



ANALOG ELECTRONICS

LECTURE NO. 6

Switching Characteristics of Diode

- ▣ In the forward-bias state it was shown earlier that there are a large number of electrons from the *n-type material* progressing through the *p-type material* and a large number of holes in the *n-type*.

Switching Characteristics of Diode

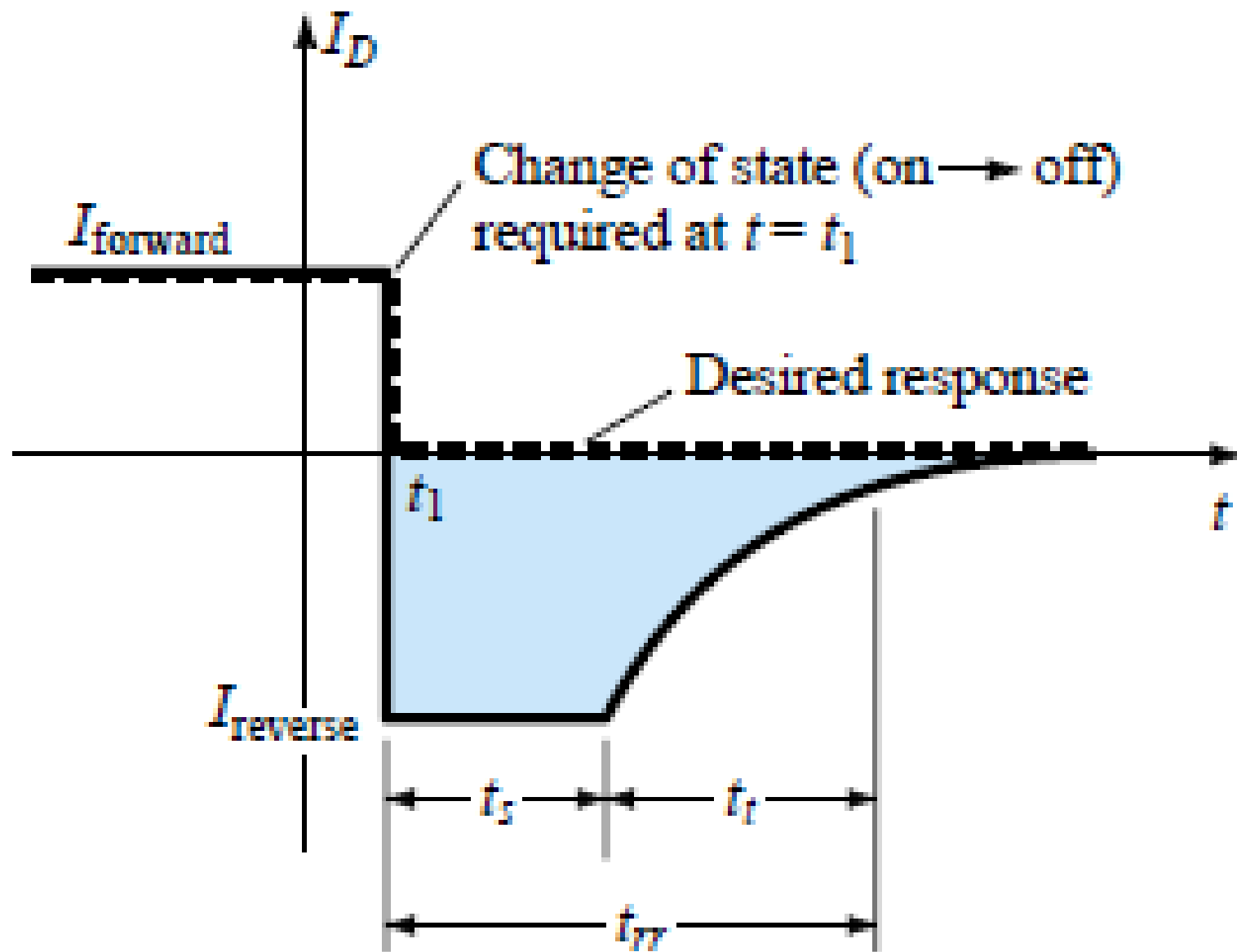
- ▣ The electrons in the *p-type* and holes progressing through the *n-type* material establish a large number of minority carriers in each material

Switching Characteristics of Diode

- ▣ If the applied voltage should be reversed to establish a reverse-bias situation, we would ideally like to see the diode change instantaneously from the conduction state to the non conduction state.

Switching Characteristics of Diode

- ▣ However, because of the large number of minority carriers in each material, the diode current will simply reverse as shown and stay at this measurable level for the period of time t_s (*storage time*) required for the *minority* carriers to return to their majority-carrier state in the opposite material.



Peak to Peak Detector

- ▣ A *peak detector* is a series connection of a diode and a capacitor outputting a DC voltage equal to the peak value of the applied AC signal.

Peak to Peak Detector

- ▣ An AC voltage applied to the peak detector, charges the capacitor to the peak of the input.
- ▣ The diode conducts positive "half cycles," charging the capacitor to the waveform peak.
- ▣ When the input waveform falls below the DC "peak" stored on the capacitor, the diode is reverse biased, blocking current flow from capacitor back to the source.
- ▣ Thus, the capacitor retains the peak value even as the waveform drops to zero

