

Class E Commutation

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

Class E-external pulse commutation: In Class E commutation method, the reverse voltage is applied to the current carrying thyristor from an external pulse source. A typical Class E commutation circuit is shown in Fig. 1 and the associated waveforms are shown in Fig. 2 Here, the commutating pulse is applied through a pulse-transformer which is suitably designed to have tight coupling between the primary and secondary. It is also designed with a small air gap so as not to saturate when a pulse is applied to its primary. It is capable of carrying the load-current with a small voltage drop compared to the supply voltage. When the commutation of T_1 is desired, a pulse of duration equal to or slightly greater than the turn-off time specification of the thyristor is applied.

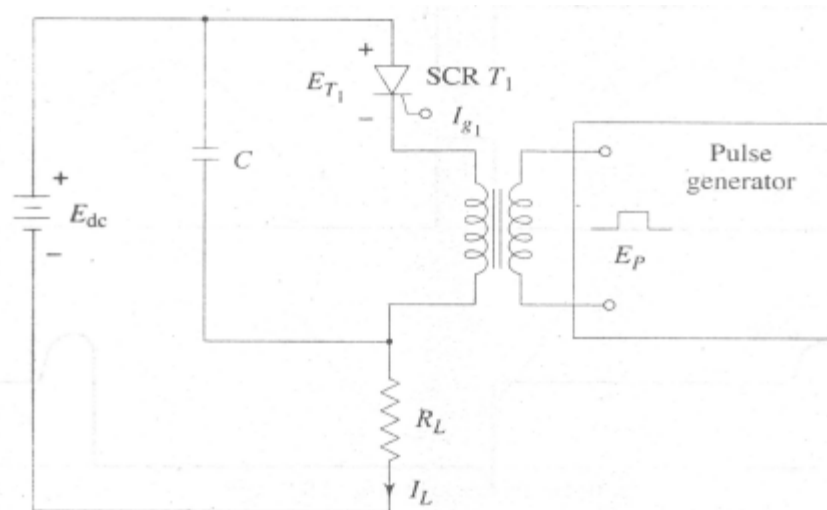


Fig.1

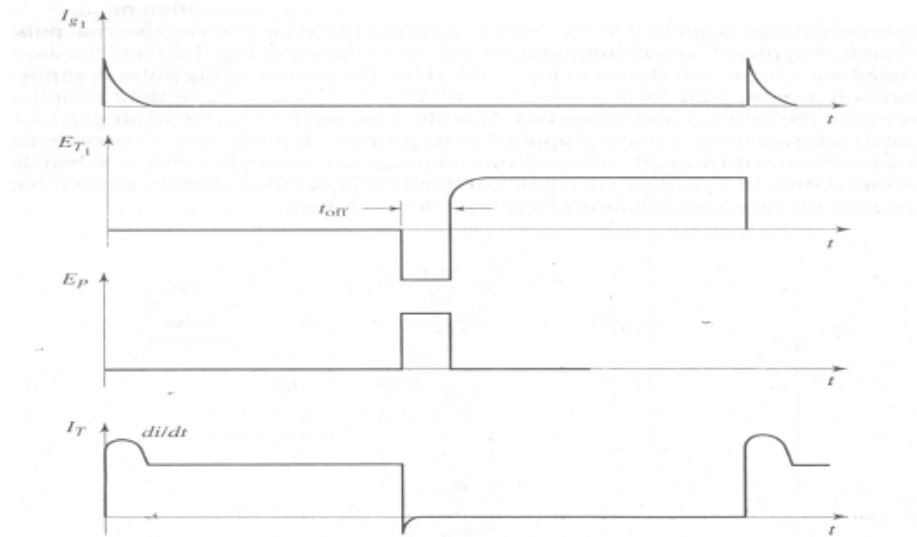


Fig.2

When the SCR T1 is triggered, current flows through the load RL and the pulse transformer. When a pulse of voltage E_p from the pulse generator is applied to the primary of the pulse transformer, the voltage induced in the secondary appears across thyristor T1 as a reverse voltage ($-E_p$) and turn it off. Since the induced pulse is of high frequency, the capacitor offers almost zero impedance. After T1 is turned off, the load current decays to zero. Earlier to the commutation, the capacitor voltage remains at a small value of about 1V.

This type of commutation method is capable of very high efficiency as minimum energy is required and both time ratio and pulse width regulation are easily incorporated. However, equipment designers have neglected this class for the designing of power circuits.