

1.5. SWITCHING CHARACTERISTICS

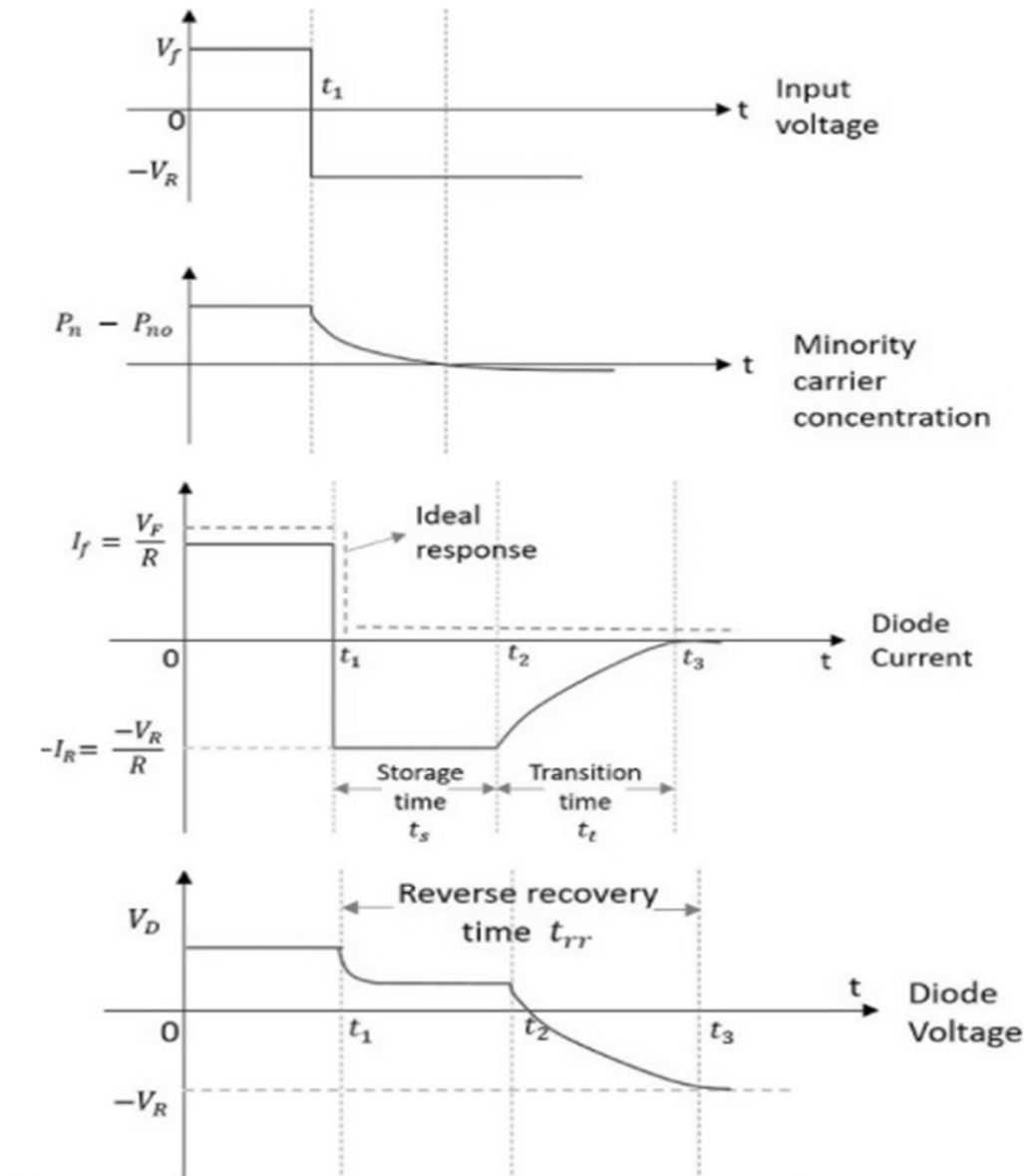


Fig:1.5.1 Switching Characteristics of Diode

(Source : <https://www.tutorialspoint.com/>)

Where

t_F = forward bias time

t_S = Storage time

t_T = transition interval

t_{RR} = reverse recovery time

Reverse recovery time:

Reverse recovery time is addition of storage time and transition interval. When the diode is in forward bias and immediately switched to reverse condition, the diode will

still conduct current for certain amount of time. The time period for which the diode conduct electricity after switching the voltage is called “reverse recovery time”

The reason for reverse recovery time is:

1. In conduction state, electrons in p-type material and holes in n-type material as minority carrier.
2. When applied the reverse voltage diode to switch from conducting to nonconducting state immediately but due to minority carrier the reverse current flows through the diode and stays at measureable level for storage time (t_S) required for minority carrier to return to their majority carrier state in the opposite material (n-type material for electron and p-type material for holes).
3. After this time period transition interval (t_T) required for current to get back to level associated with nonconduction state.

Reverse recovery time depends on junction temperature, rate of fall of forward current.

Reverse recovery time should be small for high speed switching application and can be reduced by shortening the length of P region in PN junction diode or by introducing impurities for example Gold.

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