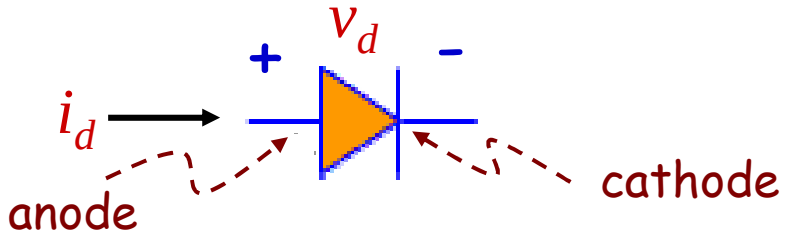
Basic Diode Concepts

- Like resistors and capacitors, diodes are two terminal devices
  - The 2 terminals are called Anode and Cathode
- It conducts current in one direction only (from anode to cathode)
- Unlike capacitors & inductors, current in diodes is directly related to voltage
  - But this current is not linearly related to voltage
- Diodes only consume power → They are said to be passive devices



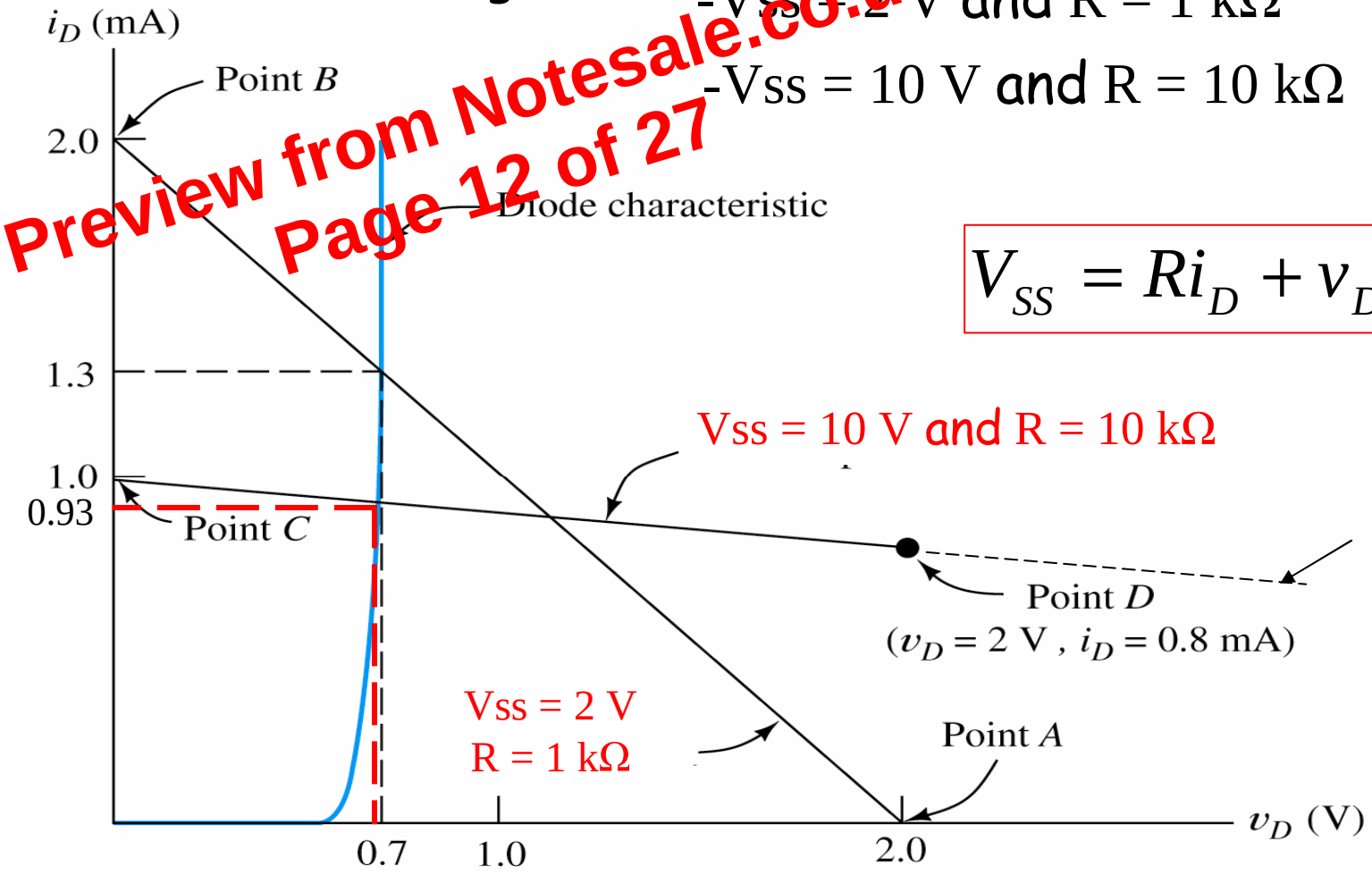
Diodes are nonlinear, two terminal, passive electrical devices

Load-Line Analysis of Diode Circuits

Example: Find the diode voltage & current at the operating point for the following cases:

-Vss = 2 V and R = 1 kΩ

-Vss = 10 V and R = 10 kΩ



$$V_{SS} = Ri_D + v_D$$

Figure 10.7 Load-line analysis for Examples 10.1 and 10.2.

Peak Inverse Voltage (PIV)

- The maximum voltage that will appear across the diode when it is off
- The specification of the diode should be greater in magnitude than PIV so it is not damages

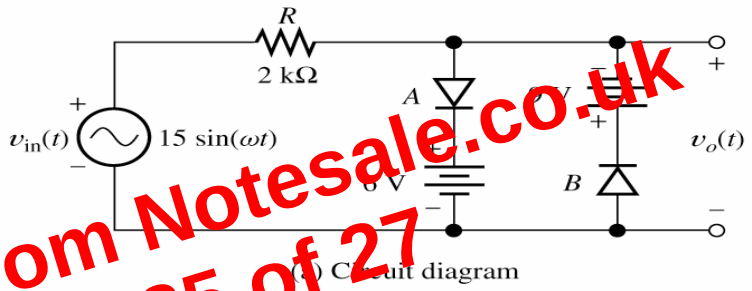
- For half-Wave rectifier:

$$\text{PIV} = V_m$$

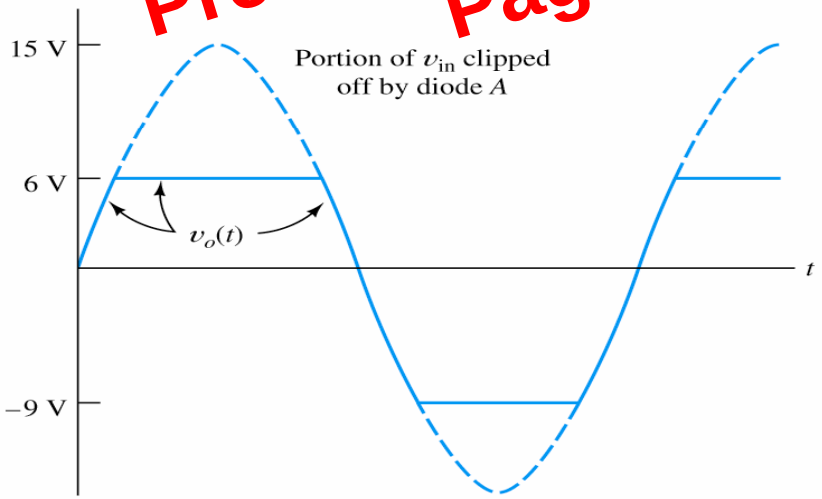
- For half-Wave rectifier with capacitor:

$$\text{PIV} = 2V_m$$

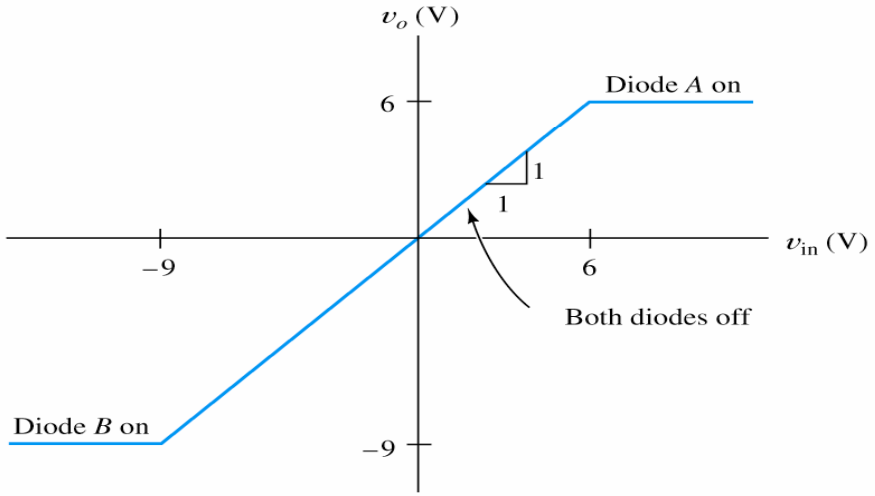
Clipper Circuits



(a) Circuit diagram



(b) Waveforms



(c) Transfer characteristic

Clipper circuit.

R is large to limit the current but small to prevent the reverse current from causing a large voltage drop