

Class B Commutation

Commutation: Commutation is the process of turning off, a conducting thyristor is called Commutation

Class B-Self Commutation By an LC Circuit:

In this method, the LC resonating circuit is across the SCR and not in series with the load. The commutating circuit is shown in Fig. 1 and the associated waveforms are shown in Fig.2. Initially, as soon as the supply voltage E_{dc} is applied, the capacitor C starts getting charged with its upper plate positive and the lower plate negative, and it charges up to the voltage E_{dc} . When thyristor T is triggered, the circuit current flows in two directions:

1. The load current I_L flows through the path $E_{dc+} - T - R_L - E_{dc-}$, and
2. Commutating current I_c .

The moment thyristor T is turned ON, capacitor C starts discharging through the path $C+ - L - T - C- .$ When the capacitor C becomes completely discharged, it starts getting charged with reverse polarity. Due to the reverse voltage, a commutating current I_c starts flowing which opposes the load current I_L . When the commutating current I_c is greater than the load current I_L . Thyristor T becomes turned OFF. When the thyristor T is turned OFF, capacitor C again starts getting charged to its original polarity through L and the load. Thus, when it is fully charged, the thyristor will be ON again.

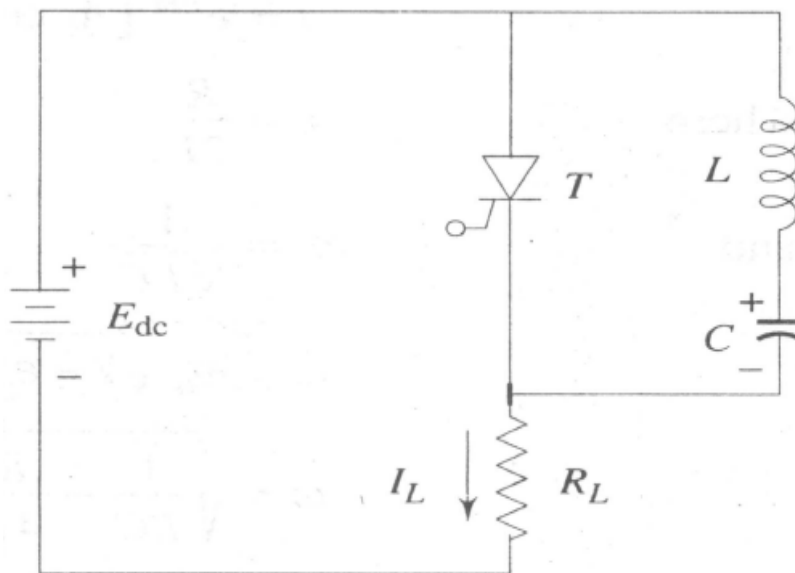


Fig.1

Hence, from the above discussion it becomes clear that the thyristor after getting ON for sometime automatically gets OFF and after remaining in OFF state for sometime, it

again gets turned ON. This process of switching ON and OFF is a continuous process. The desired frequency of ON and OFF states can be obtained by designing the commutating components as per the requirement. The main application of this process is in DC chopper circuits, where the thyristor is required to be in conduction state for a specified duration and then to remain in the OFF state also for a specified duration. Morgan chopper circuit using saturable reactor in place of the ordinary inductor L is a modified arrangement for this process. The circuit has the advantage of longer oscillation period and therefore of more assurance of commutation. In this Class B commutation method, the commutating component does not carry the load current. Both Class A and Class B turn-off circuits are self-commutating types, that is in both of these circuits the SCR turns-off automatically after it has been turned on.

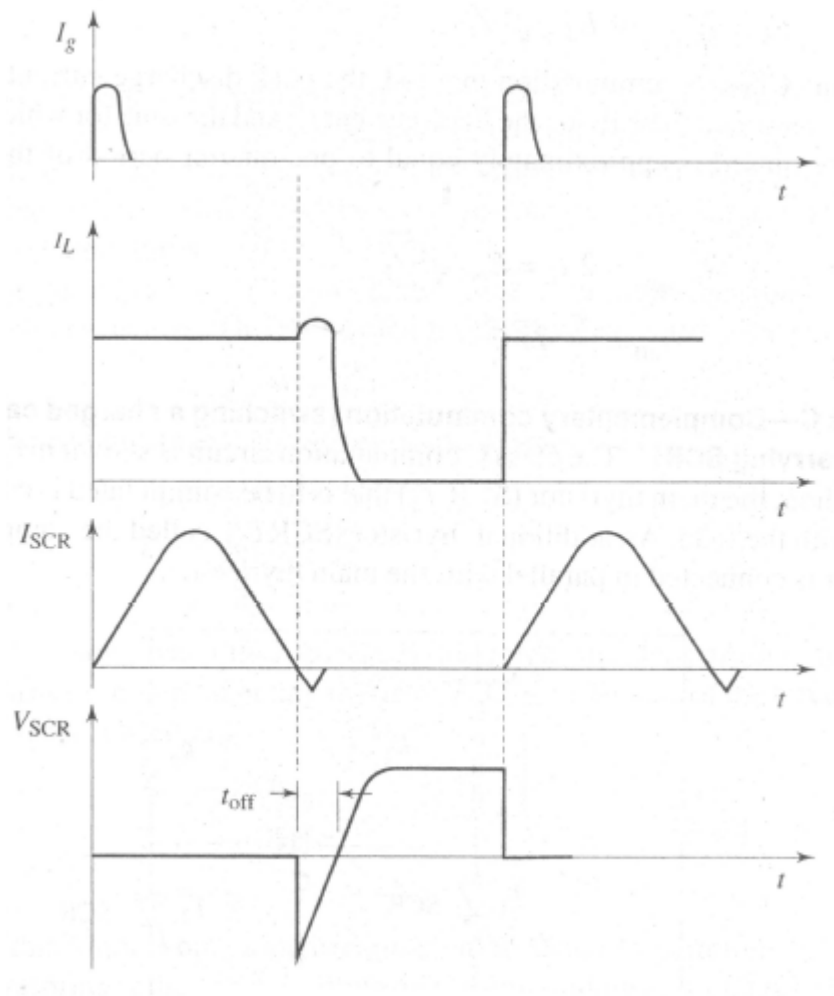


Fig.2