



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)



COIMBATORE-35

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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: UJT

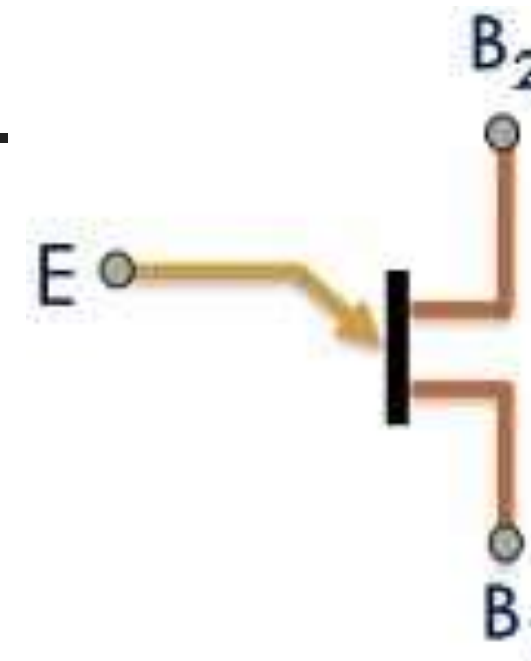




UNI JUNCTION TRANSISTOR

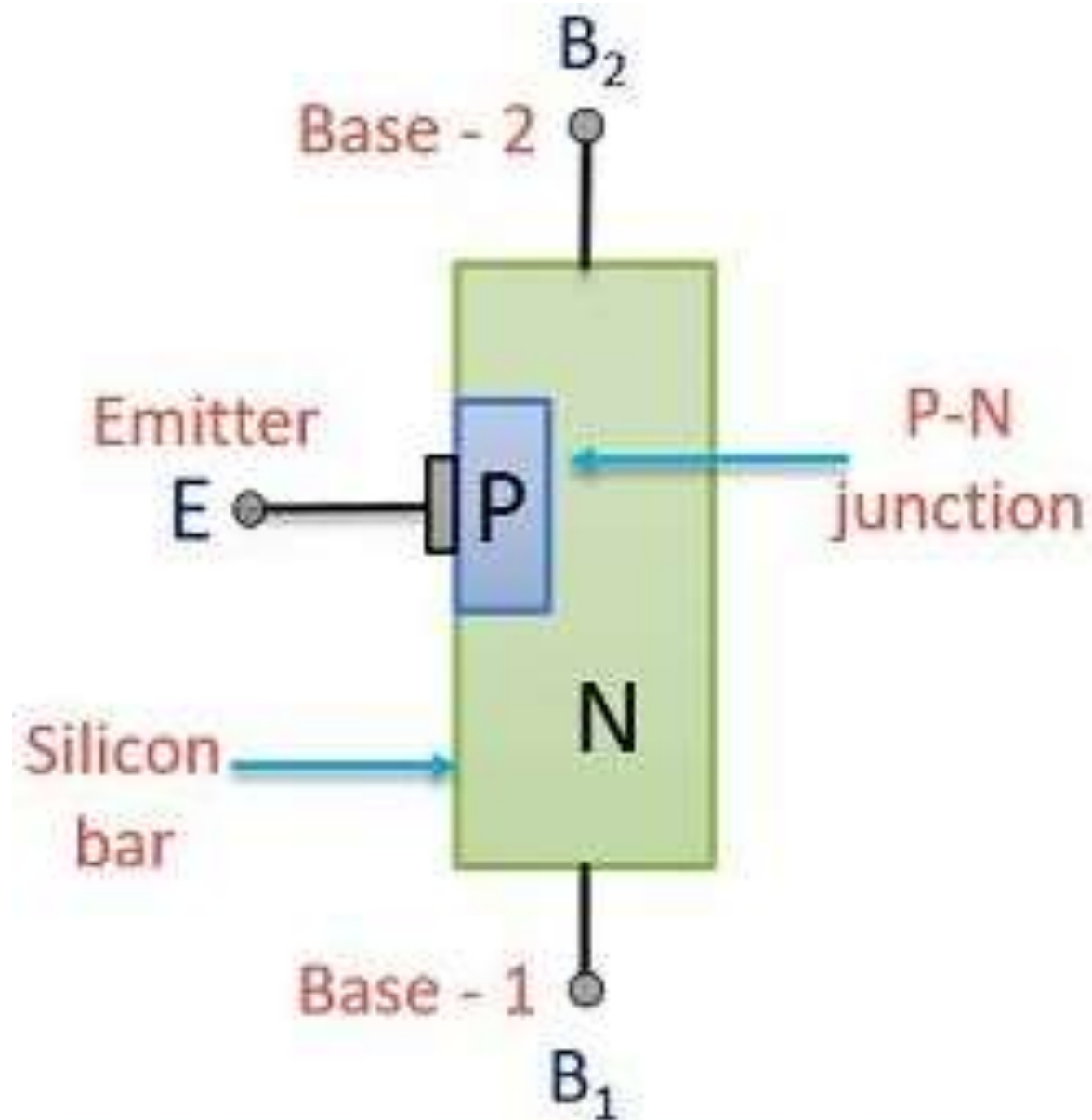


- Unijunction Transistor is a semiconductor switching device having 2 layers and 3 terminals and is abbreviated as UJT.
- It is called so because of the presence of only one junction.
- It has the ability to limit large power with a small input signal and is also known as a **double base diode**.
- UJT is a device that possesses negative resistance characteristic that means its emitter current rises regeneratively when triggered. Thus an emitter supply is needed in order to restrict it.





Construction of UJT

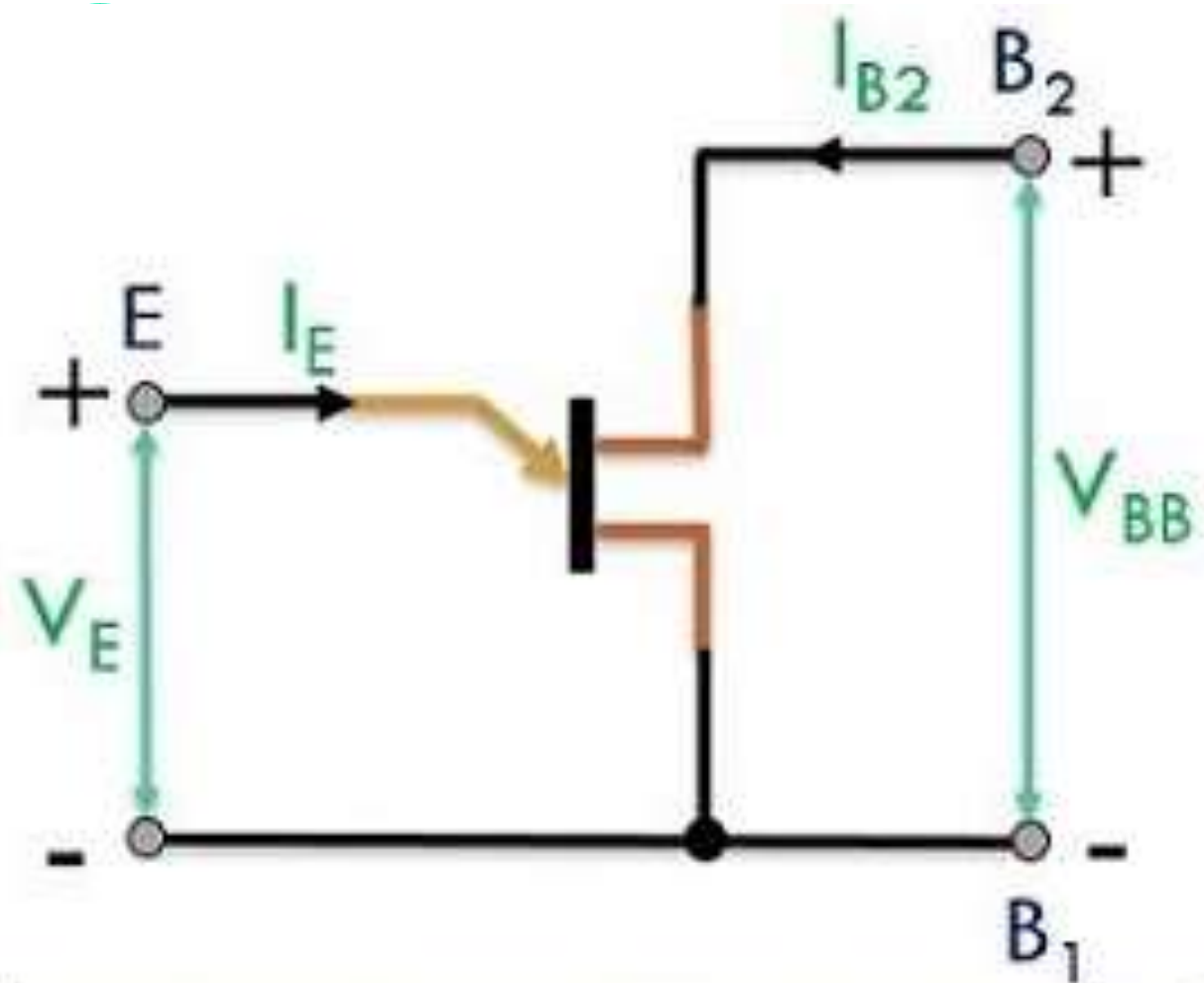


Basic structure of UJT

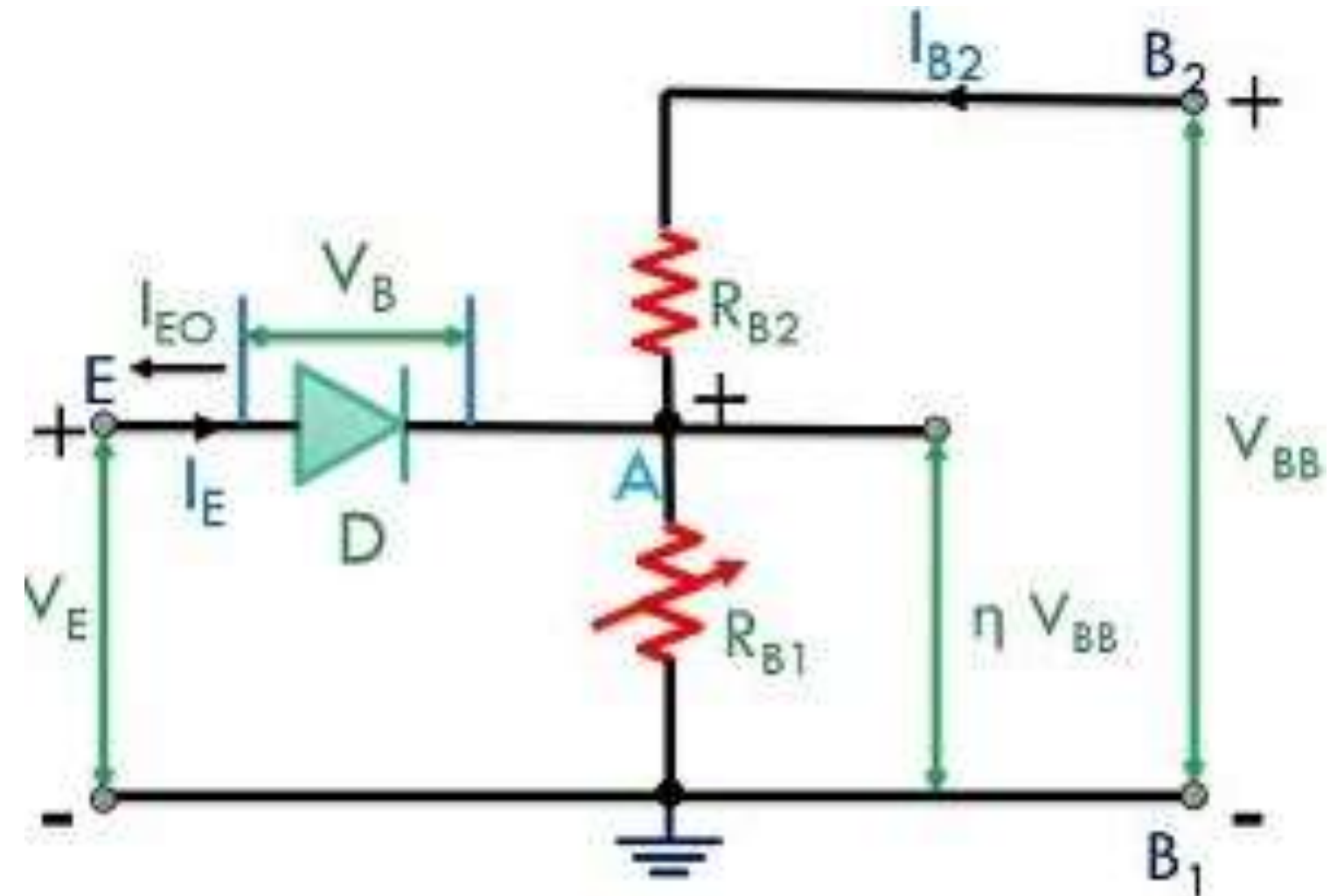
- Its structure is almost similar to an N-channel JFET. UJT consists of a lightly doped N-type silicon bar in which a P-type material is diffused thus producing PN junction.
- Due to the existence of a single PN junction, it is termed as a Unijunction device.
- It consists of two ohmic contacts at the end of the bar which is labelled as base 1 (B1) and base 2 (B2).
- Emitter region is closer to B2 in order to have the optimum electrical characteristic.



Basic arrangement of a UJT



Basic UJT arrangement



Equivalent circuit of UJT



Working of a UJT

- The two resistor of the circuit together constitutes the total resistance which is the resistance between B2 and B1 where the emitter is kept open is known as **Interbase resistance R_{BB}** .

$$R_{BB} = R_{B1} + R_{B2}$$

- Normally the value of RB1 is greater than that of RB2.

$$V_A = V_{BB} \times \frac{R_{B1}}{R_{B1} + R_{B2}}$$

$$V_A = \eta V_{BB}, \quad \text{where } \eta \text{ is the intrinsic standoff ratio}$$



Working of a UJT

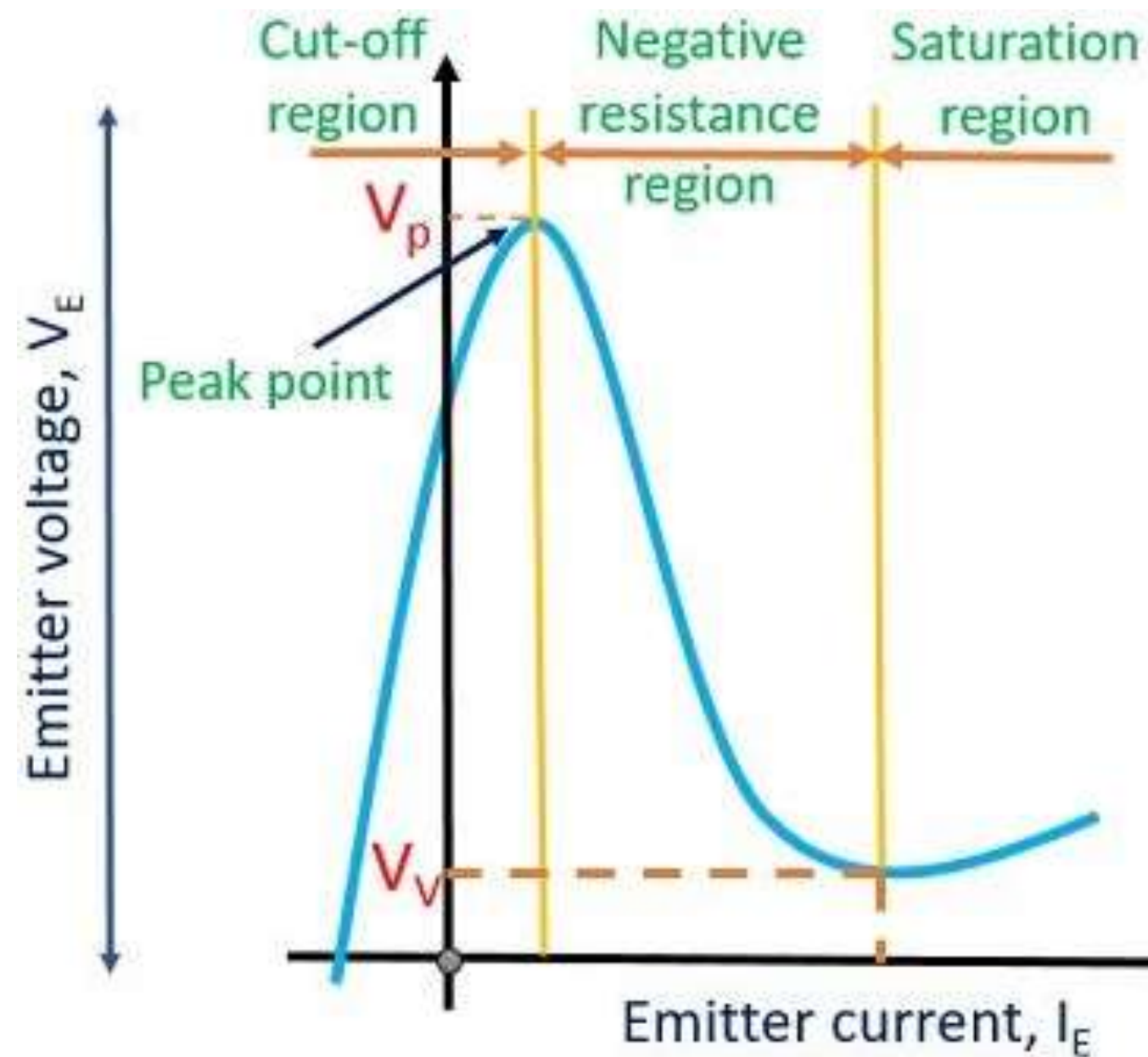
- Consider a condition when there is no emitter potential supplied to the circuit. In such a case the diode gets reverse biased.

$$V_A + V_B = \eta V_{BB} + V_B$$

- On proceeding further, if the emitter potential is increased more, the diode will now get forward biased. The emitter potential that puts the diode in forward biased condition is known as **peak point voltage** and is denoted by V_p .
- The minimum value of I_E to trigger the device is known as **peak point current** of the emitter terminal denoted by I_p .



Characteristics of Unijunction transistor



Emitter characteristic of UJT



SUMMARY



KEEP
LEARNING..
Thank u

SEE YOU IN NEXT CLASS