



# **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 ELECTRONICS & COMMUNICATION ENGINEERING**

### **19ECB311- OPTICAL AND MICROWAVE ENGINEERING**

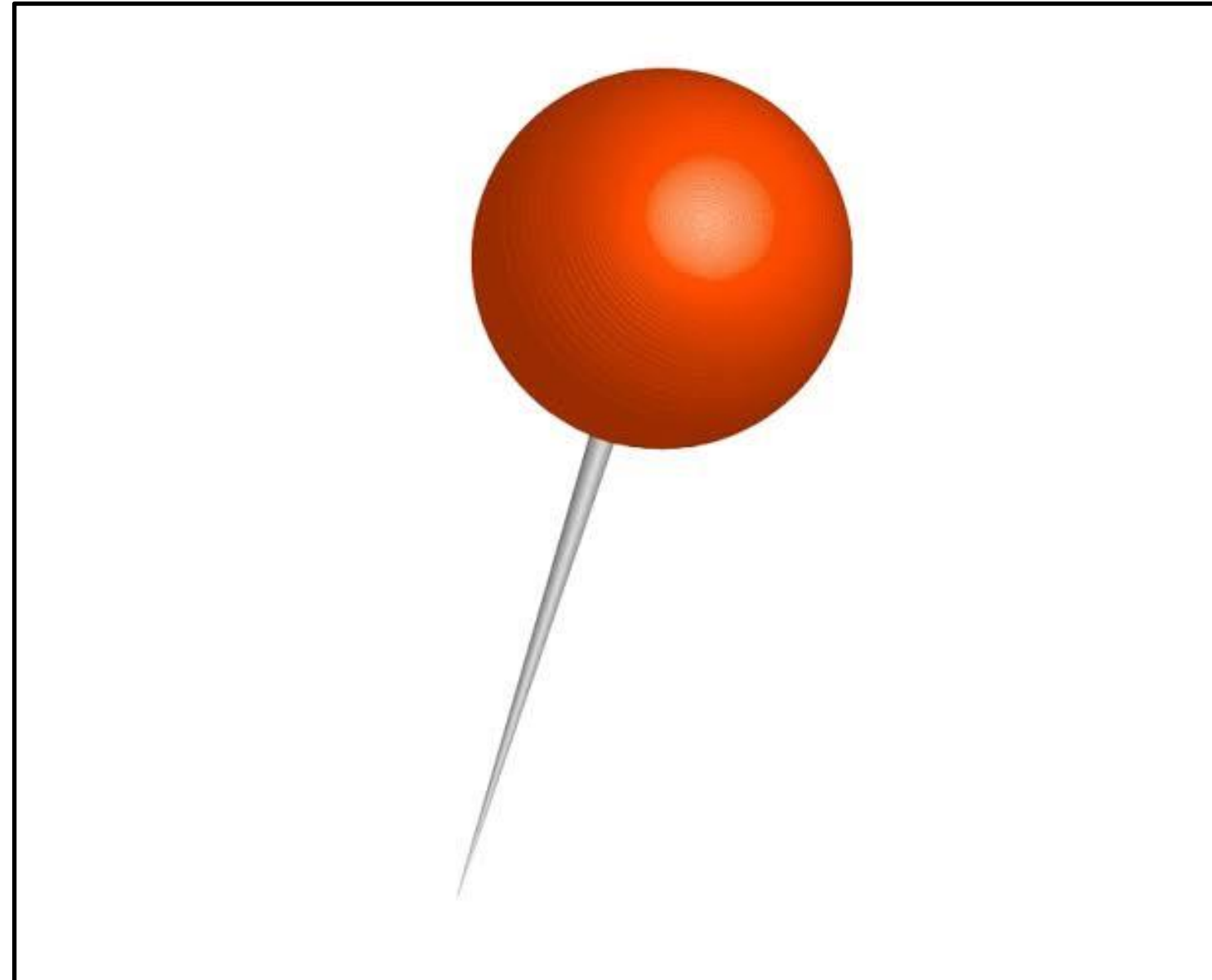
III YEAR/ VI SEMESTER

UNIT II-MICROWAVE ACTIVE DEVICES

TOPIC 3-PIN DIODE



# Guess the TOPIC





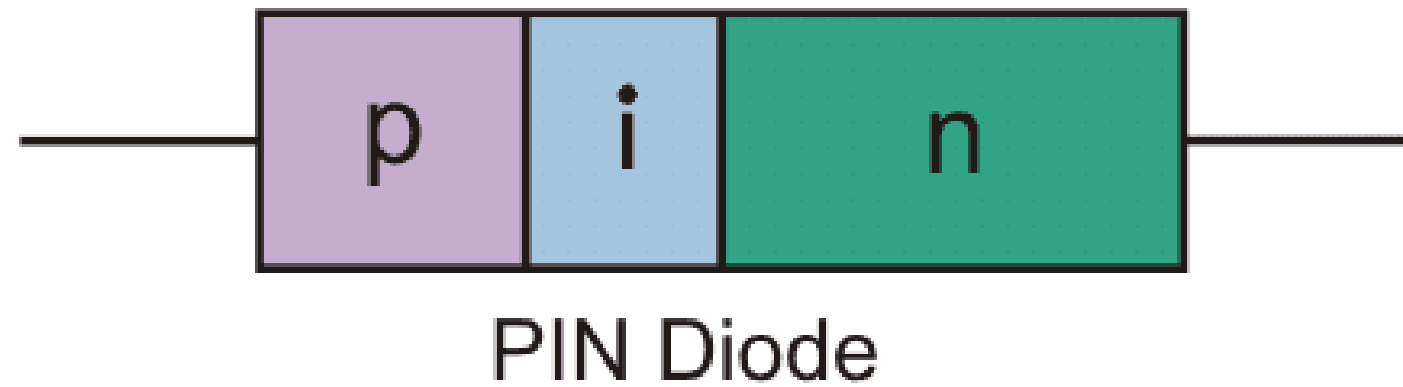
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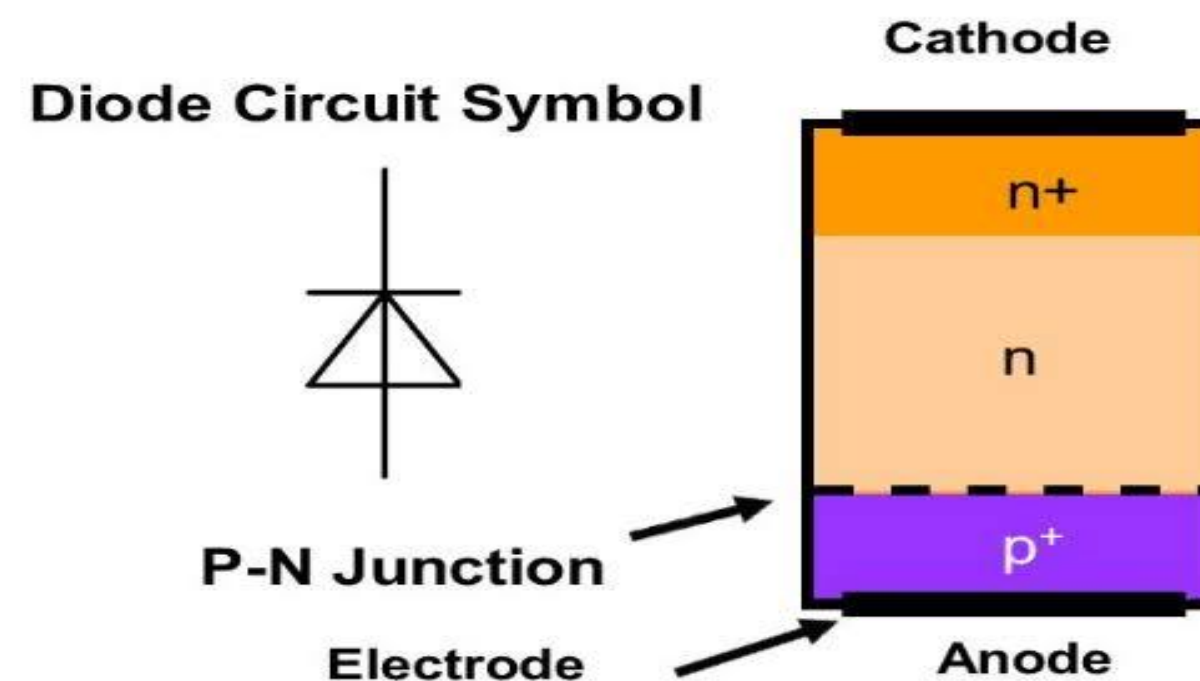
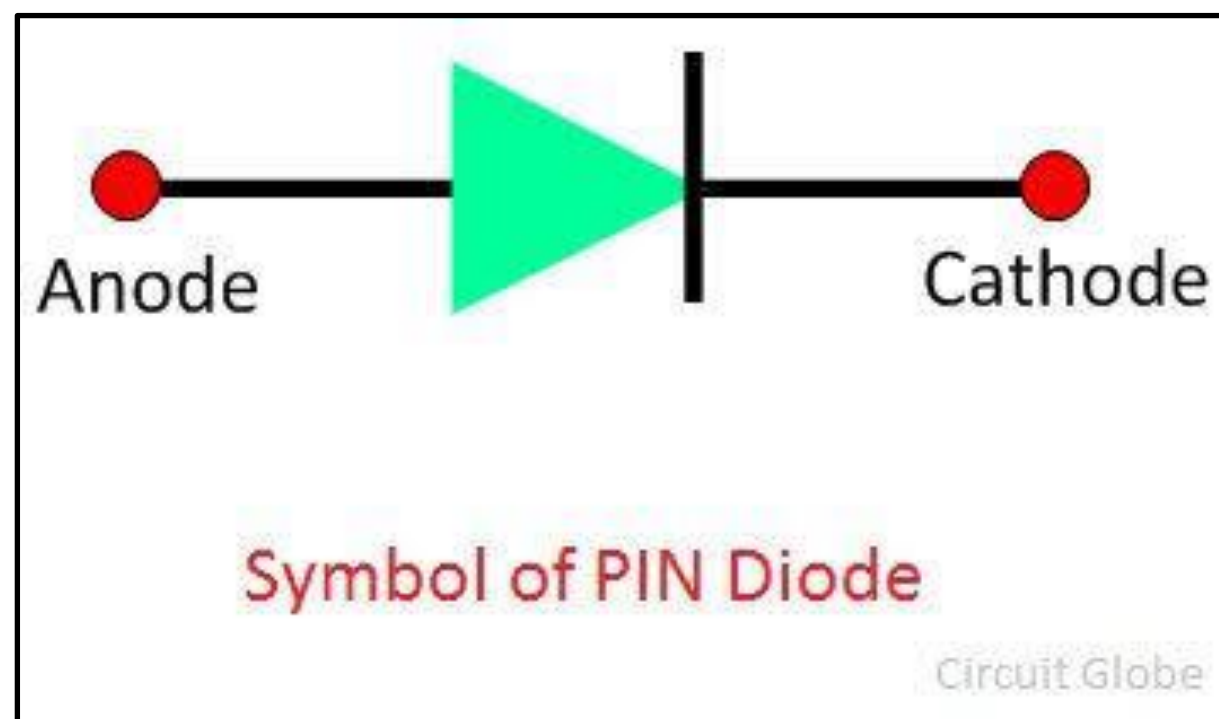
# PIN DIODE



**Wide un-doped intrinsic semiconductor region**



## Pin diode-symbol



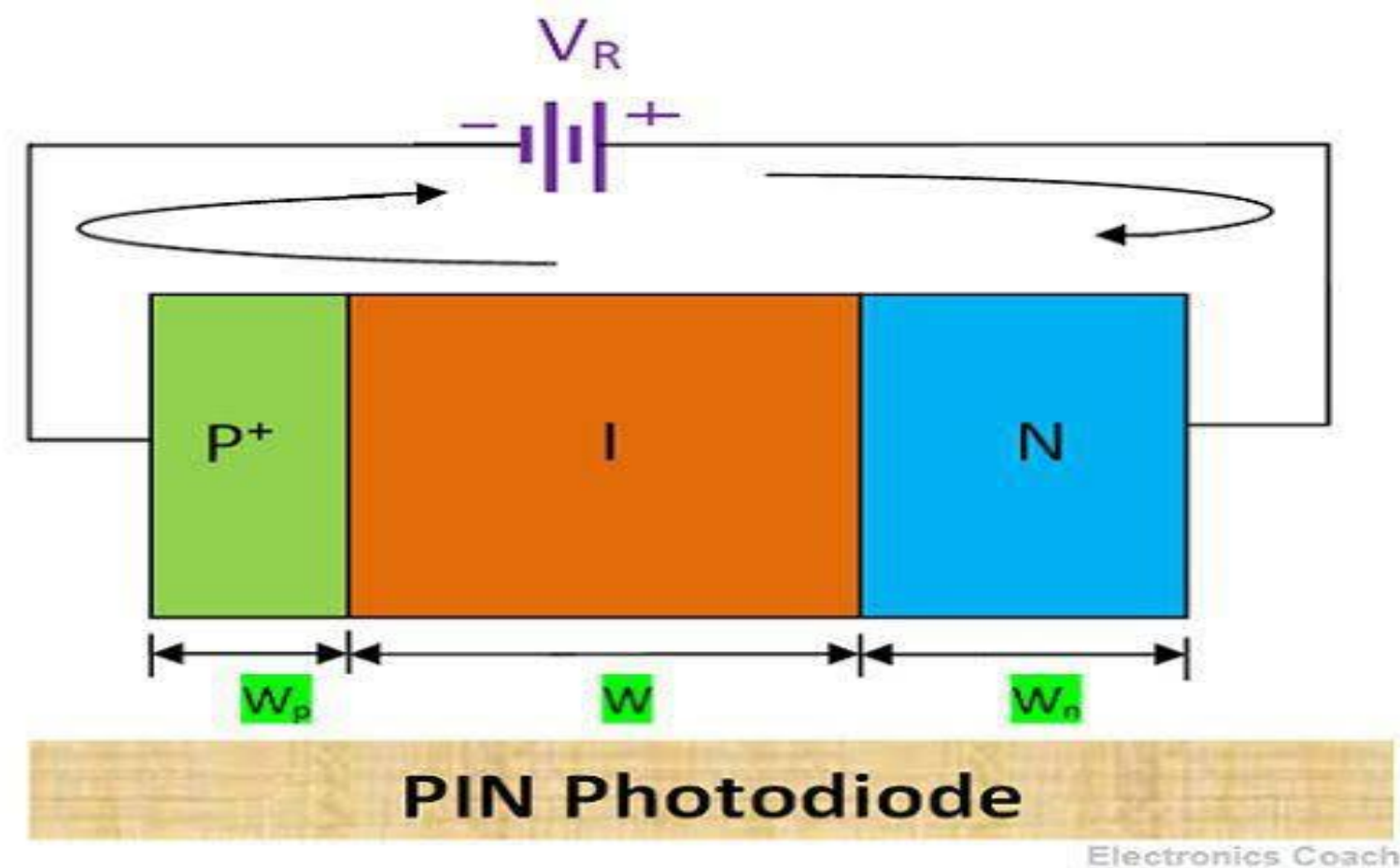
Wide intrinsic region in contrast to an ordinary p-n diode

P type and N type regions are heavily doped



## Pin diode-Working Principle

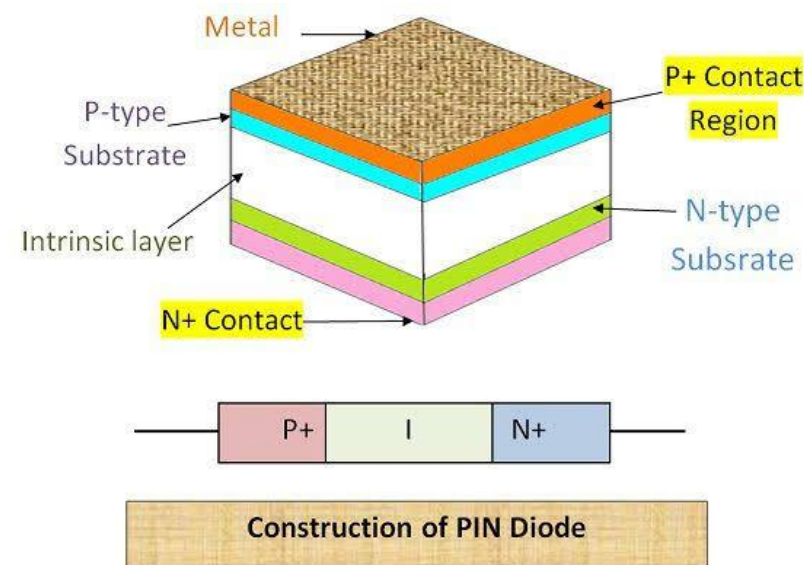
P and N regions are heavily doped because they are used for Ohmic contacts



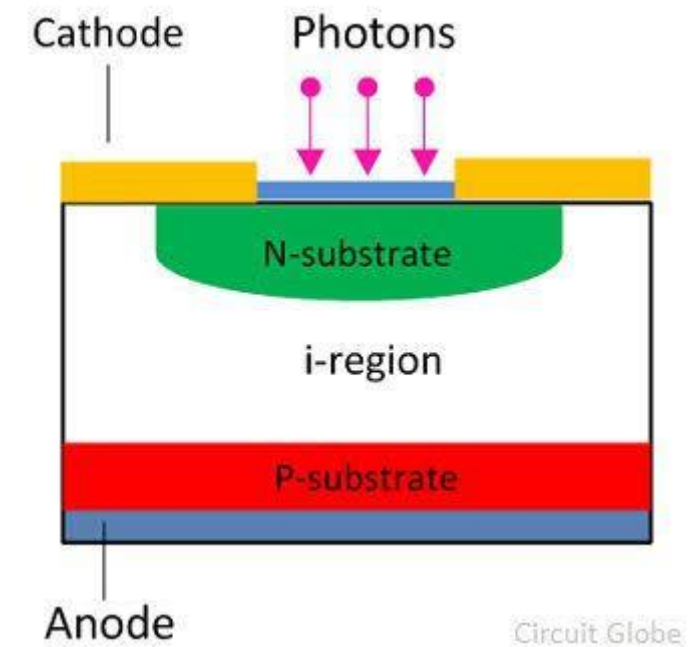




## PIN DIODE-EQUIVALENT CIRCUIT



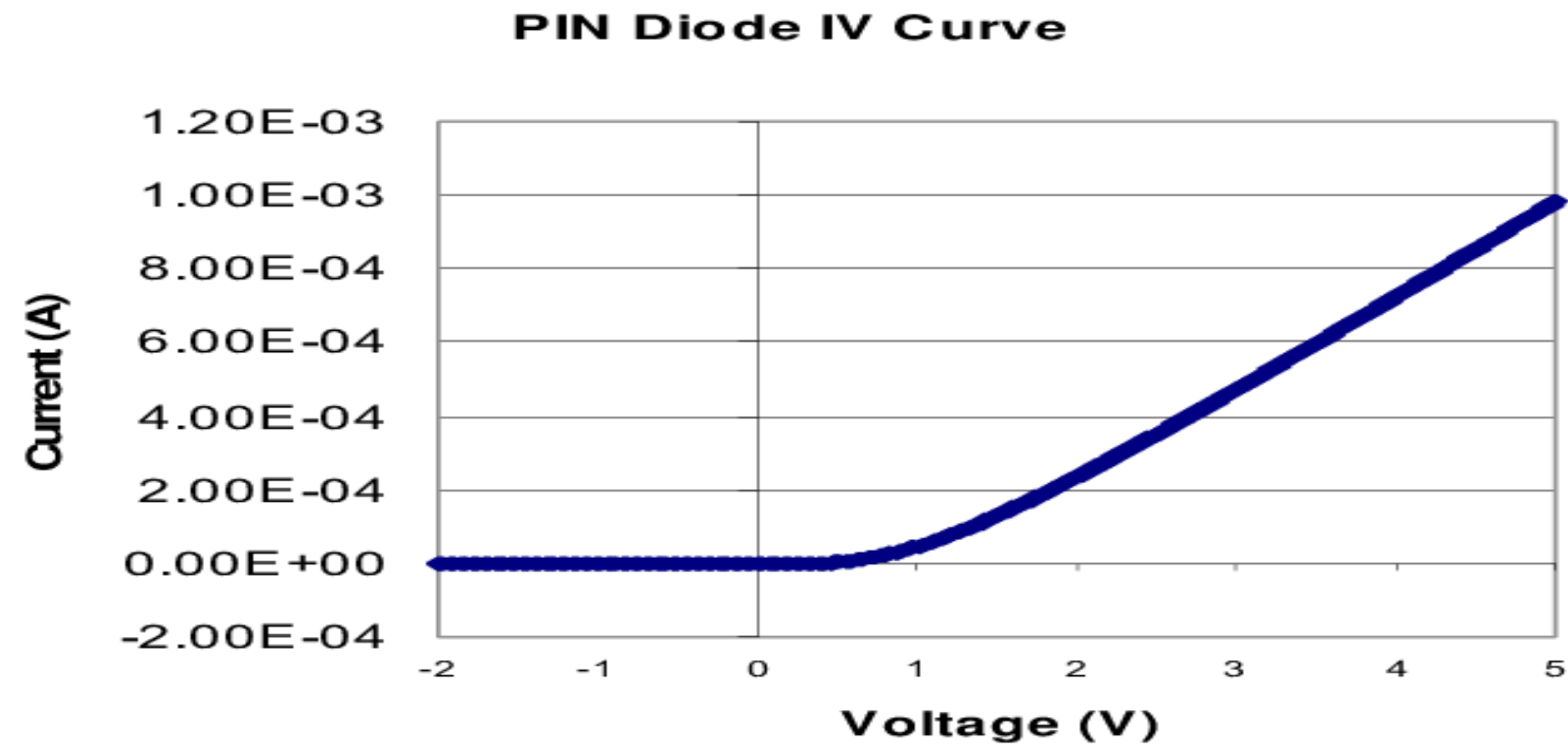
Large stored charge adrift in a thick intrinsic region



Used in RF and Microwave Switches



# CHARACTERISTICS



Used in RF and Microwave variable attenuator





## ADVANTAGES



***High reverse breakdown voltage:*** The width of the depletion layer in PIN diode is large. It imparts it the ability of high reverse breakdown voltage. Thus, it is suitable for protection of circuits from a large current.

***High Capacitance:*** The width of intrinsic layer is large due to which capacitance of diode is low. As the capacitance of a device is inversely proportional to the distance between the electrodes.

***Photodetection:*** Due to the large width of the intrinsic layer, the photons striking the surface will be more. And the generation of the electron-hole pair will also increase. Due to which more current will flow. Thus, PIN diode helps to achieve improved photo detection.



## DISADVANTAGES



***High Reverse Recovery Time:*** The PIN diode has high reverse recovery time due to which power losses are significant..



## APPLICATIONS



1. An RF Microwave PIN diode Attenuator.
2. A PIN Diode RF Microwave Switch.
3. Photodetector and photovoltaic cell
4. Limiter

**PIN diodes are useful as RF switches, attenuators, photodetectors, and phase shifters**



**THANK YOU**