



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 BIOMEDICAL ENGINEERING

COURSE NAME: 19EIB201/ ELECTRONIC DEVICES

II YEAR / III SEMESTER

Unit 1 – Transistors

Topic 2: SCR



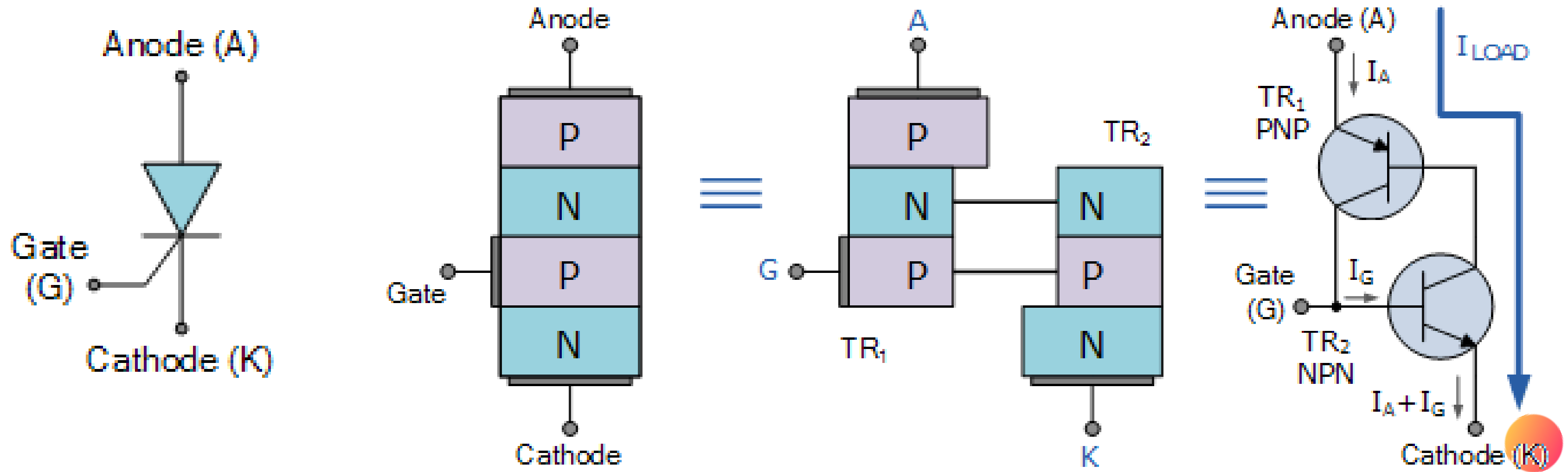


SILICON CONTROLLED RECTIFIERS

- The half wave, full wave, and bridge rectifiers use 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.

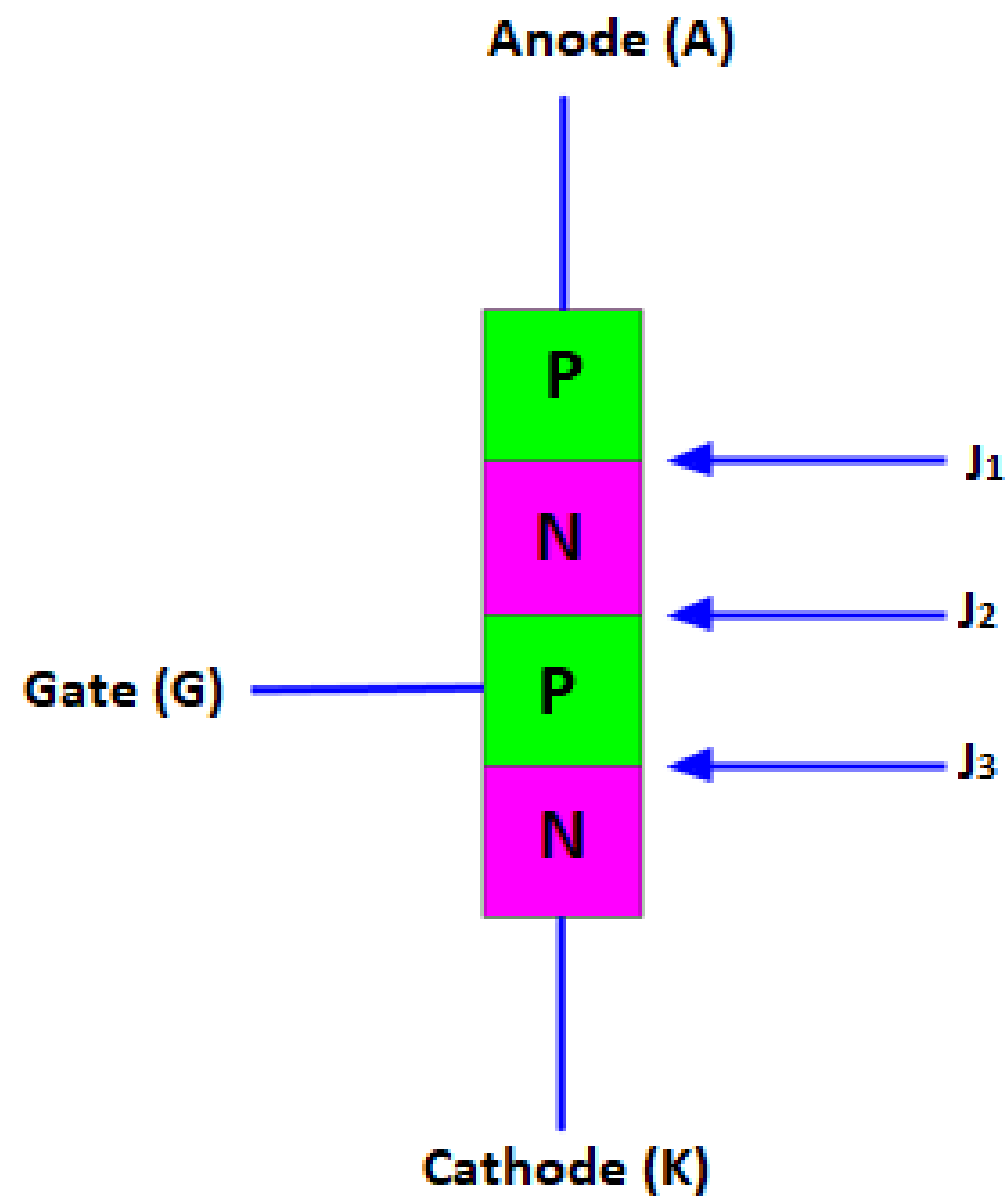


Construction of SCR

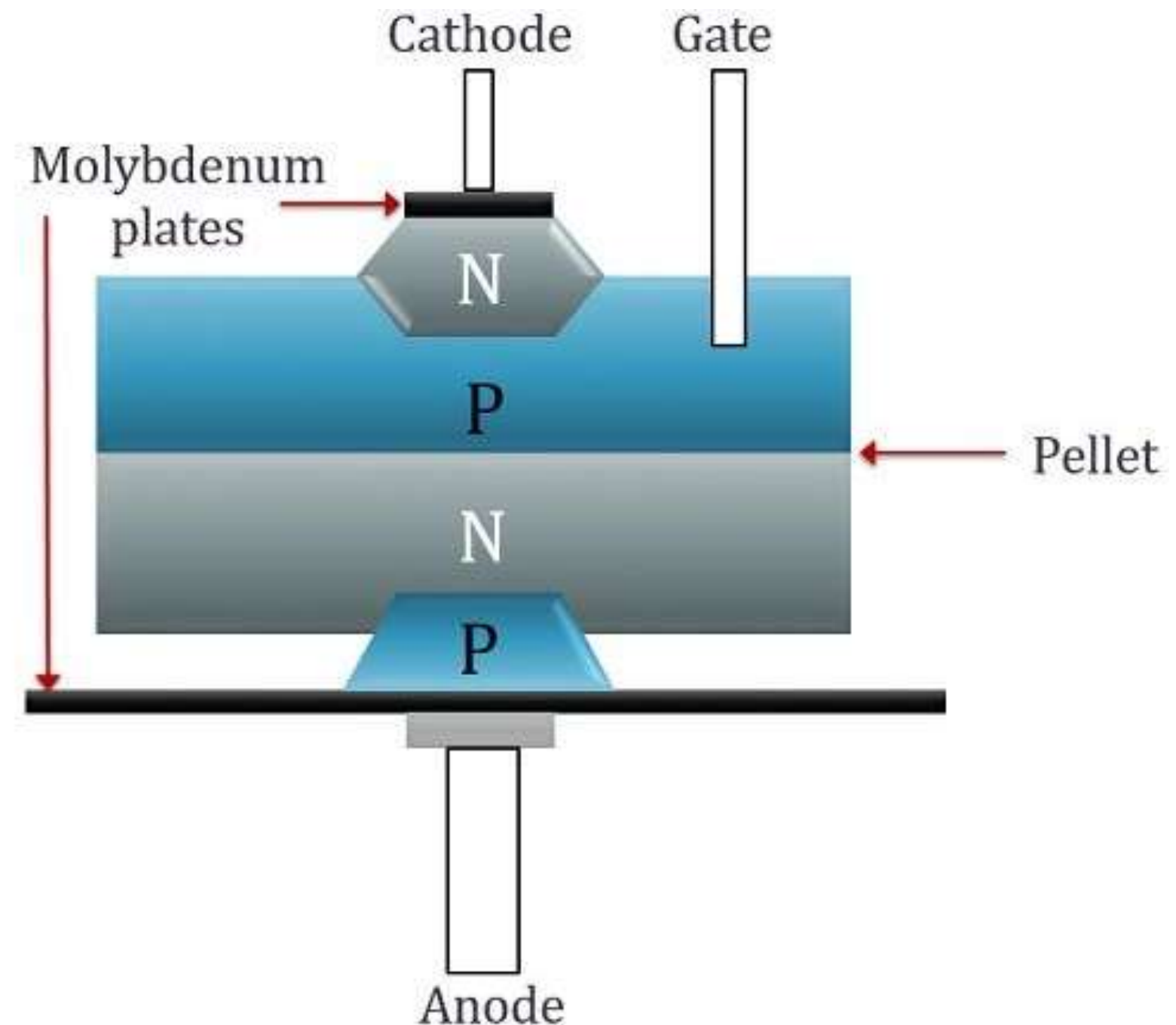




Construction of SCR



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.

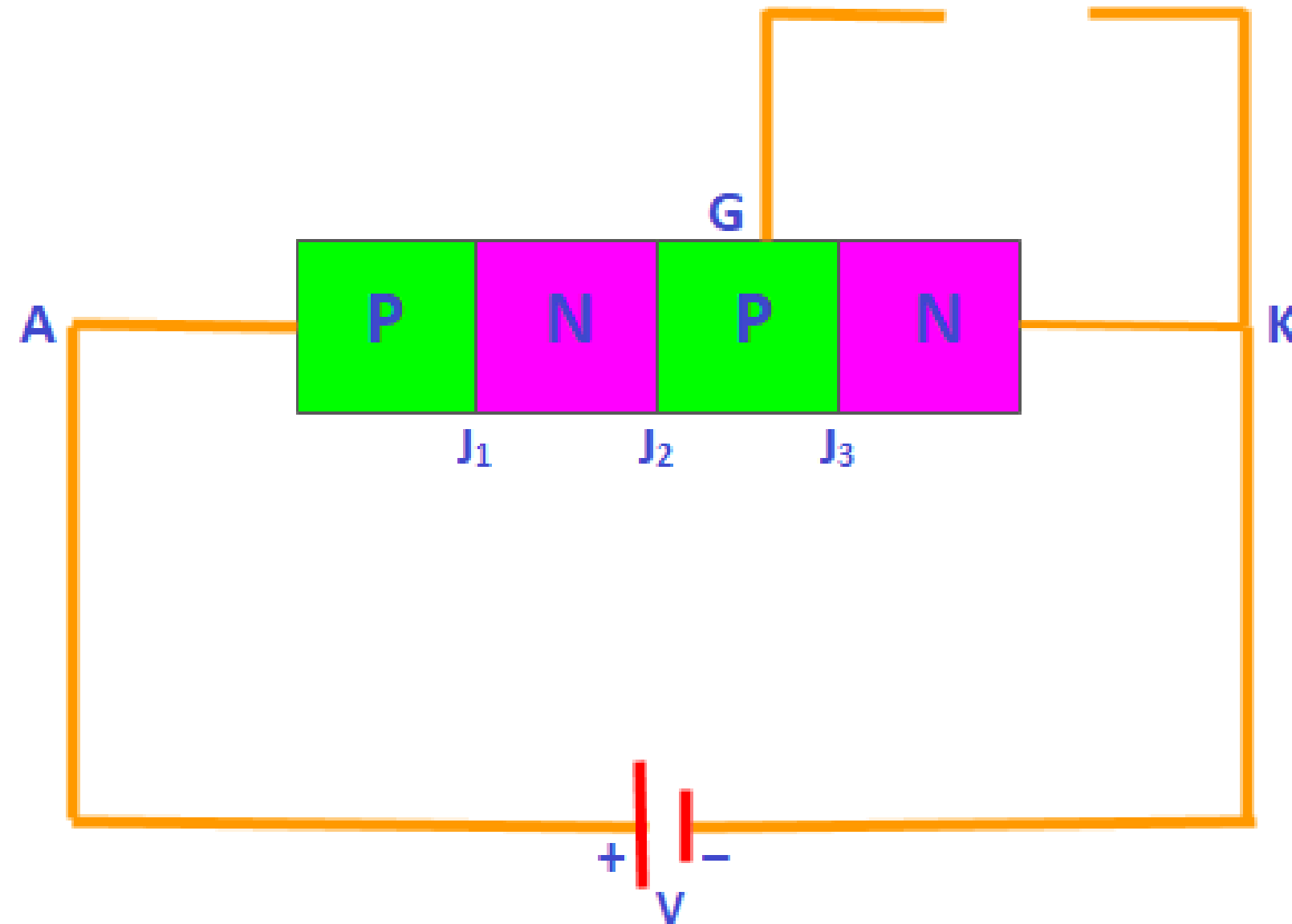
1) Forward Blocking Mode (Off State)

2) Forward Conducting Mode (On State)

3) Reverse Blocking Mode (Off State)



Forward Blocking Mode (Off State)

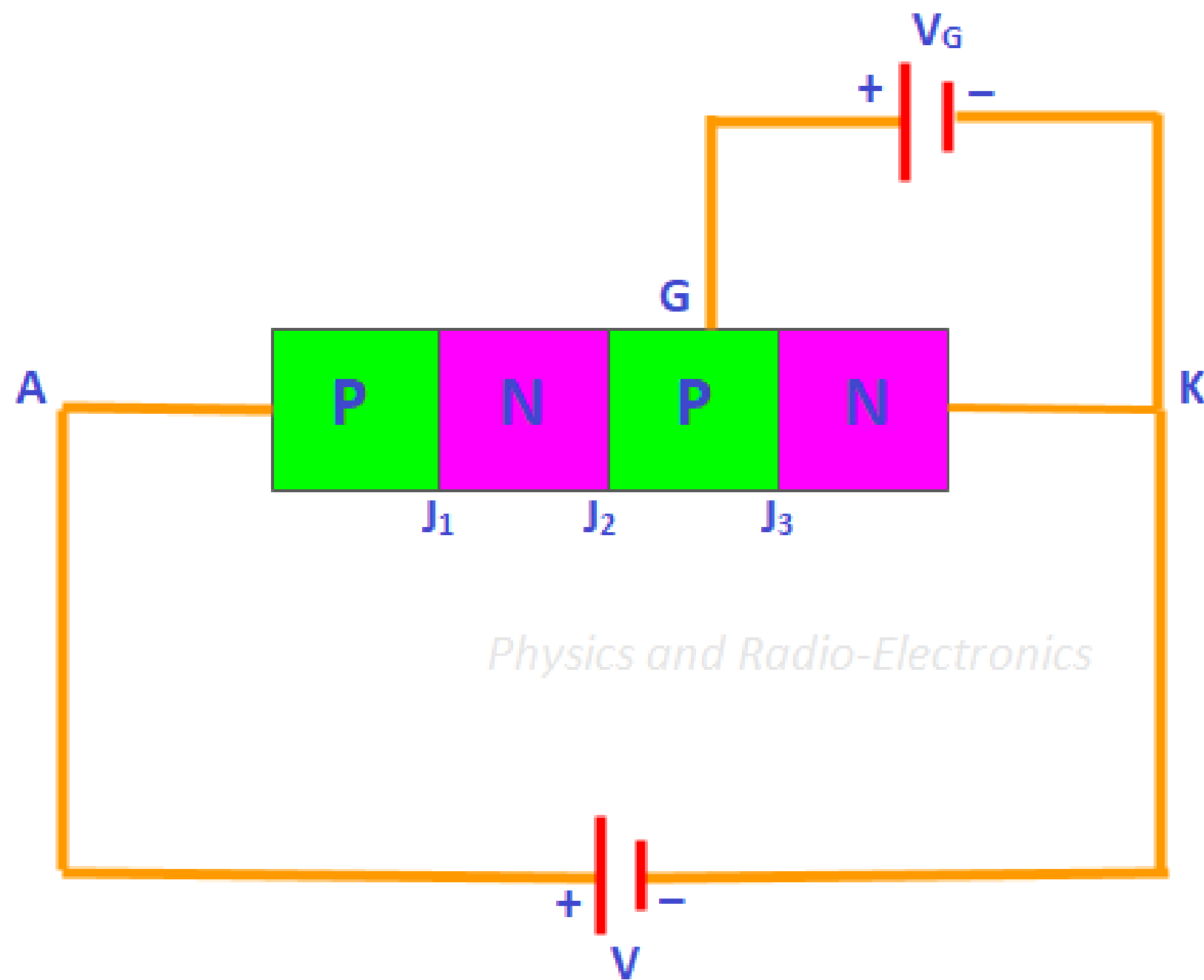


Forward Blocking Mode of SCR

- 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)

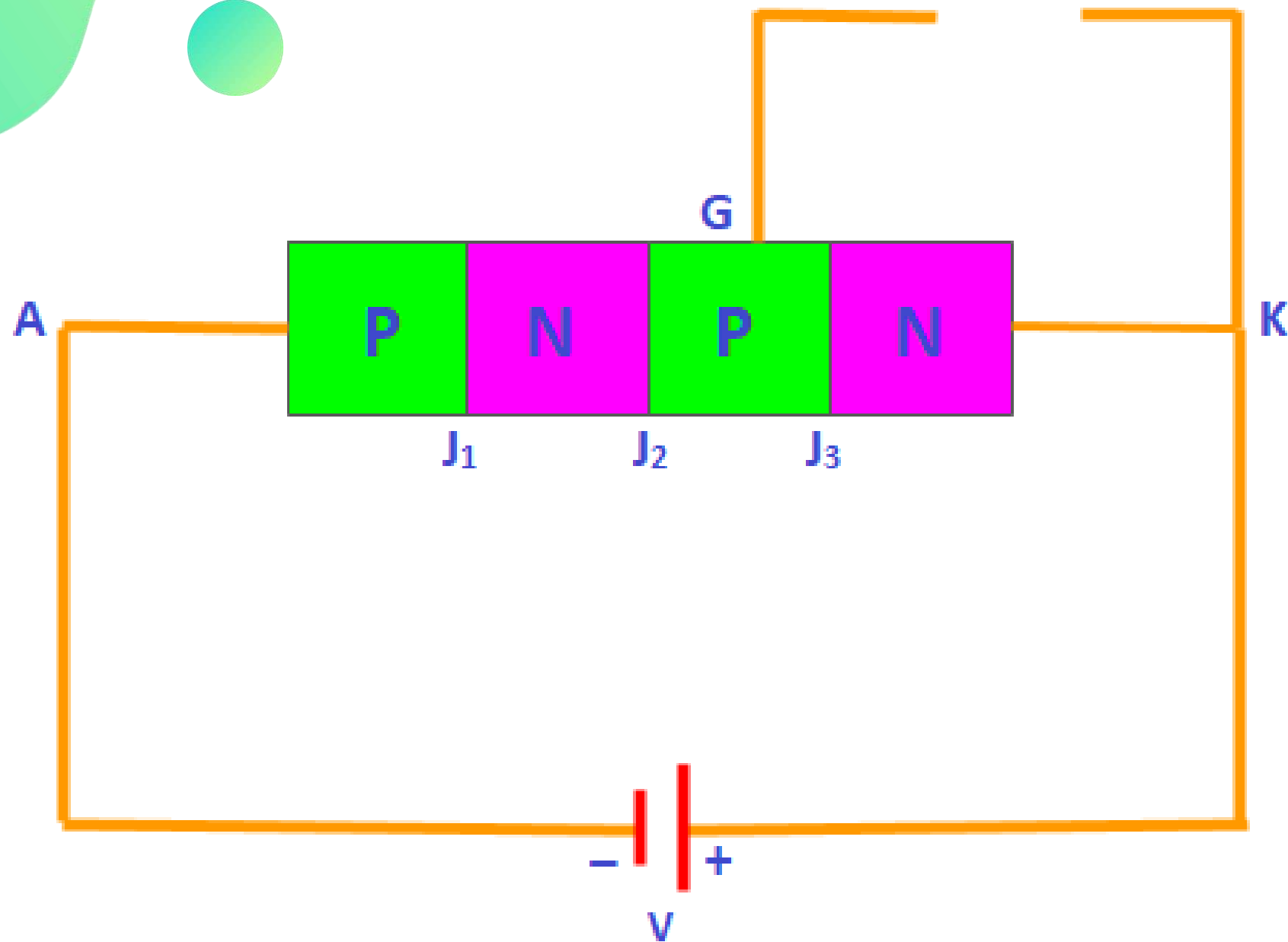


Forward Conducting Mode of SCR

- 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)

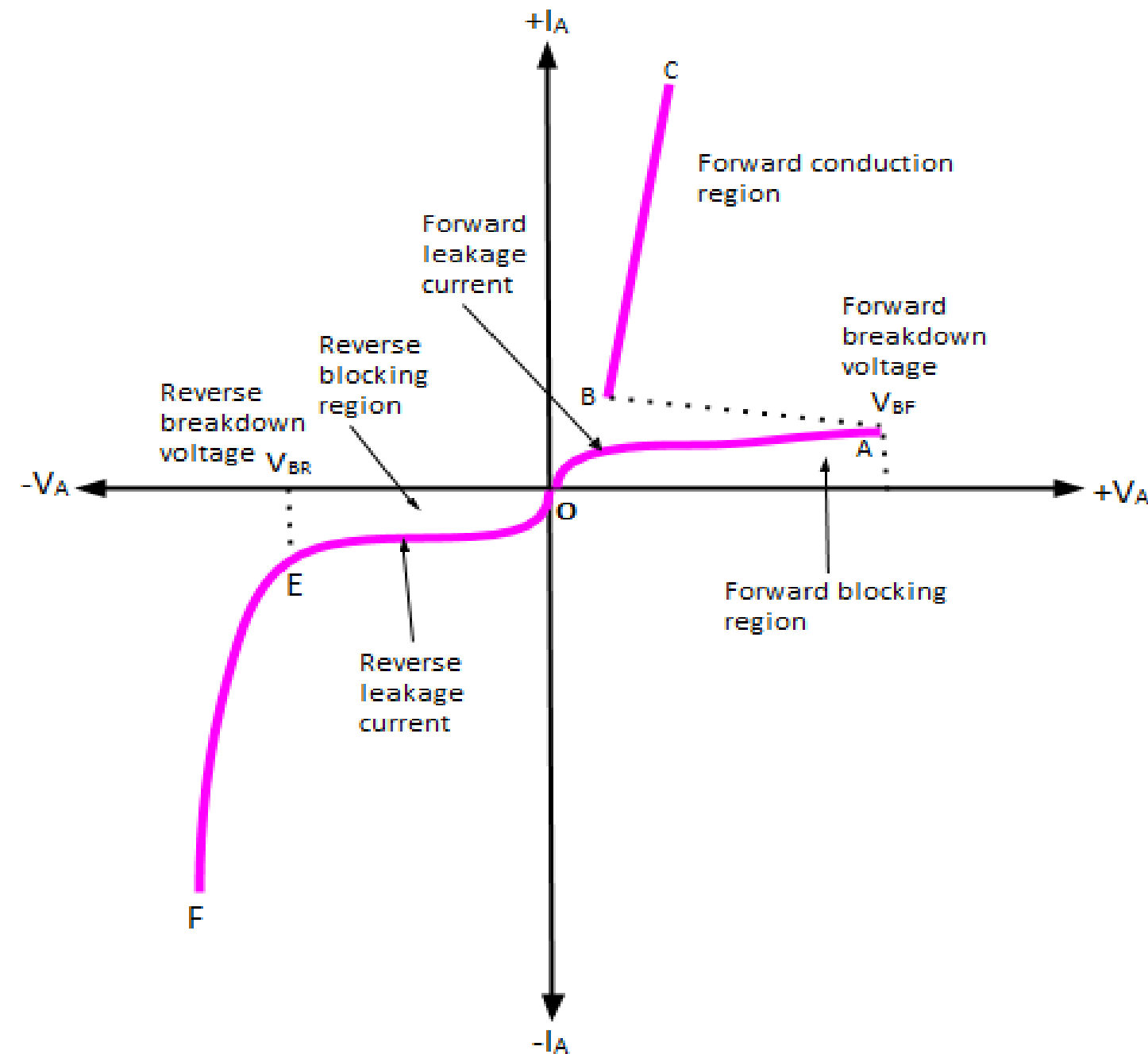


Reverse Blocking Mode of SCR

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



SUMMARY



KEEP
LEARNING..
Thank u

SEE YOU IN NEXT CLASS