

Ch-2

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Thyristors and their operations:-

Thyristor:- It is semiconductor device. It has high voltage and current rating, so it is used as in power controlling. It has fast switching speed. so it is used as switching device.

Use:- used in D.C. and A.C. motor control, induction heating, power control in aeroplane, computer etc.

Types of Thyristor:-

- 1) SCR, 2) TRIAC, 3) DIAC, 4) SUS,
5) SBS, 6) SCS 7) LASCR 8) GTO

NOTE:- SCR, TRIAC and DIAC are most important thyristor.

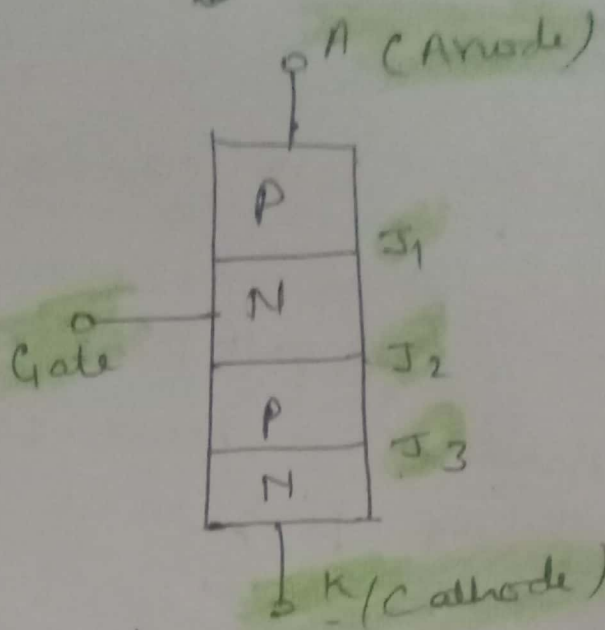
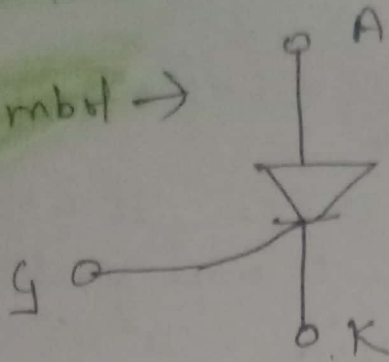
Silicon Controlled Rectifier (SCR)

It has four p-n-pn layer and three terminals Anode (A), Cathode (K) and Gate (G). It has three junctions J_1 , J_2 and J_3 .

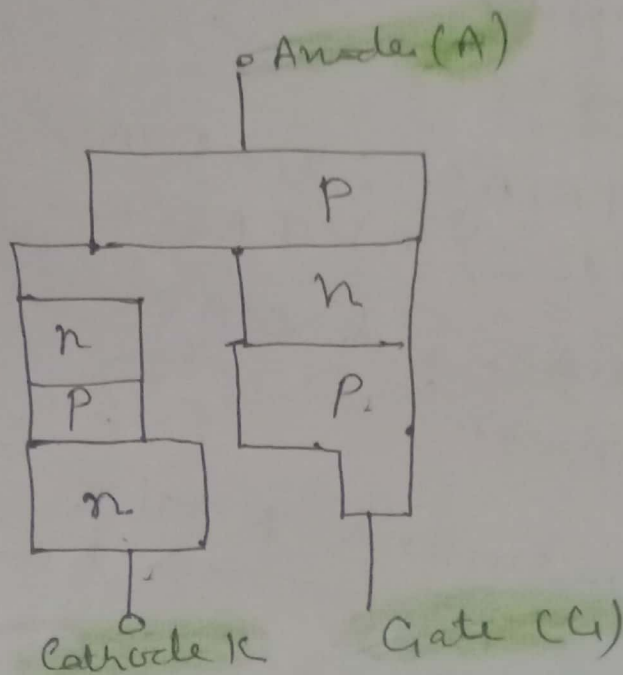
NOTE:- SCR is current controlling device.

Constructions:

Symbol \rightarrow

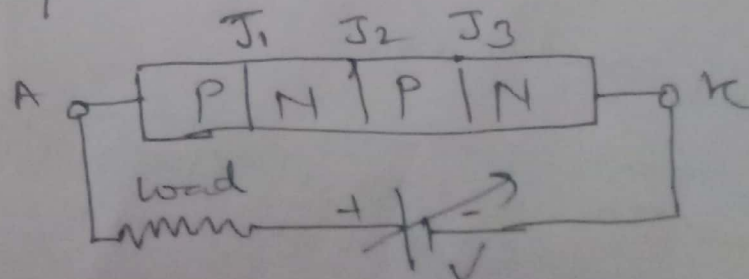


Its construction is equivalent to two $n-p-n$ and $p-n-p$ transistor.



Working of SCR :-

It works only when anode (A) terminal is at higher potential W.R.T. to cathode (K).



Working of SCR :-

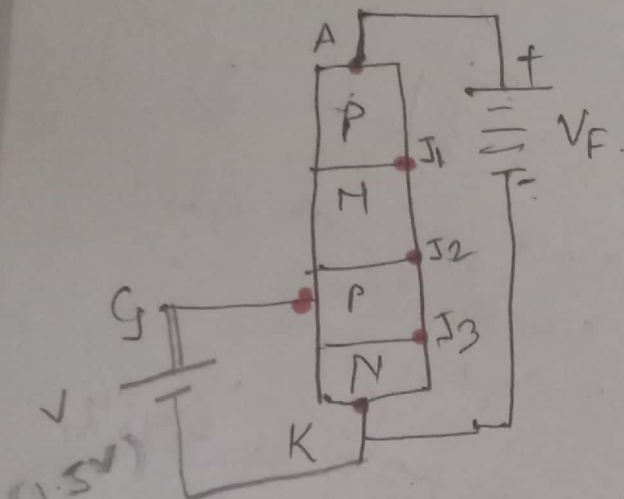
- 1) Forward Blocking Mode
- 2) Forward Conduction Mode
- 3) Reverse Conduction Mode

To operate SCR all the Junctions should be :-

J_1
 J_2
 J_3

} — **FB**

① Forward blocking Mode :-



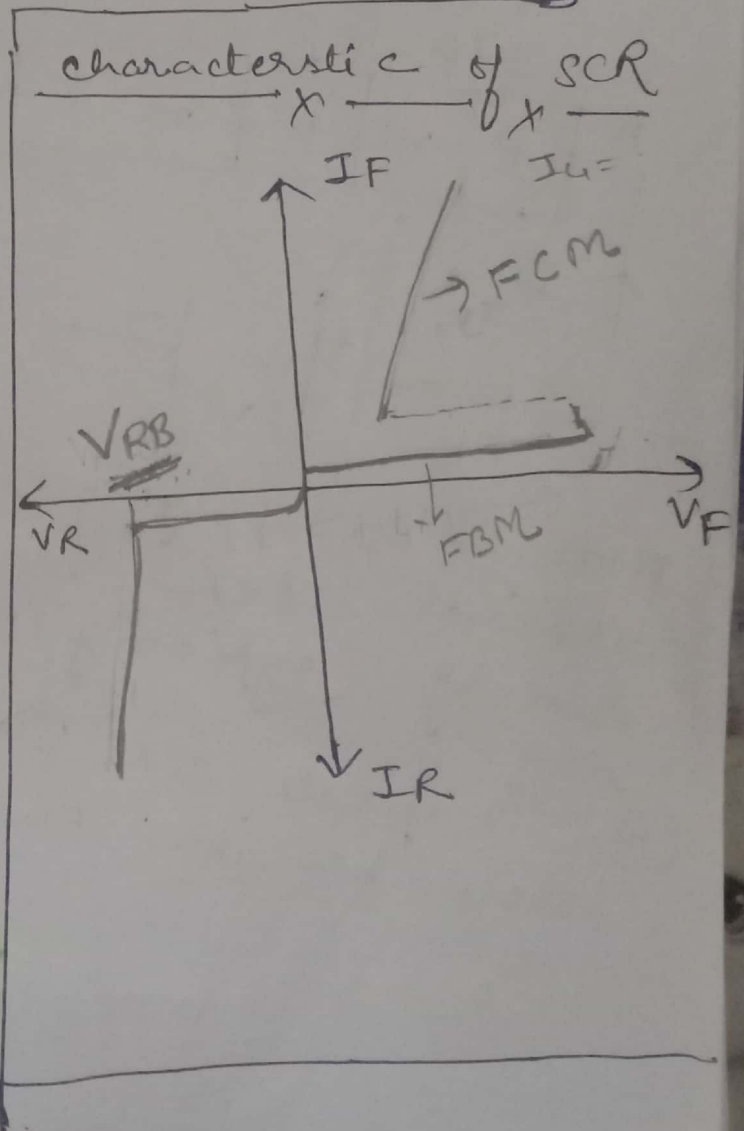
$J_1 \rightarrow$ FB ✓
 $J_2 \rightarrow$ RB ✗
 $J_3 \rightarrow$ RB ✓

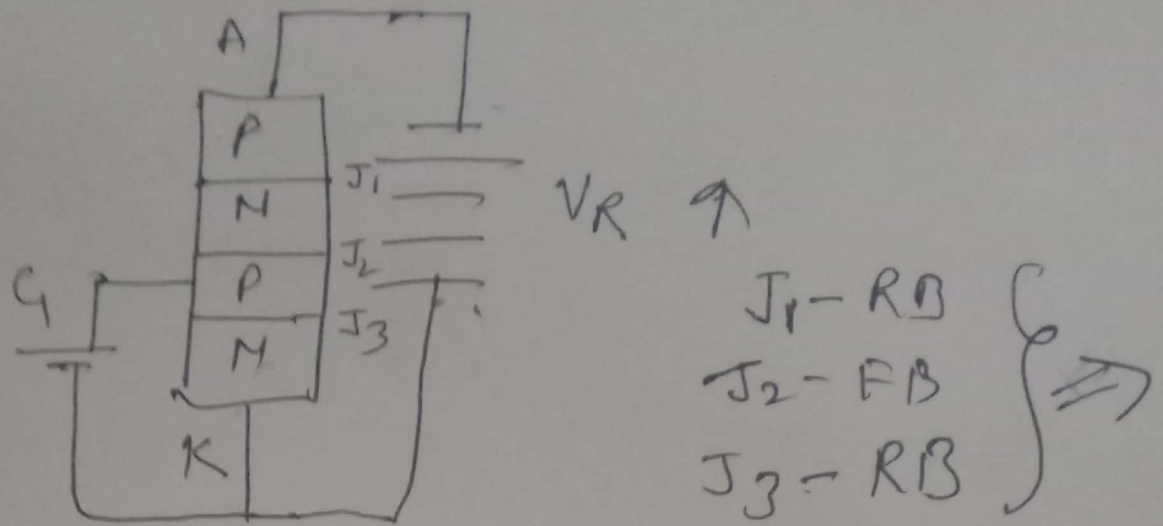
② Forward Conduction Mode

$J_1 \rightarrow$ FB
 $J_2 \rightarrow$ FB
 $J_3 \rightarrow$ FB

③ Reverse blocking Mode

$J_1 \rightarrow$ RB ✗
 $J_2 \rightarrow$ FB —
 $J_3 \rightarrow$ RB ✓





Application of scr :-

- 1) It has high voltage and current rating so it is used to control the power.
- 2) used to convert AC into controlled
- 3) used to control the speed of motors.