



SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

Approved by AICTE & Affiliated to Anna University
Accredited by NBA & Accredited by NAAC with 'A+' Grade,
Recognized by UGC saravanampatti (post), Coimbatore-641035.



Department of Biomedical Engineering

Course Name: **23BMB101-Electron Devices and Circuits**

I Year : II Semester

Unit II -Transistors

Topic : Silicon Controlled Rectifiers (SCR)



INTRODUCTION



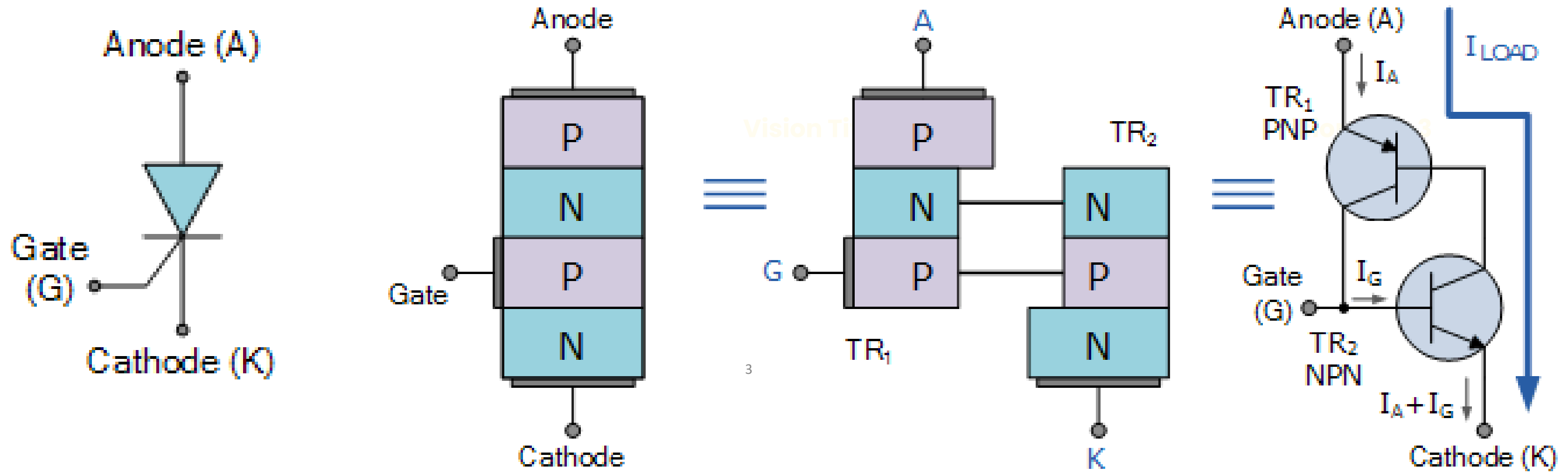
- The half wave, full wave, and bridge rectifiers uses normal p-n junction diodes (two layer diodes). So if the voltage applied to these diodes is high enough, then the diodes may get destroyed.
- SCR is a special type of rectifier which can withstand high voltages.
- A Silicon Controlled Rectifier is a 3 terminal and 4 layer semiconductor current controlling device.
- Silicon controlled rectifier is also sometimes referred to as SCR diode, 4-layer diode, 4-layer device, or Thyristor.
- Silicon controlled rectifier is a unidirectional current controlling device.

Vision Tit 2

Vision Title 3

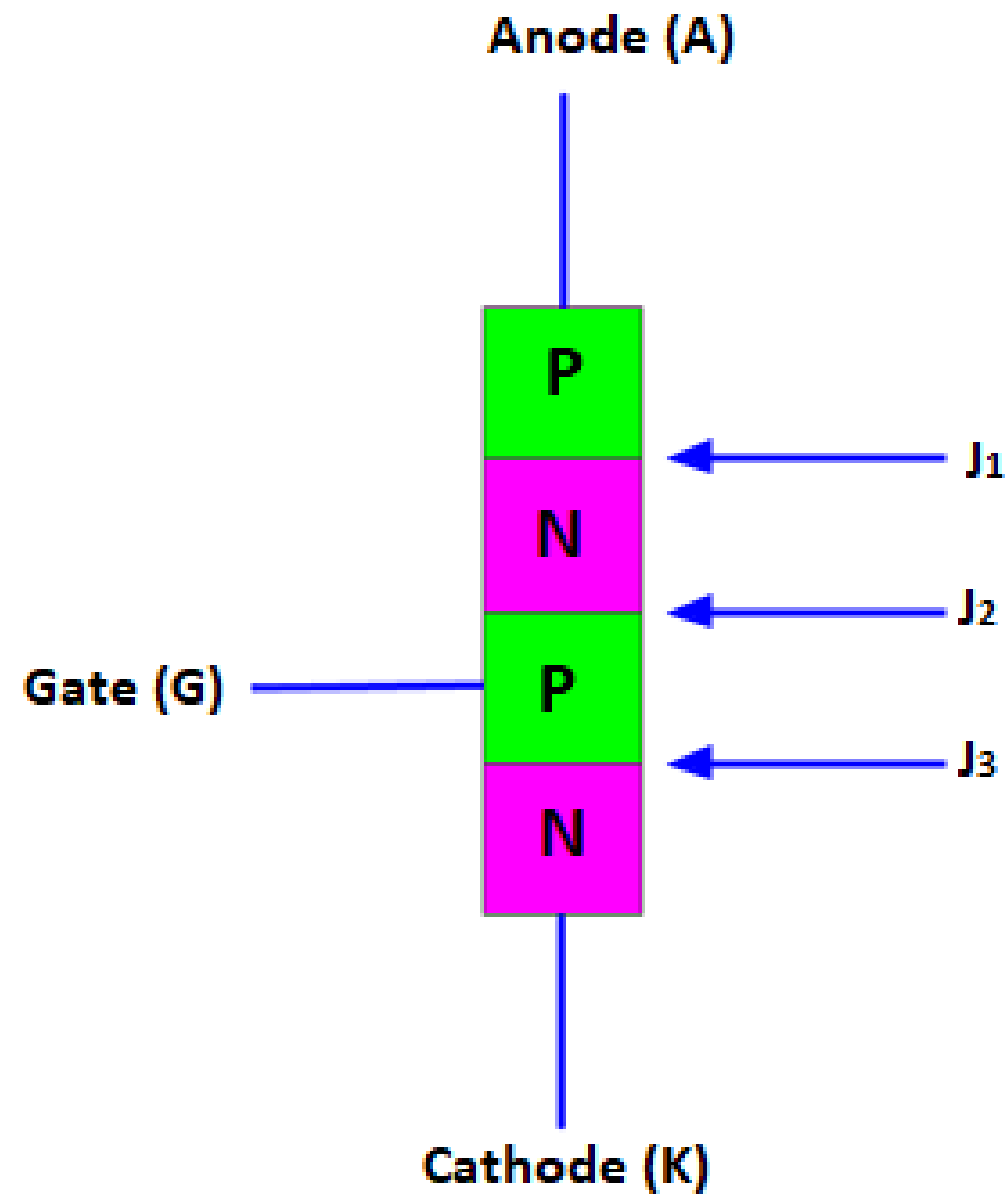


Construction of SCR

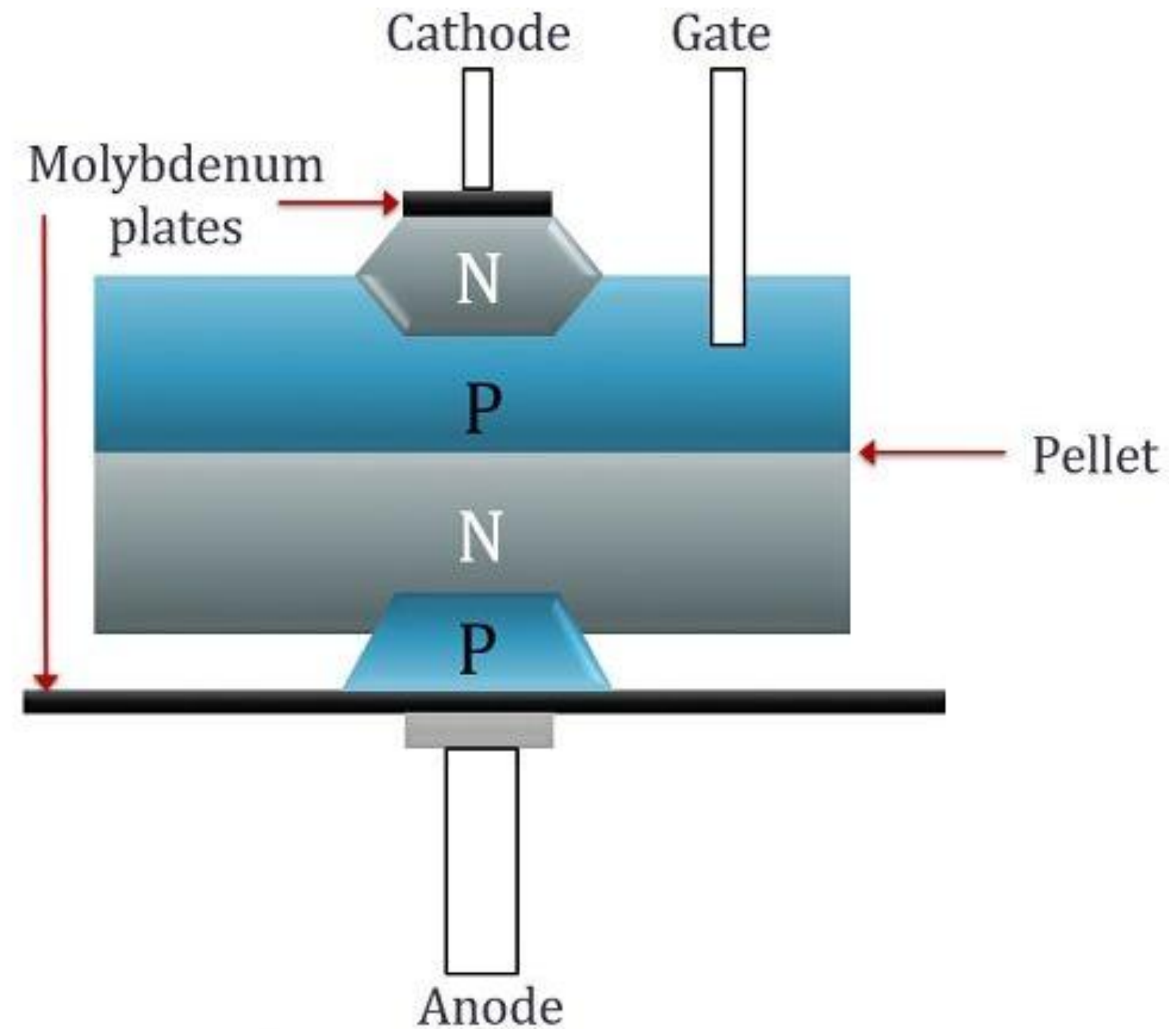




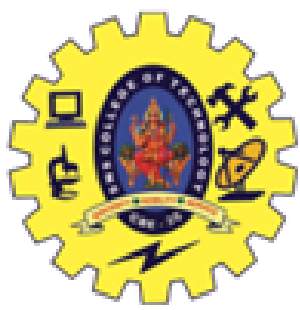
Construction of SCR



SCR Structure



Constructional structure of Thyristor(SCR)



Working of a SCR

- There are three modes of operation for a Silicon Controlled Rectifier (SCR), depending upon the biasing given to it.

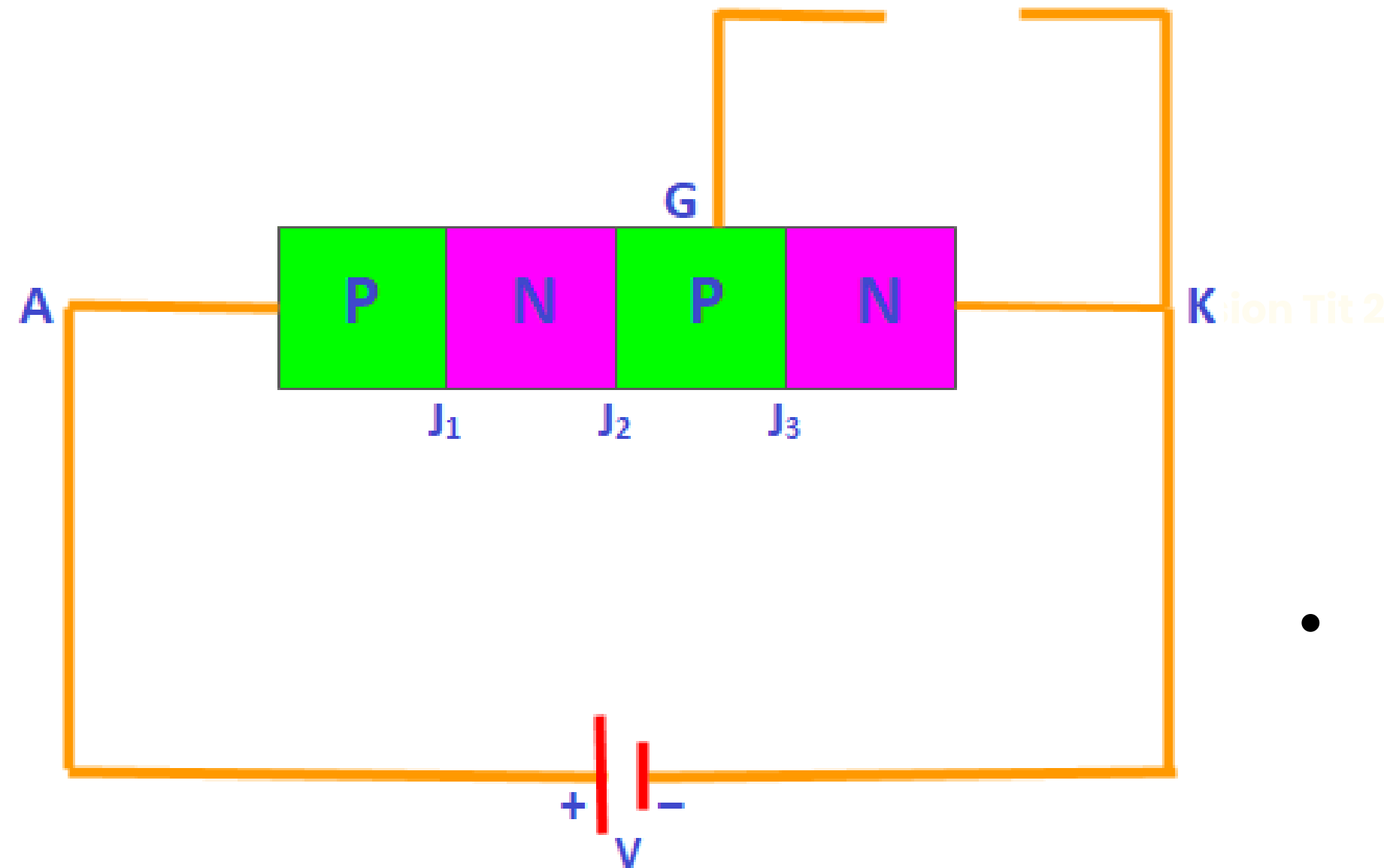
Vision Tit 2

- 1) Forward Blocking Mode (Off State)
- 2) Forward Conducting Mode (On State)
- 3) Reverse Blocking Mode (Off State)

5



Forward Blocking Mode (Off State)

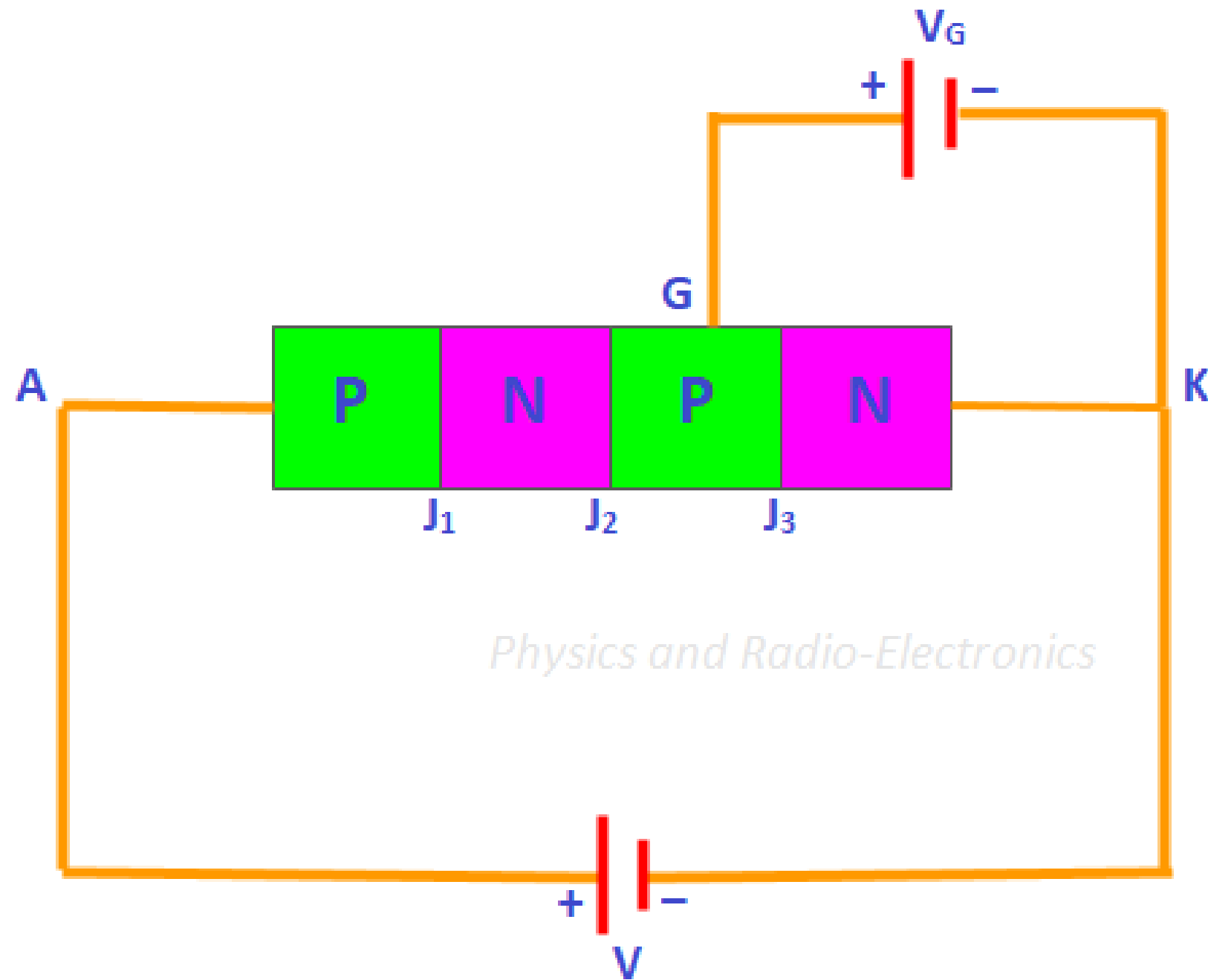


Forward Blocking Mode of SCR

- In this mode of operation, the positive voltage (+) is given to anode A (+), negative voltage (-) is given to cathode K (-), and gate G is open circuited.
- In this case, the junction J1 and junction J3 are forward biased whereas the junction J2 becomes reverse biased.



2) Forward Conducting Mode (On State)

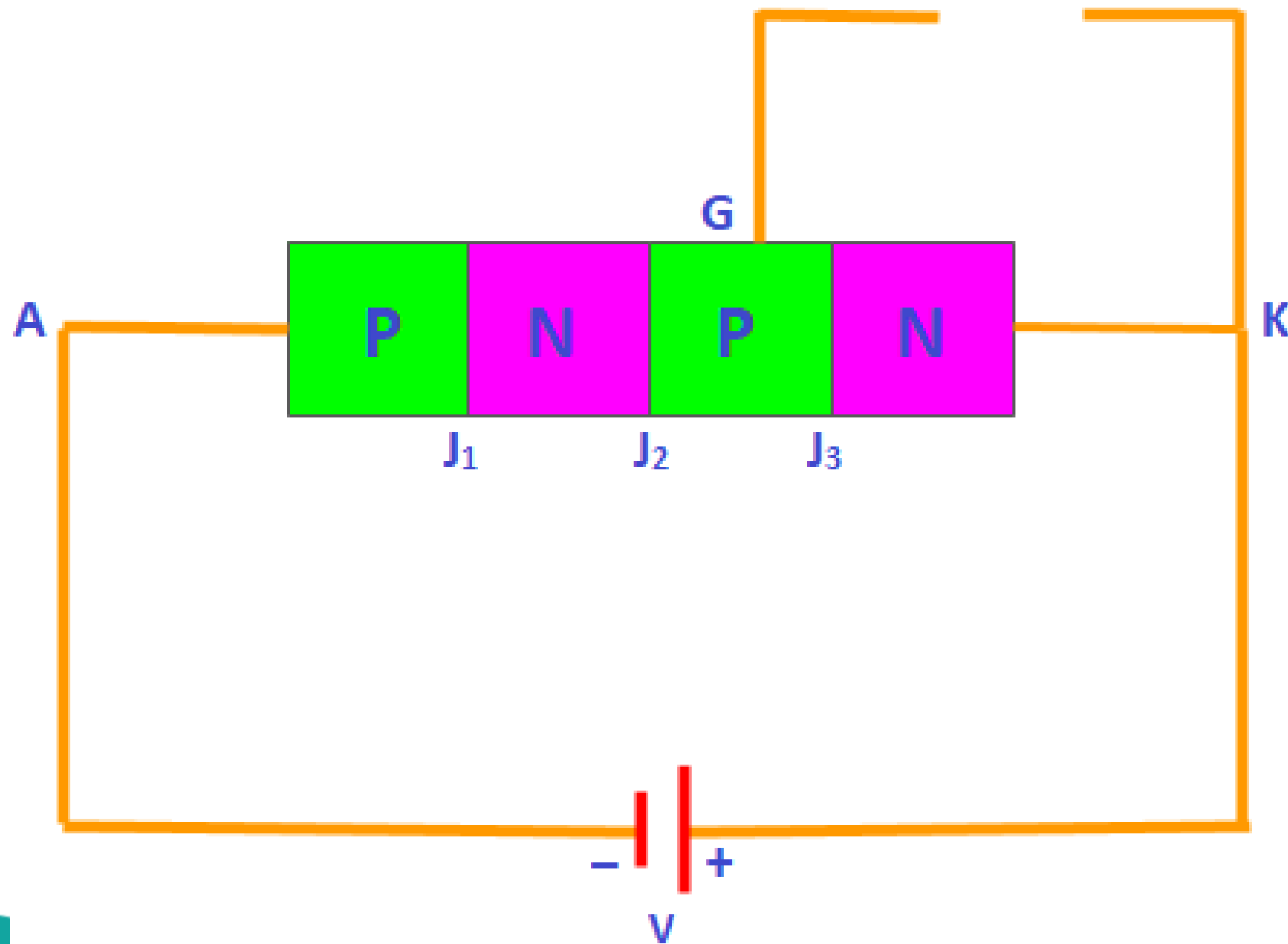


Forward Conducting Mode of SCR

- The Silicon Controlled Rectifier can be made to conduct in two ways:
 1. By increasing the forward bias voltage applied between anode and cathode beyond the breakdown voltage
 2. By applying positive voltage at gate terminal.



3) Reverse Blocking Mode (On State)

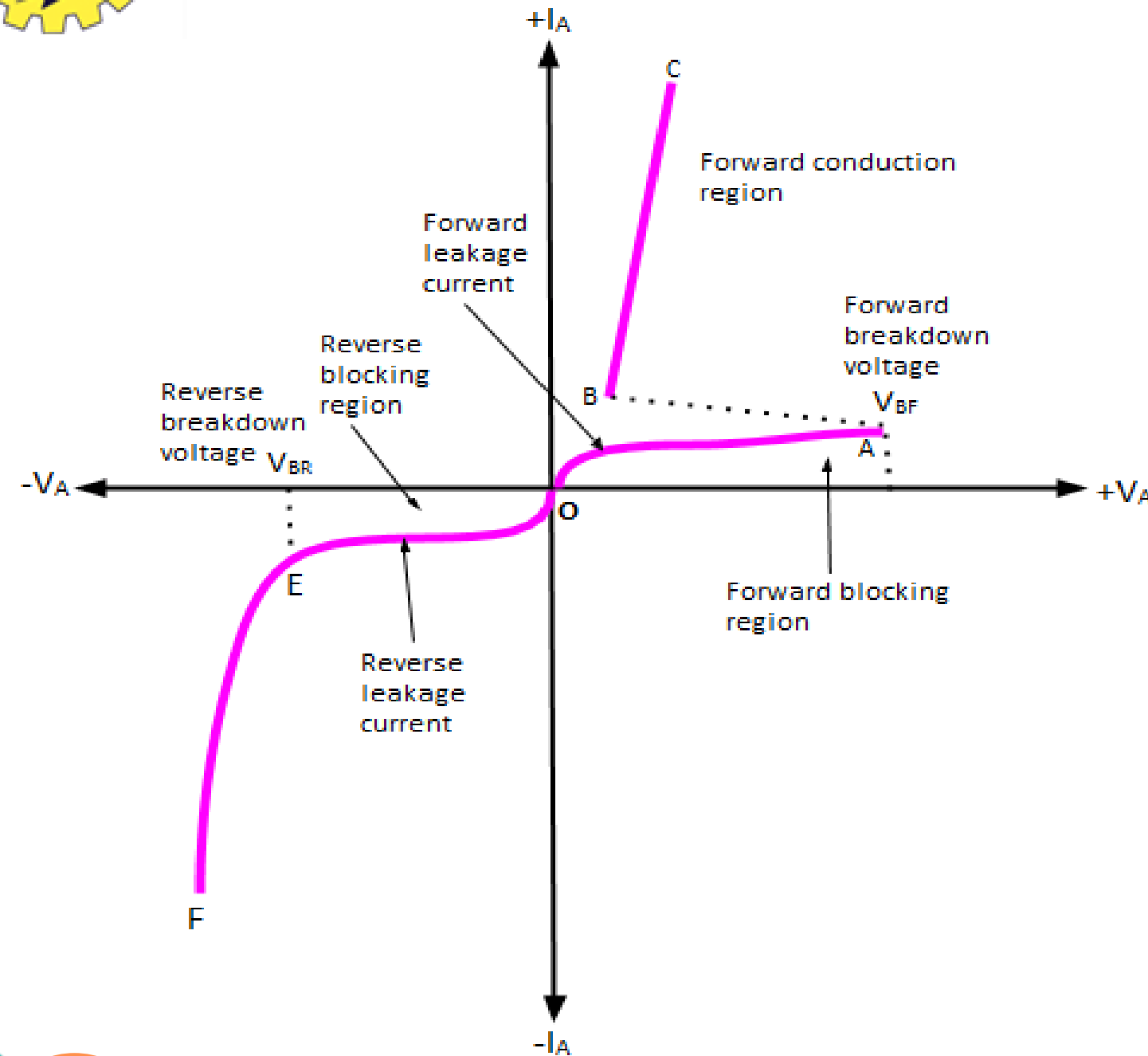


Reverse Blocking Mode of SCR

- In this mode of operation, the negative voltage (-) is given to anode (+), positive voltage (+) is given to cathode (-), and gate is open circuited.
- The junction J1 and junction J3 are reverse biased whereas the junction J2 becomes forward biased.



V-I Characteristics of SCR



V-I Characteristics of SCR

- The V-I characteristics of SCR is divided into three regions:

Vision Tit 2

1. Forward blocking region
2. Forward conduction region
3. Reverse blocking region
4. Forward blocking region

9