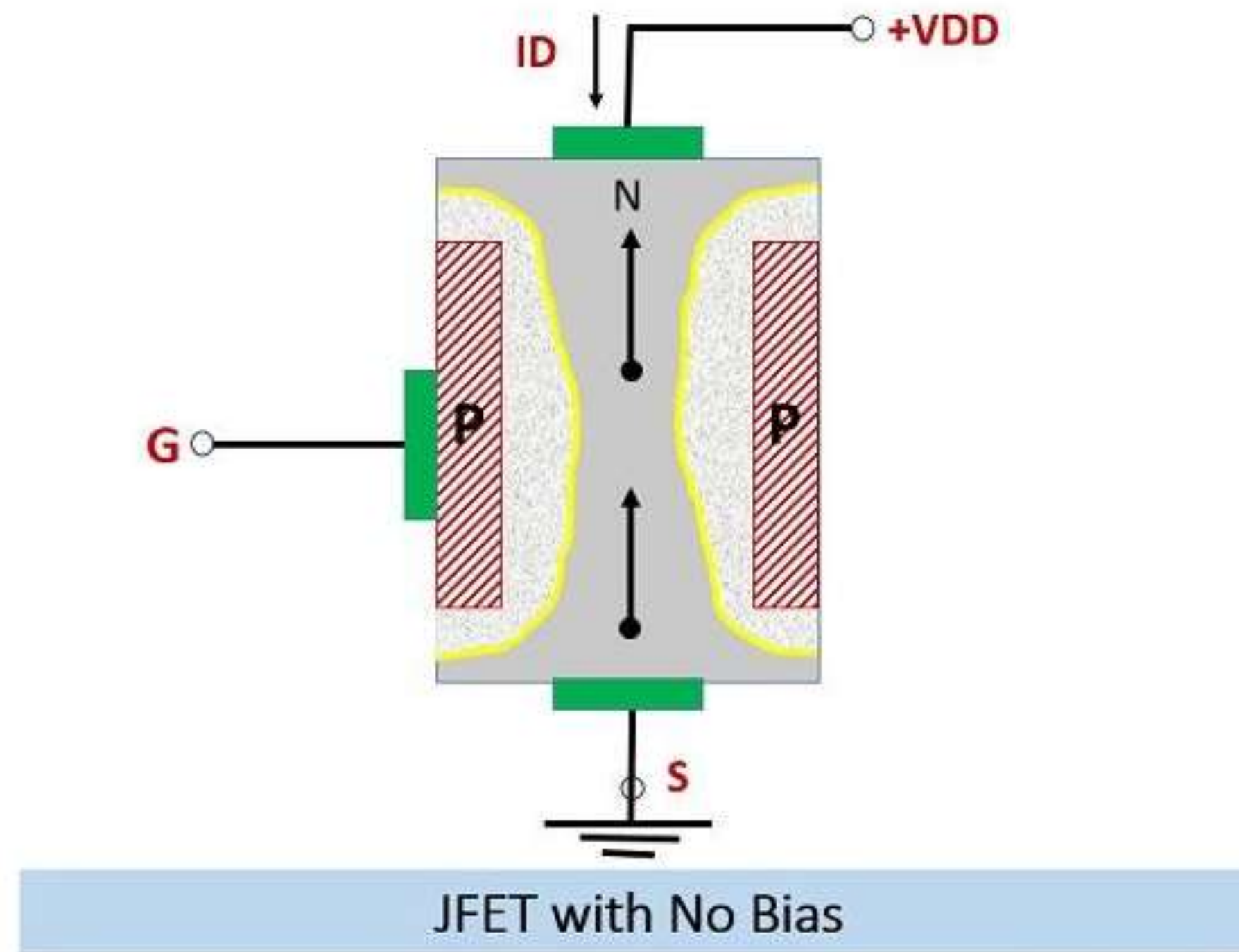


P-Channel JFET



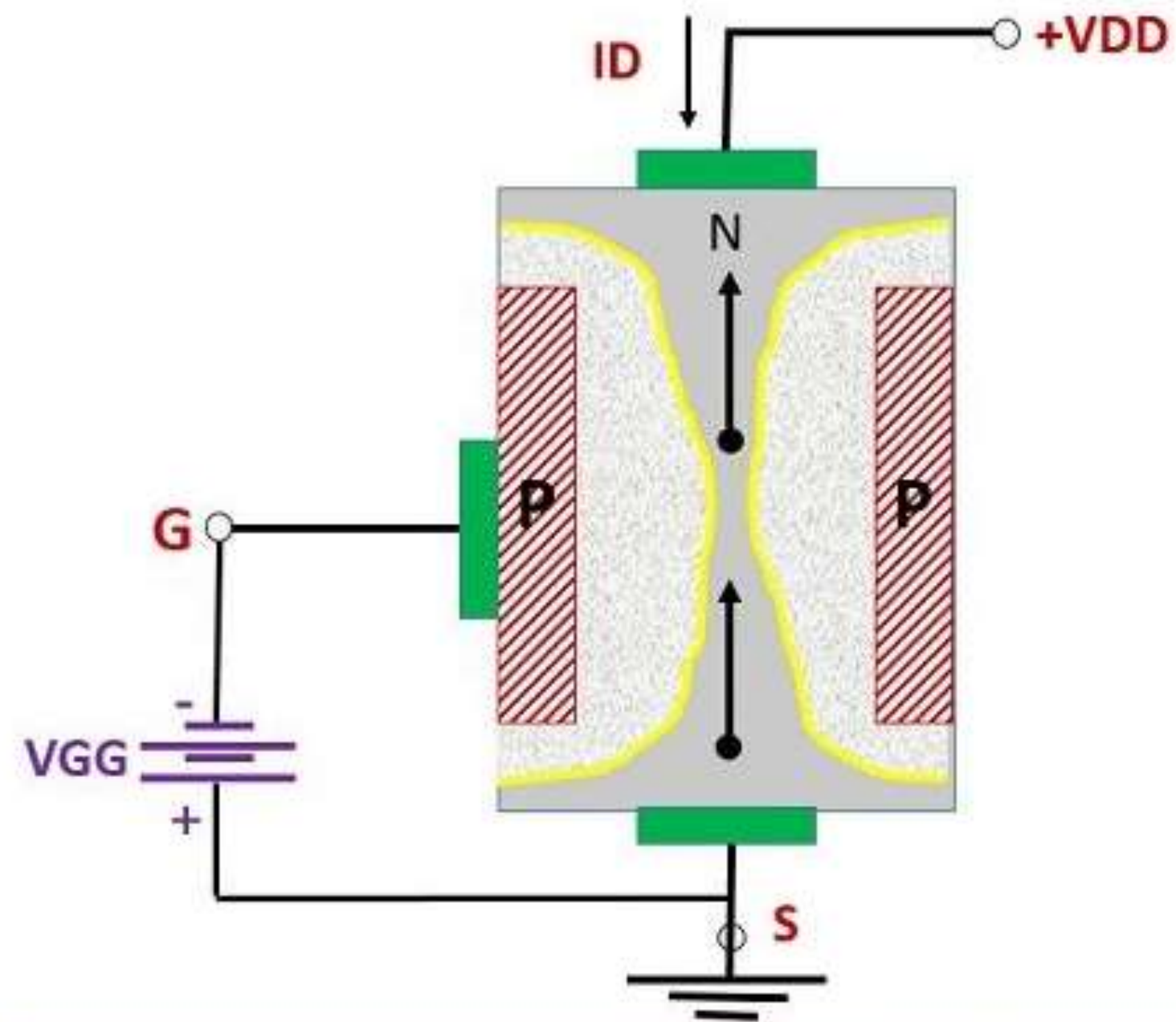


# Working of JFET- When NO bias is applied





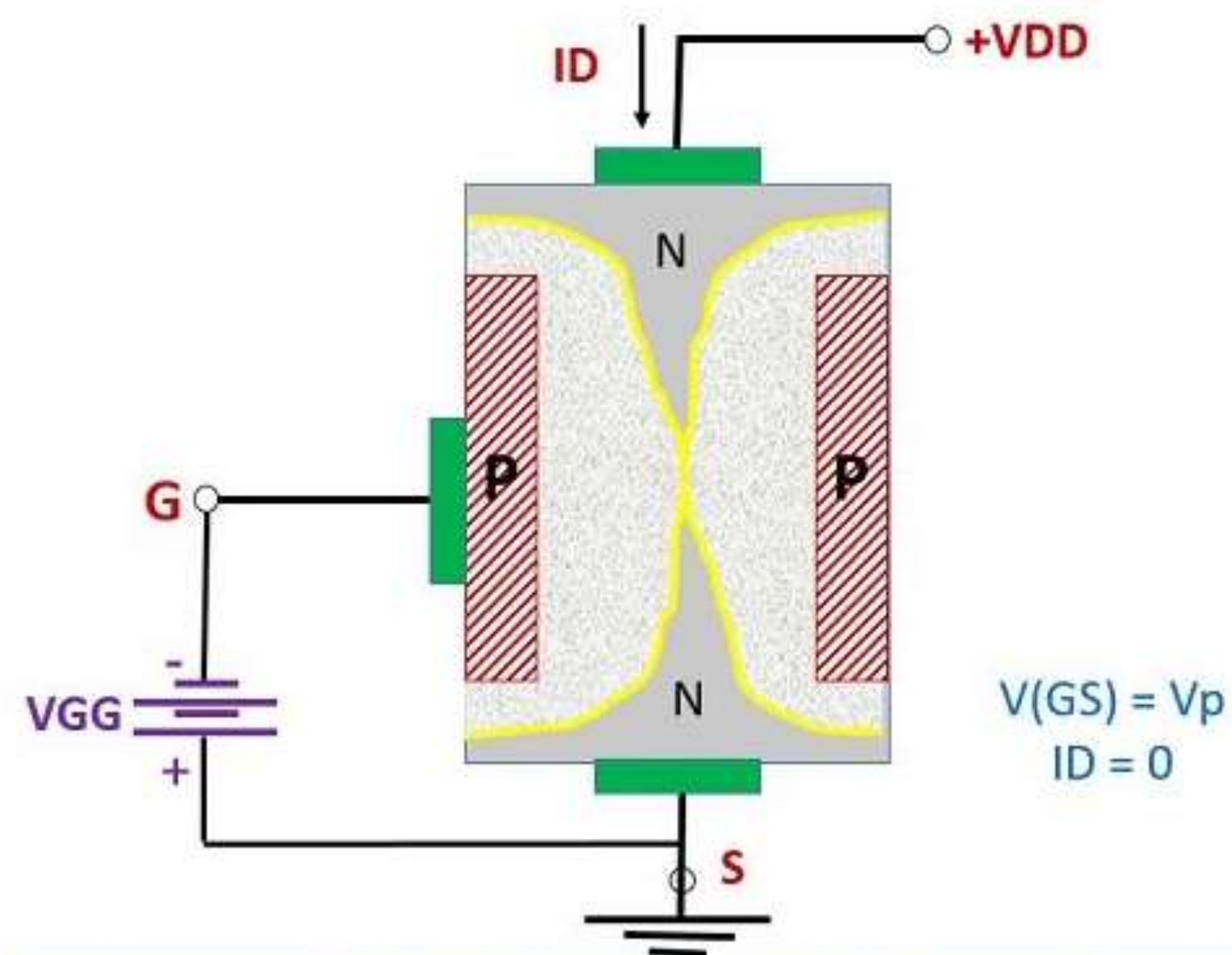
# Working of JFET- When small negative bias is applied



JFET with Small Negative Bias



# Working of JFET- When the Large negative bias is applied

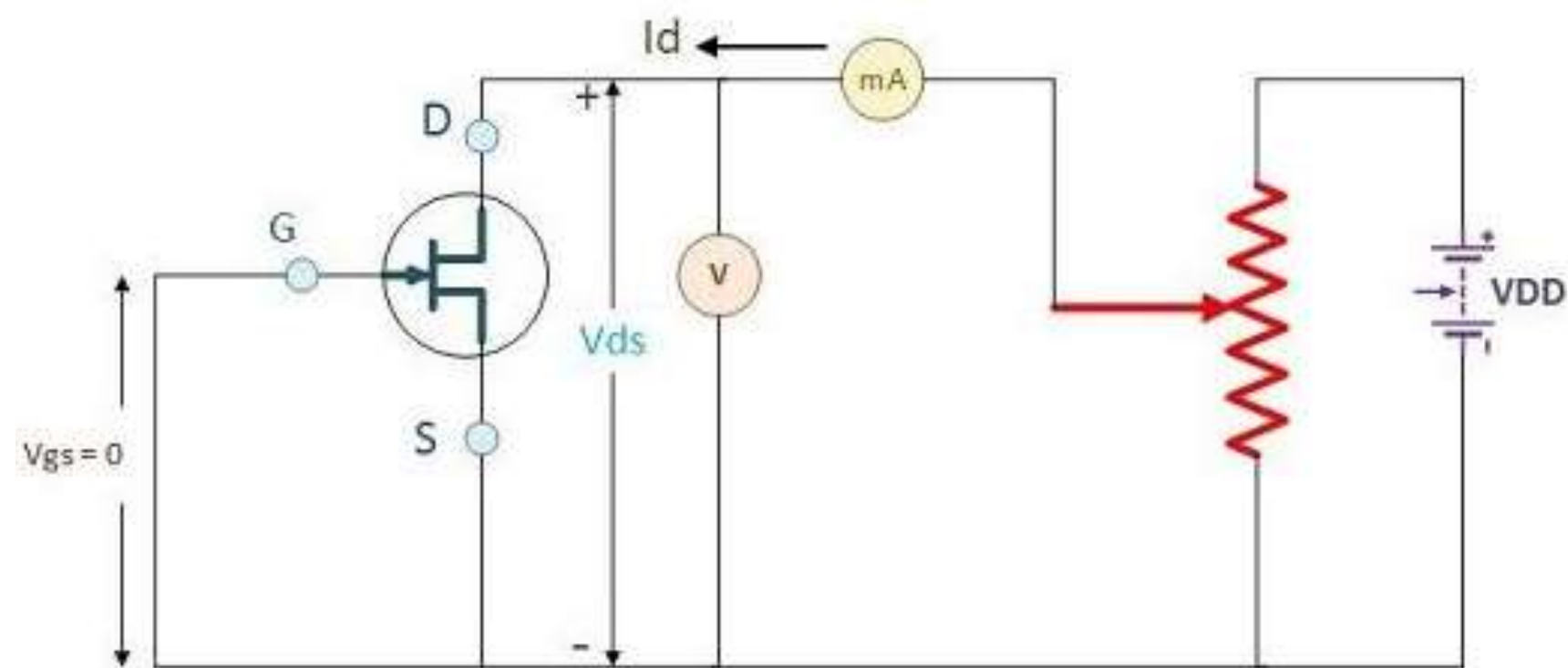


JFET with Large Negative Bias

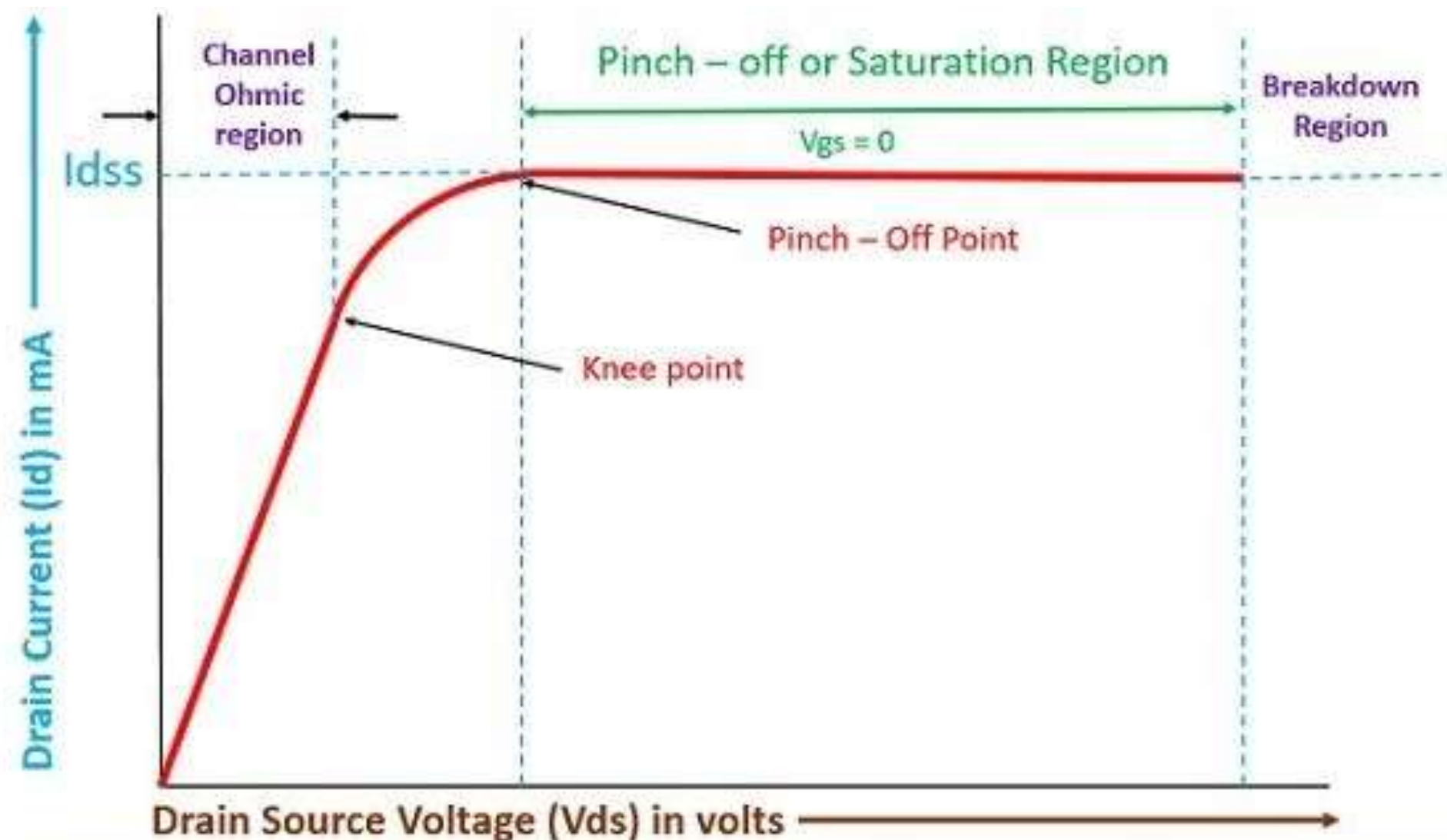




# Characteristics of JFET- Output Characteristics or Drain Characteristics



Circuit Diagram for determining drain characteristics with shorted gate for an N-channel JFET



JFET Output Characteristics with Shorted gate



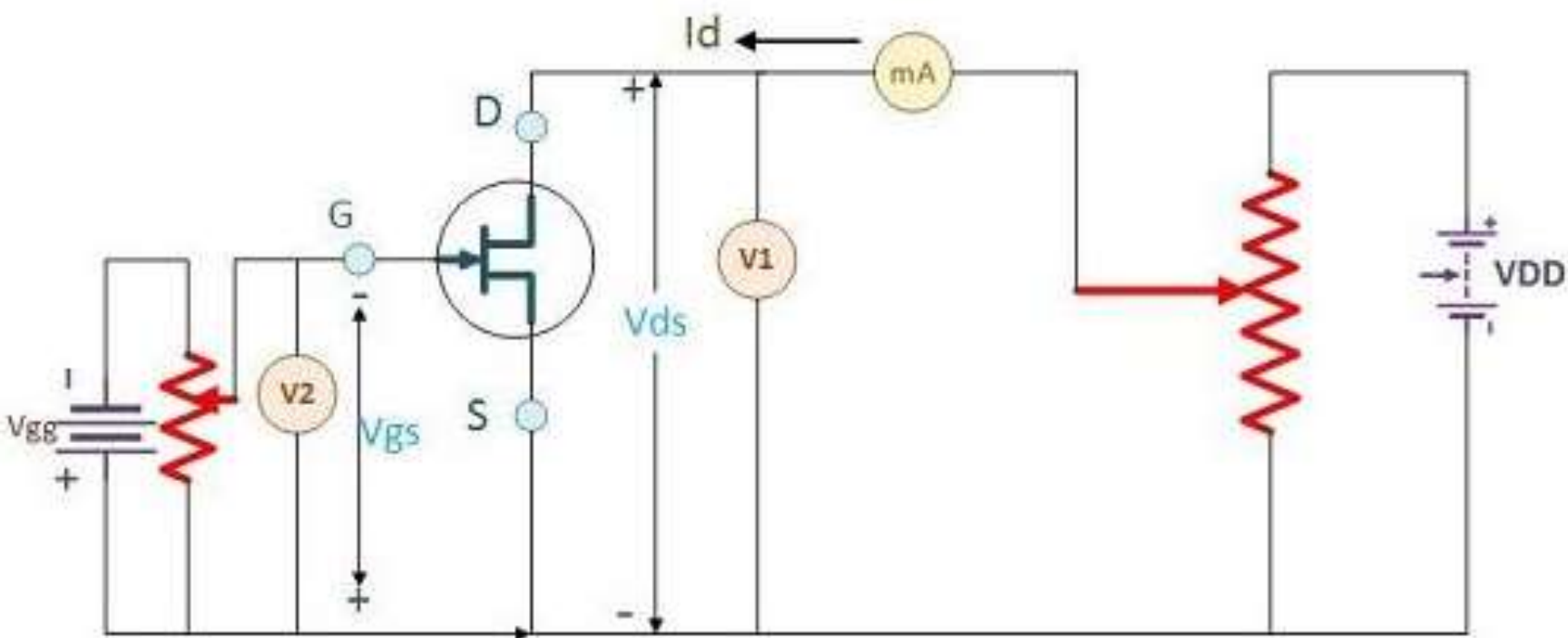
# Output Characteristics



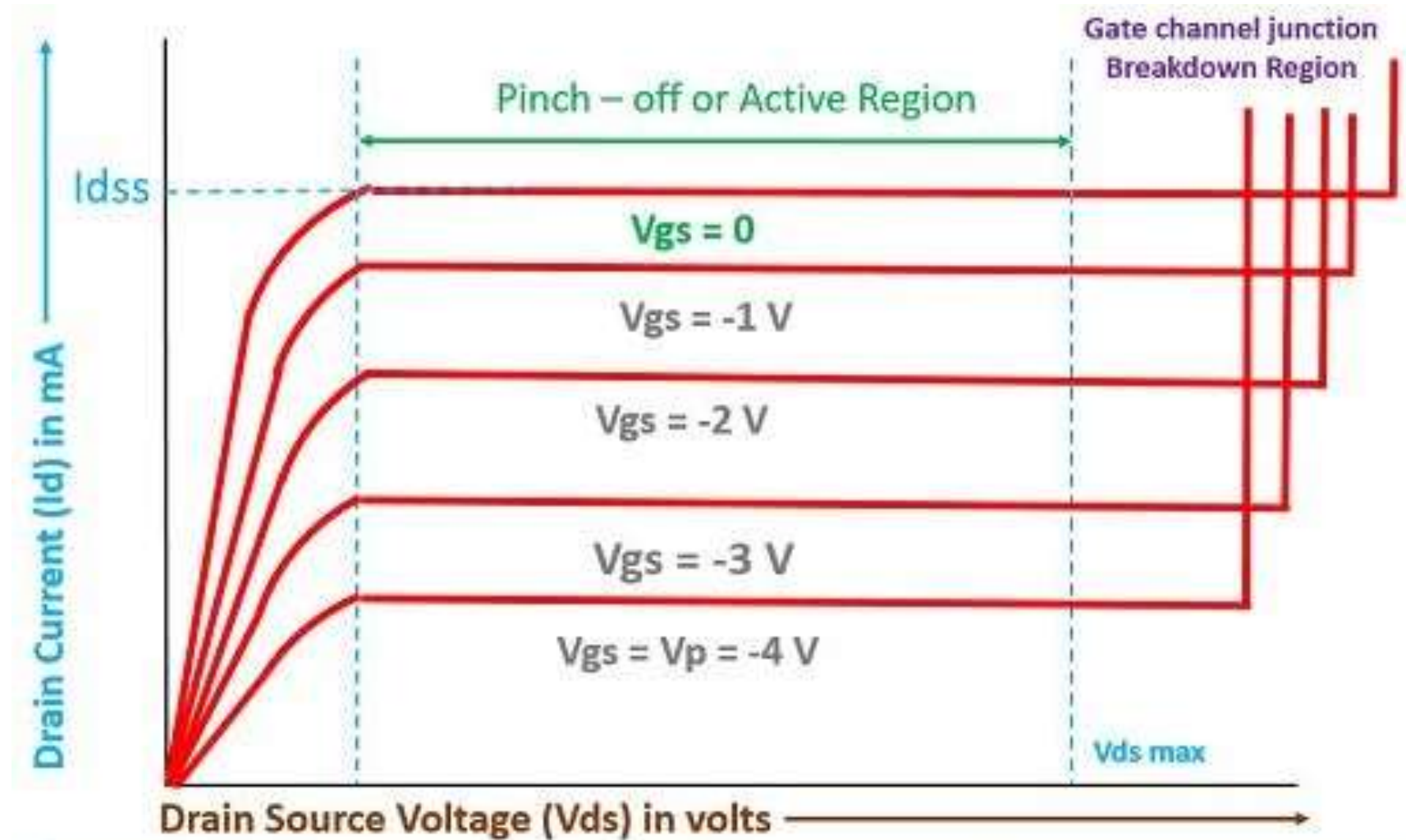
- **Knee Point:** There exists a point in the characteristics curve where the variation of drain current with drain-source voltage appears to be linear. But after this point, the linearity changes into a curve.
- **Channel Ohmic Region:** The region to the left of the knee point in the characteristics curve is the channel ohmic region.
- **Pinch-off point:** The point in the curve above which the drain current does not increase further no matter how much we are increasing the drain to source voltage, this point is termed as the pinch-off point.
- **Pinch-off Voltage:** The voltage at the pinch-off point is termed as pinch-off voltage because at this voltage the current is completely turned to be constant.
- **Drain-Source Saturation Current:** The drain to source saturation current is the current which becomes constant or completely enters a saturation state



# Output Characteristics – With external bias:



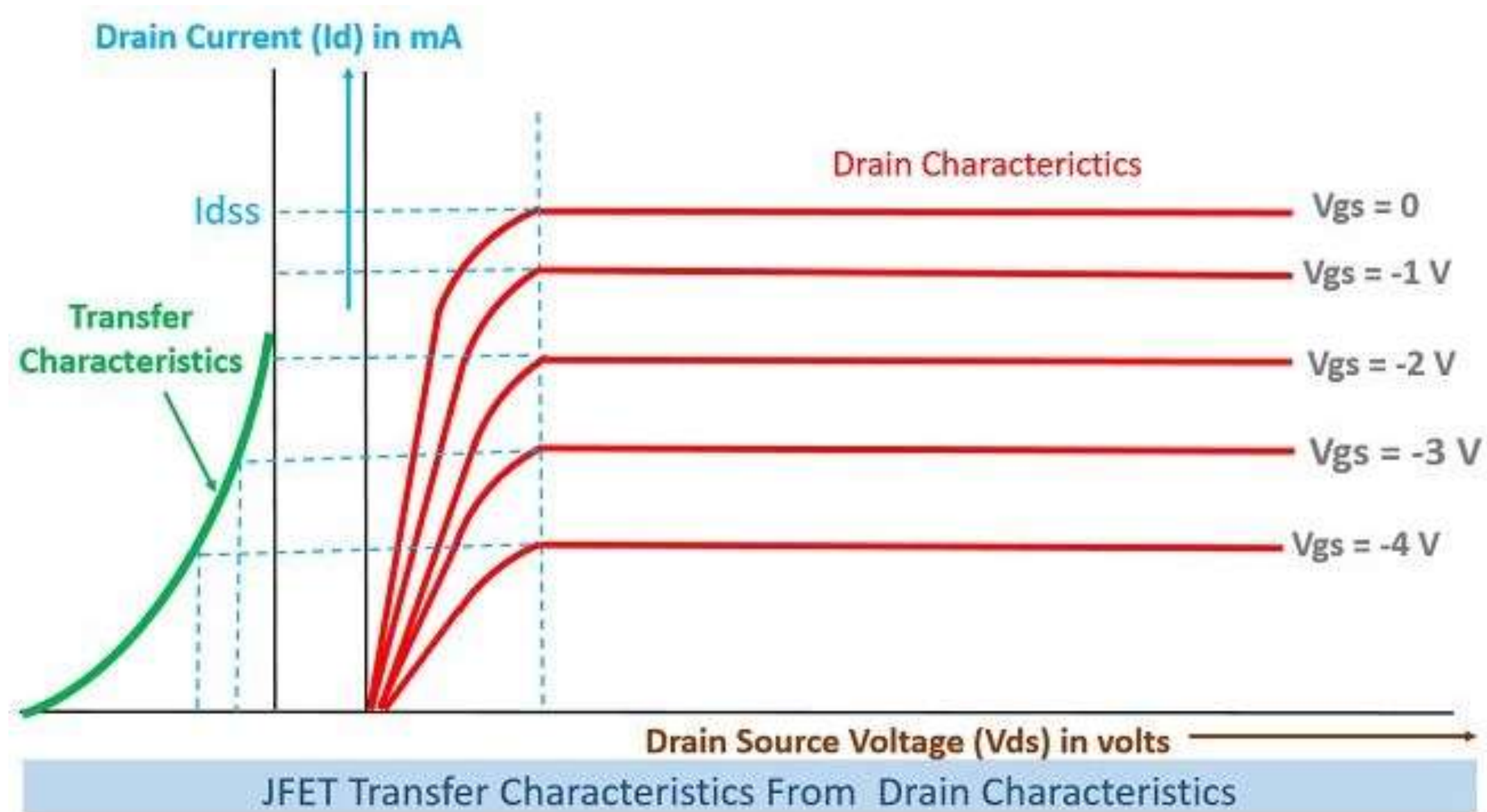
Circuit Diagram for determining drain characteristics with external bias for an N-channel JFET



JFET Output Characteristics with External Bias



# Transfer Characteristics





# SUMMARY



# ASSESSMENT

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Dear student,

Quiz is posted in your Google class room

Allotted time for quiz is 5 min

No of Questions is 10





KEEP  
LEARNING..  
**Thank u**

SEE YOU IN NEXT CLASS