



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

16EC402- MICROWAVE AND OPTICAL ENGINEERING

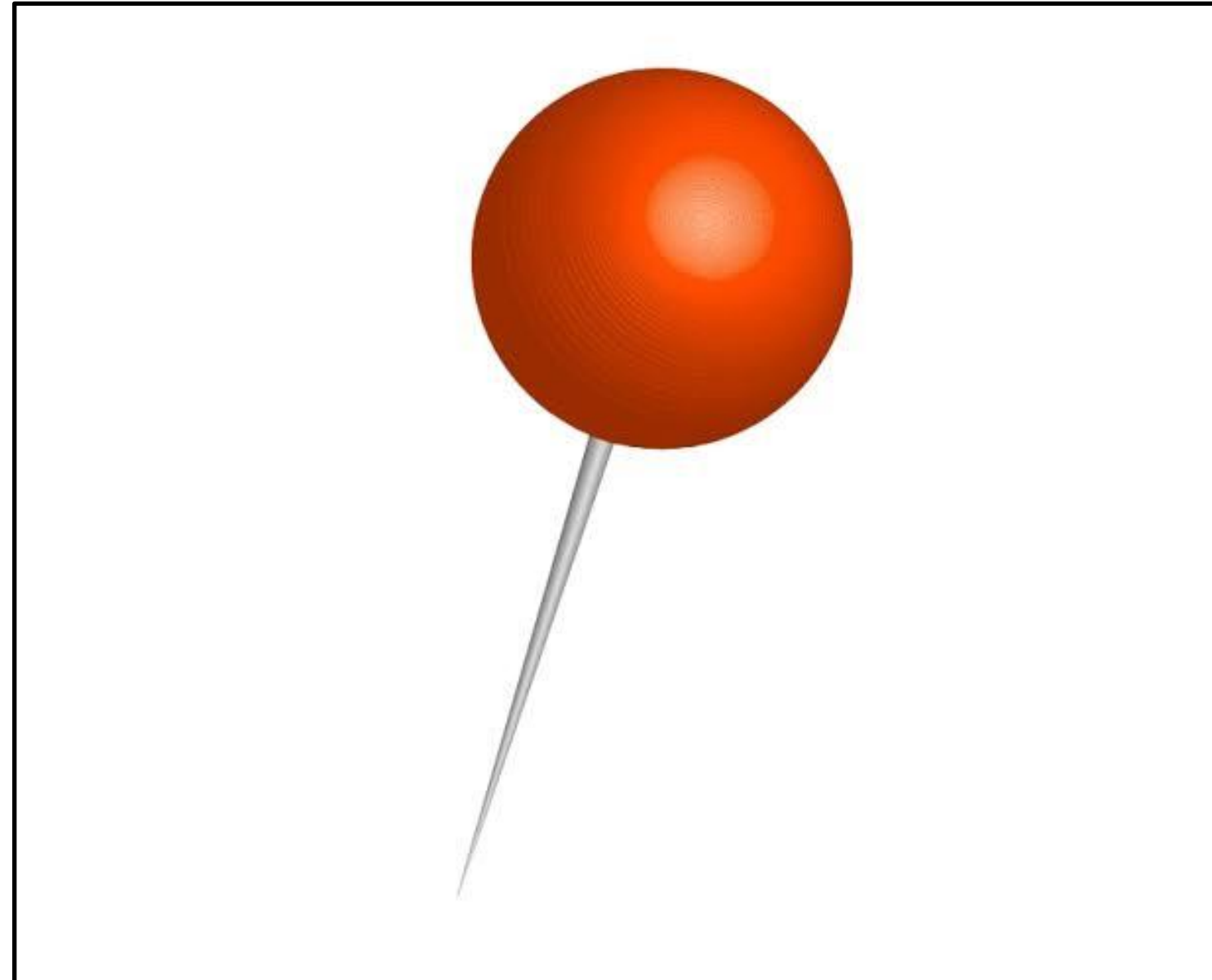
IV YEAR/ VII SEMESTER

UNIT I-MICROWAVE ACTIVE DEVICES

TOPIC 2-PIN DIODE



Guess the TOPIC





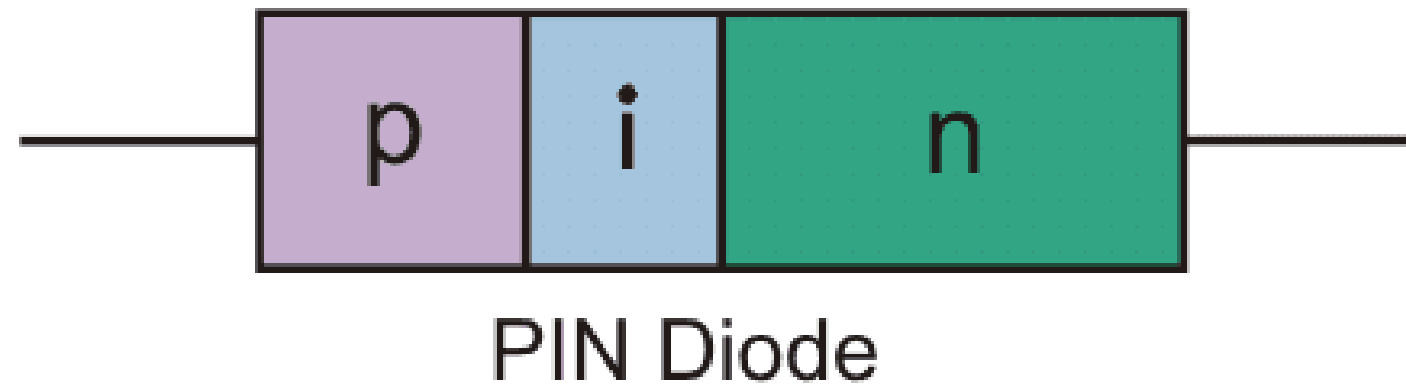
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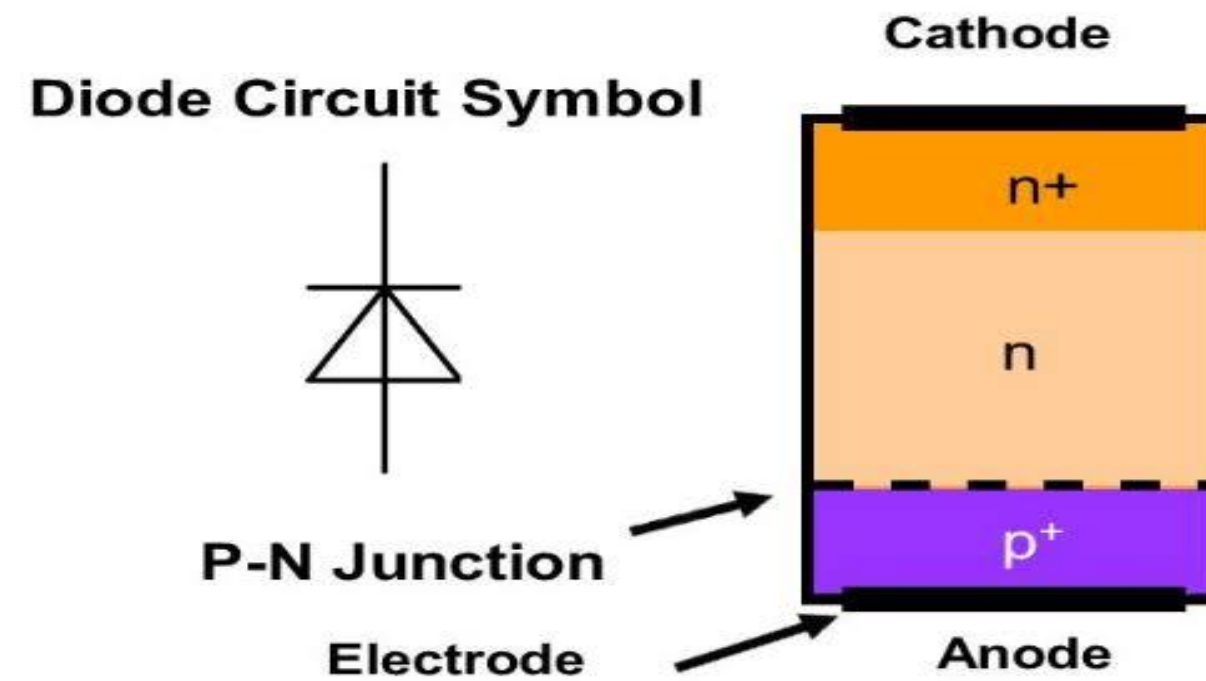
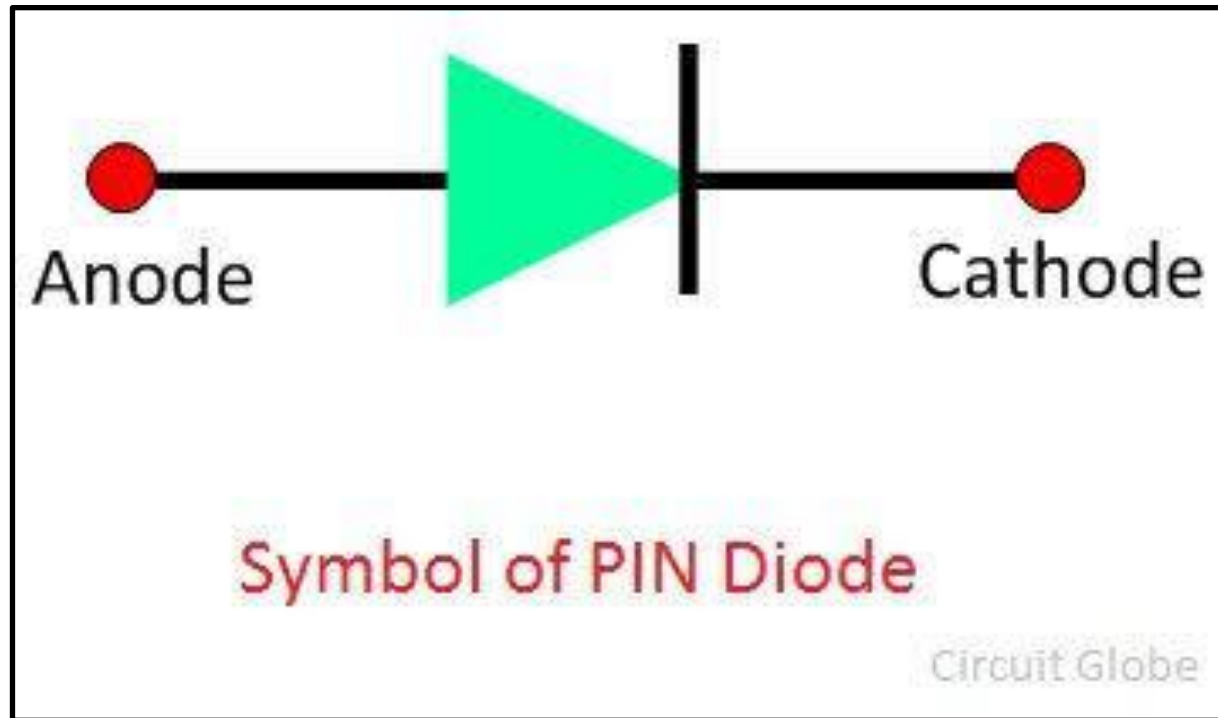
PIN DIODE



Wide un-doped intrinsic semiconductor region



Pin diode-symbol



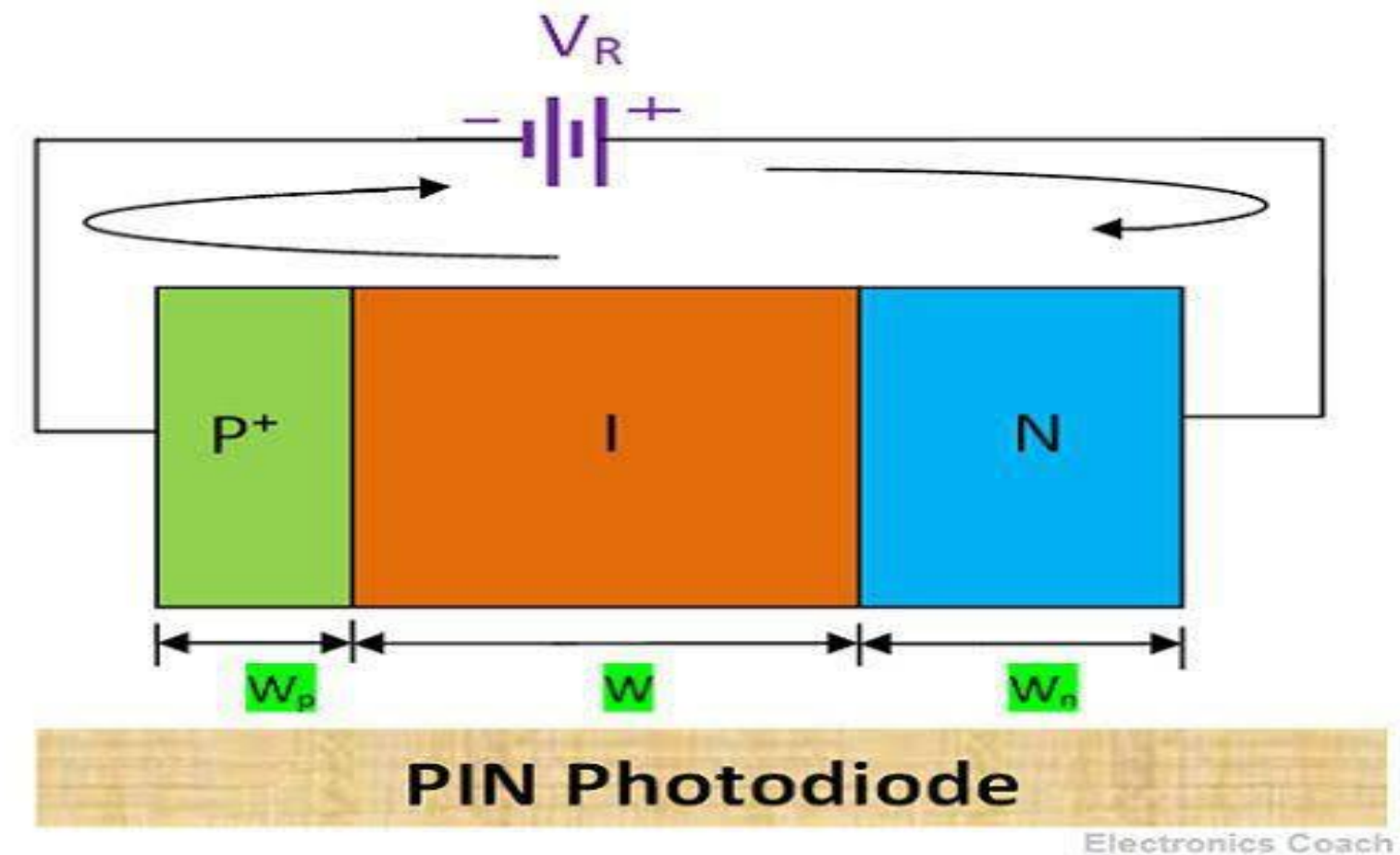
Wide intrinsic region in contrast to an ordinary p-n diode

P type and N type regions are heavily doped



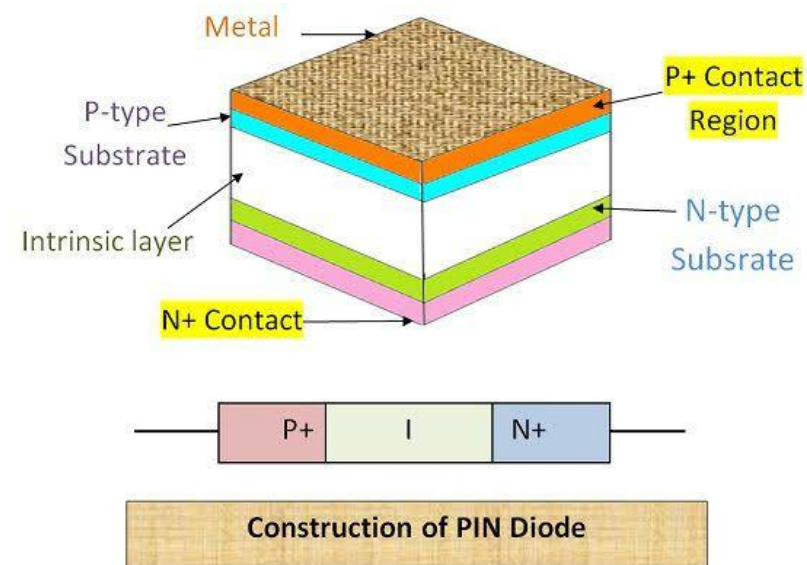
Pin diode-Working Principle

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

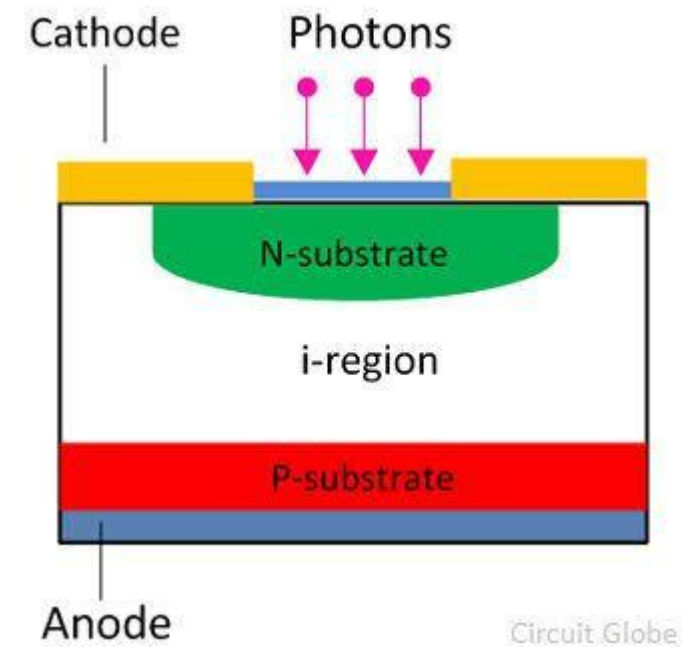




PIN DIODE-EQUIVALENT CIRCUIT



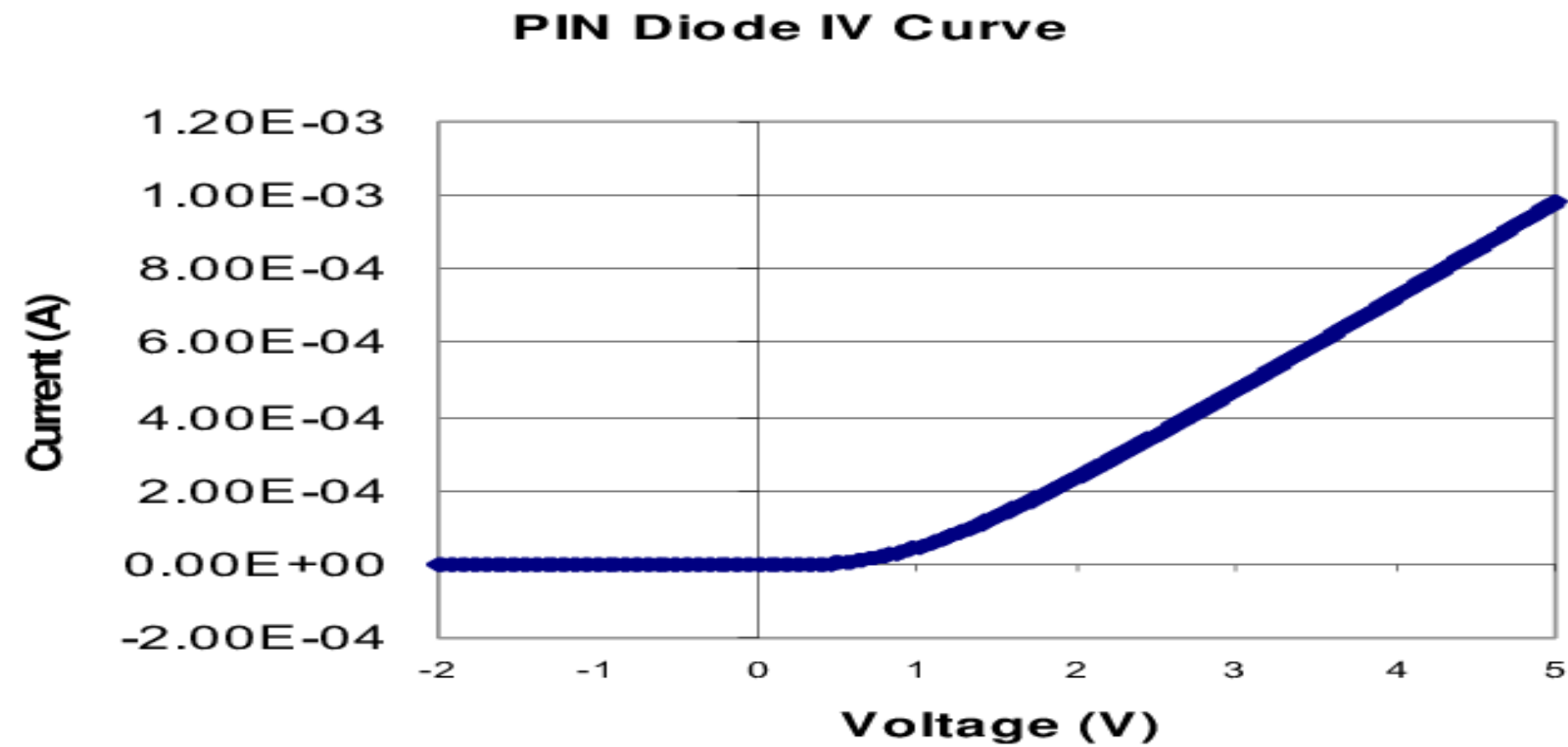
Large stored charge adrift in a thick intrinsic region



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