



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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23EET104 / ANALOG ELECTRONICS CIRCUITS I YEAR / II SEMESTER



UNIT-II: MULTI JUNCTION DEVICES

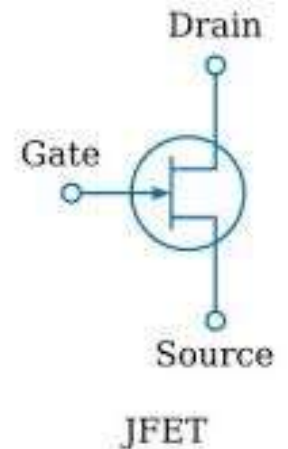
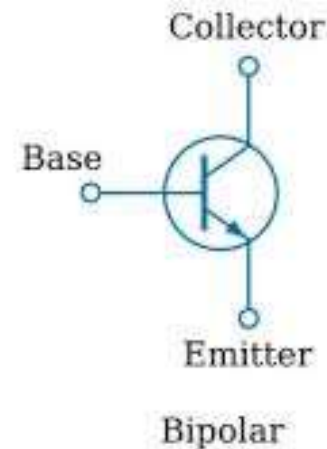
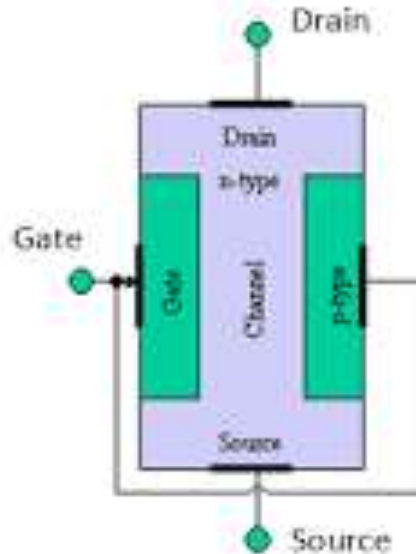
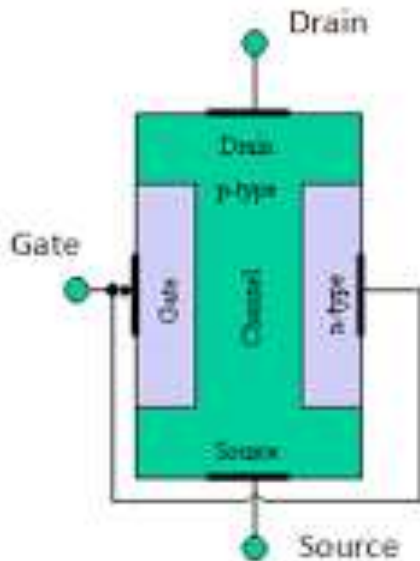
JFET



FET

- ❖ The Phenomenon of modulating the conductance of a semi conductor by applying an electric field in perpendicular to that – **Field Effect**.
- ❖ The disadvantage of BJT (more noise, low input impedance) is over come by FET
- ❖ JFET – **Junction Field Effect Transistor** – is a **unipolar** transistor controlled by GATE Voltage.

STRUCTURE and SYMBOL

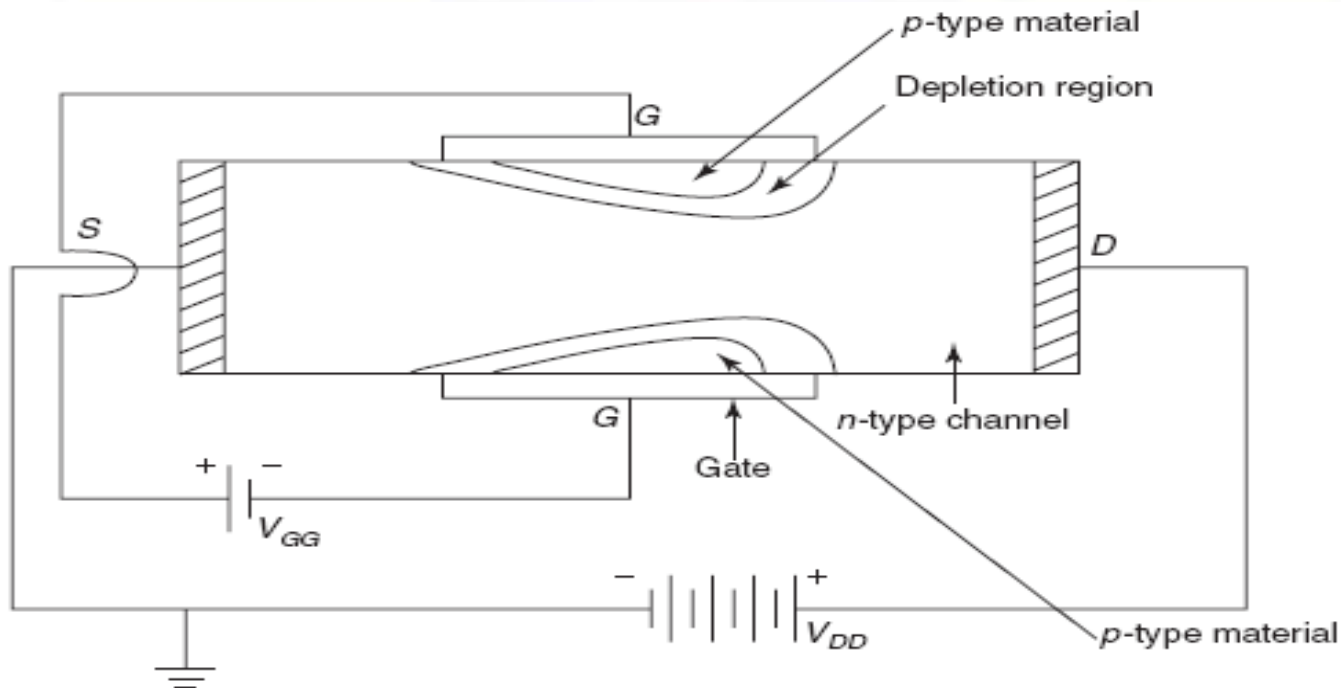




CONSTRUCTION OF THE JFET



- ❖ The JFET is a three-terminal device whose one terminal is capable of controlling the current between the other two.
- ❖ In JFETs, the width of a junction is used to control the effective cross-sectional area of the channel that conducts current.
- ❖ JFETs are basically of two types: *n-channel* and *p-channel*.

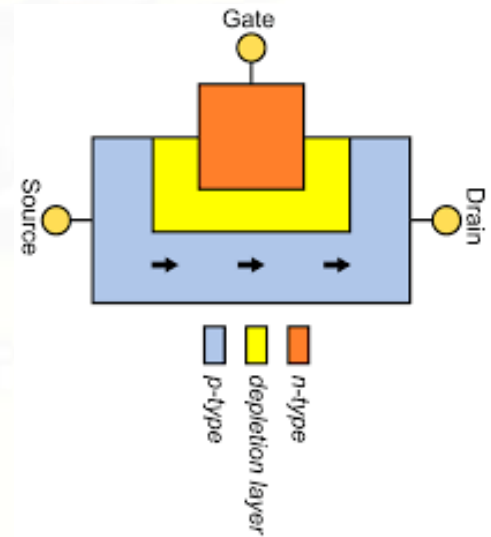
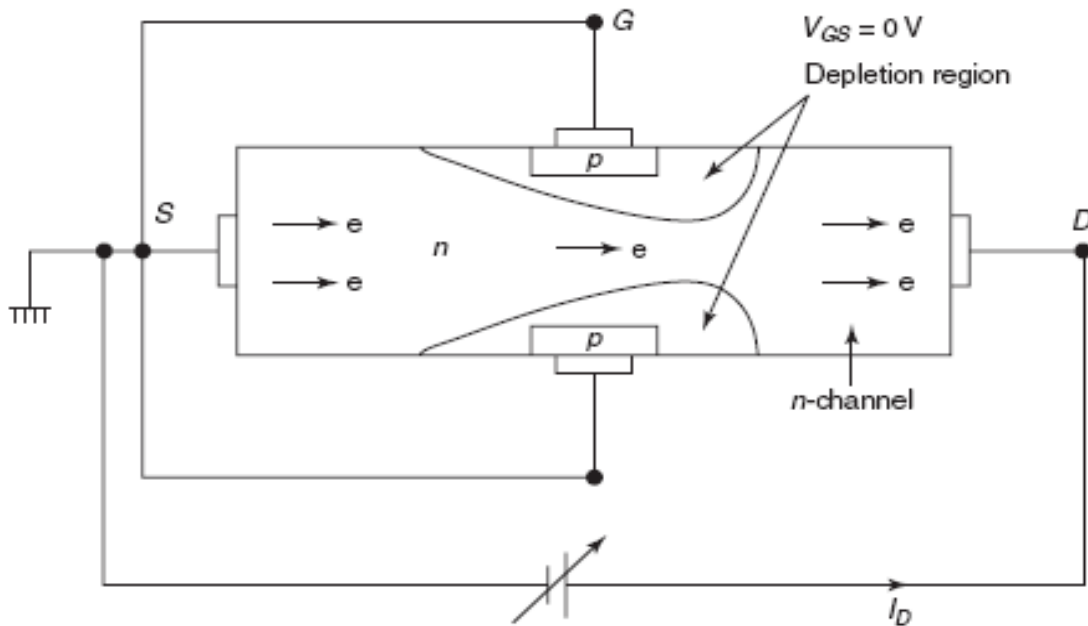




BIASING OF THE JFET



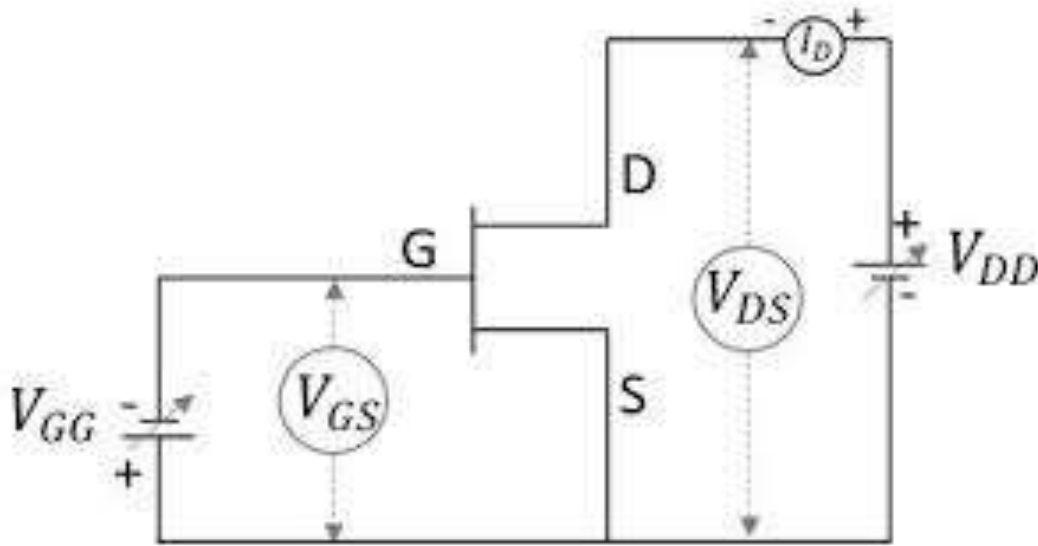
- ❖ Let us now study the operation of the device with respect to the characteristics of an ***n-channel JFET***.
- ❖ We shall consider two different cases in this regard.
- ❖ When $V_{GS} = 0\text{ V}$, V_{DS} some positive value: a positive voltage V_{DS} has been applied across the channel and the gate has been connected directly to the source to establish the condition $V_{GS} = 0\text{ V}$.





VI Ch. of JFET

- ❖ When $V_{GS} = 2\text{ V}$, with **negative biased**, then the depletion layer increases.
- ❖ At one instant, the depletion layer fully occupies and closes the channel called **Pinch off region**. Also called as constant (saturation) region.
- ❖ V_{DS} some positive value: a positive voltage V_{DS} has been applied across the channel and the gate has been connected directly to the source to establish the condition $V_{GS} = 0\text{ V}$.

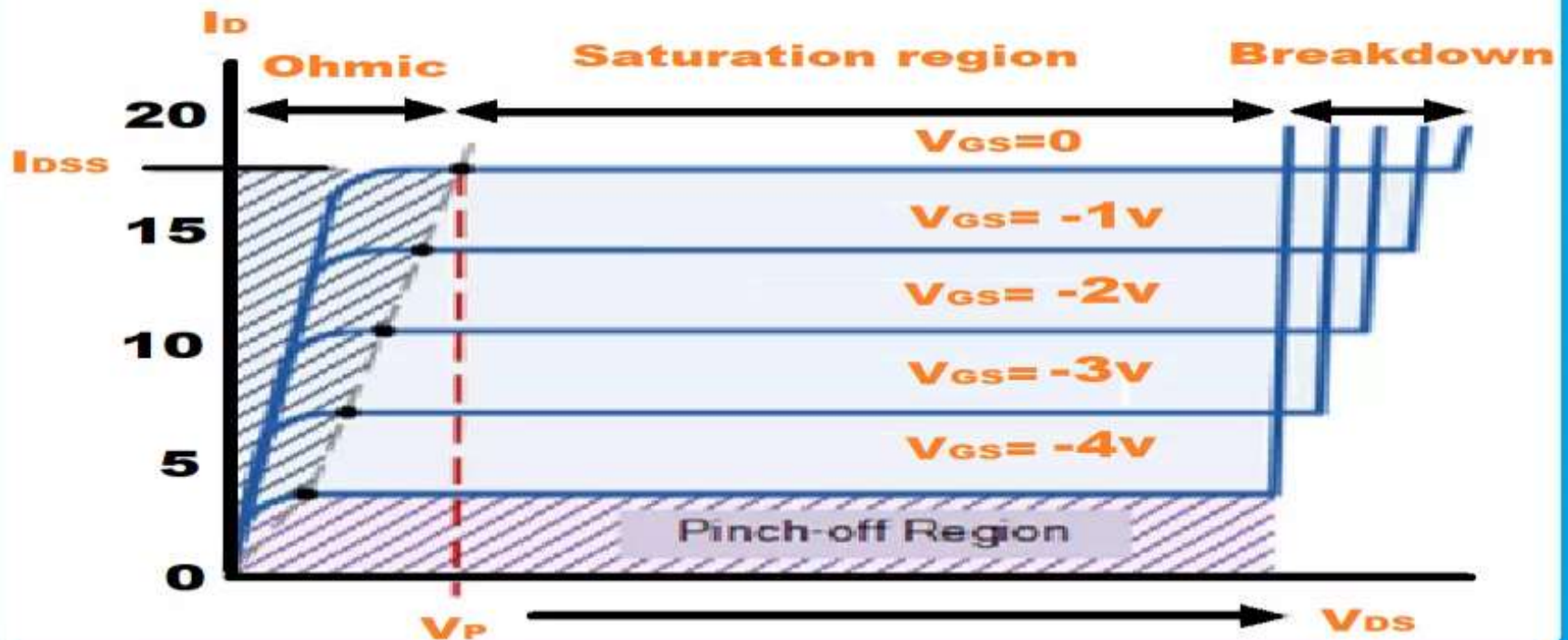




VI Characteristics

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Characteristics of FET





BJT Vs JFET

S.No	BJT	JFET
1.	Low input impedance	High input impedance
2.	High output impedance	Low output impedance
3.	Bipolar device	Unipolar device
4.	Noise is more	Less noise
5.	Cheaper	Costlier
6.	Gain is more	Less gain
7.	Current controlled device	Voltage controlled device

