

Diode Characteristics

Source: James Brophy, Basic Electronics for Scientists, 5th Edition

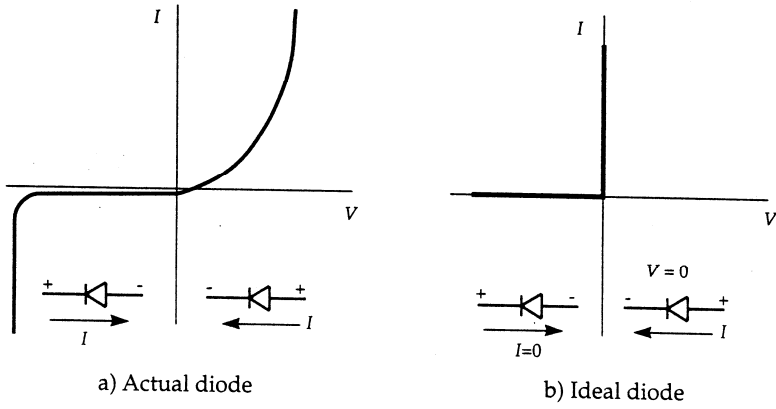


Figure 6.18 Characteristics of a diode.

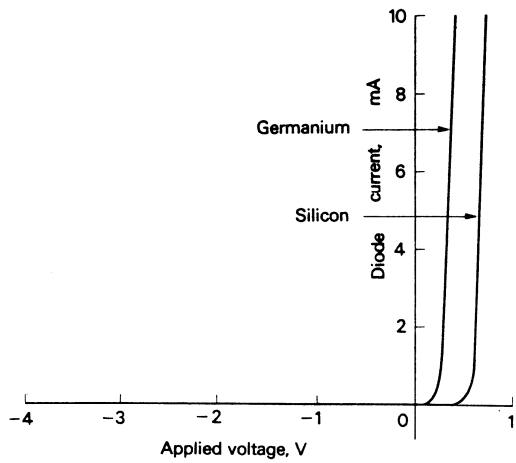


Figure 3-2 Current-voltage characteristics of germanium and silicon junction diodes.

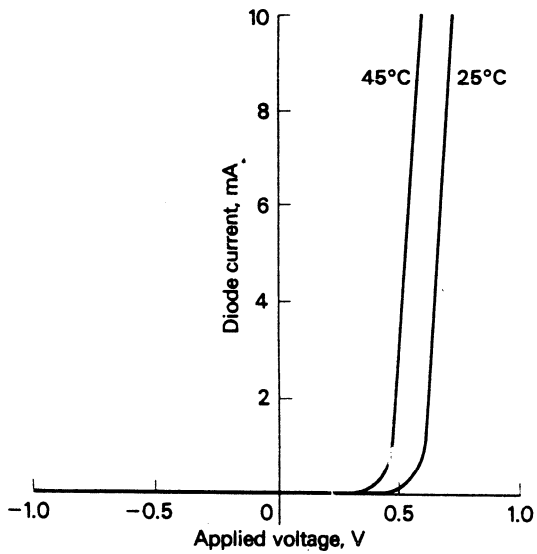


Figure 3-3 Effect of temperature on current-voltage characteristics of silicon junction diode.

Semiconductors, P-Type, and N-Type Materials

Forward and Reverse Biasing of the PN Junction

Reference: Aminian and Kazimierczuk, *Electronic Devices: A Design Approach*, 2004

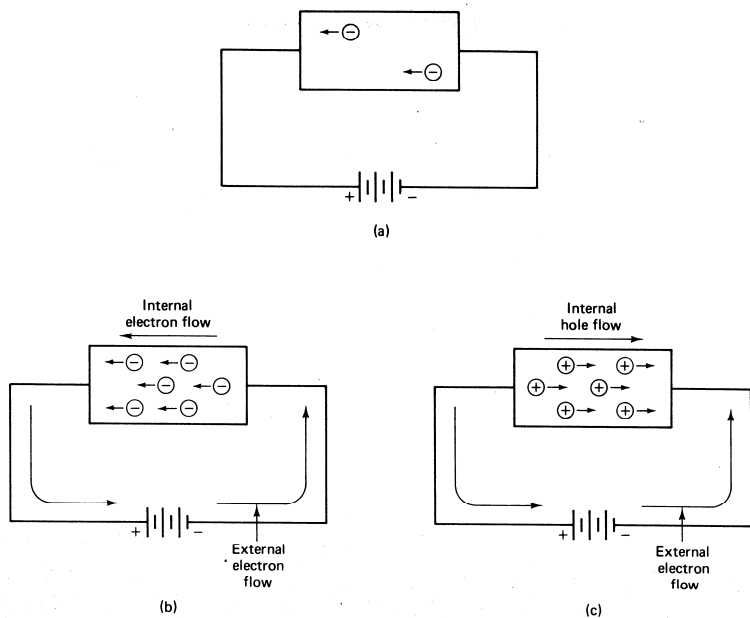
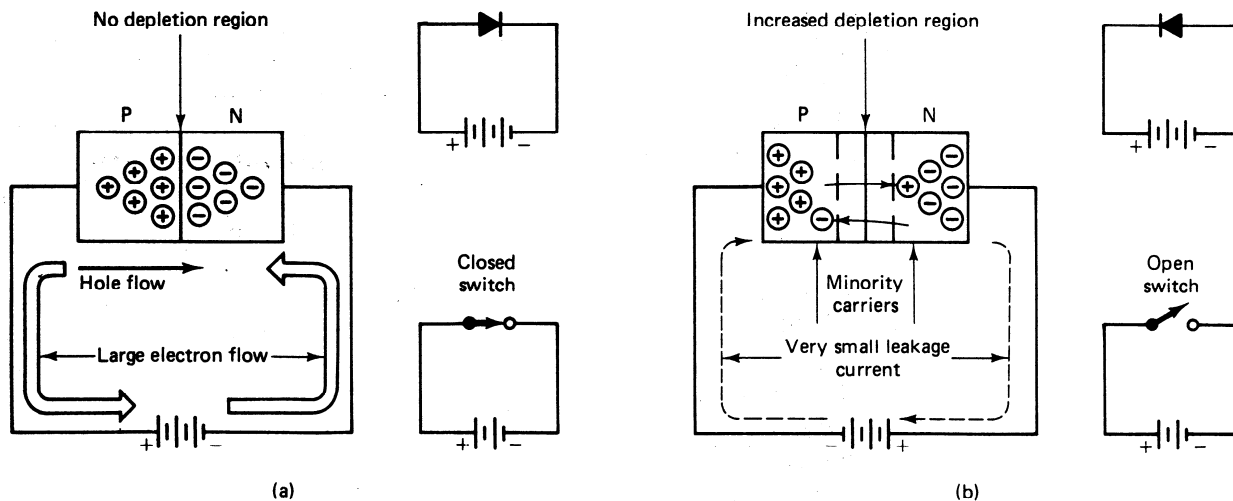


Figure 1-6 Conduction in semiconductor materials: (a) very little current flow in pure silicon; (b) electron flow in *n*-type material; (c) hole flow in *p*-type material.



Biasing the diode: (a) forward bias; (b) reverse bias.

Forward and Reverse Biasing of the PN Junction - continued

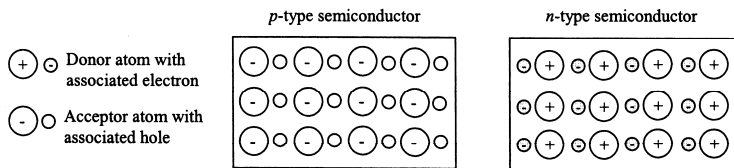


Figure 1-9: Blocks of *p*-type and *n*-type semiconductors before they are joined

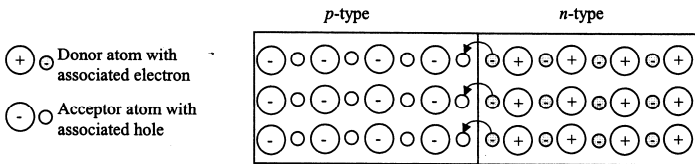


Figure 1-10: Blocks of *p*-type and *n*-type semiconductors at the instant they are joined

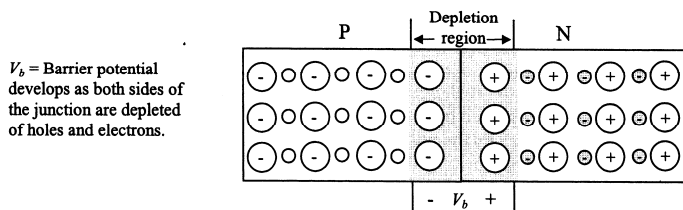


Figure 1-11: The *p-n* junction after recombination of electron-hole pairs

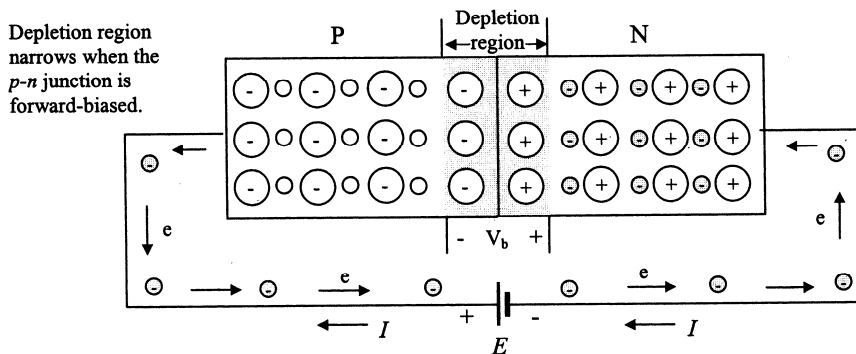


Figure 1-12: Forward biasing the *p-n* junction with an external source

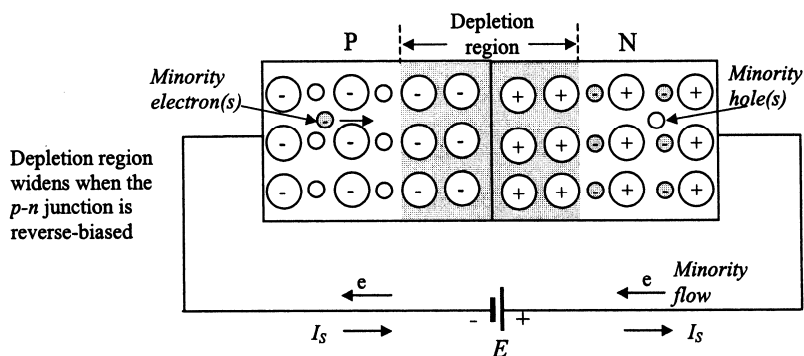


Figure 1-13: Reverse biasing the *p-n* junction with an external source

Diode Rectifiers, Clippers, and Clamps

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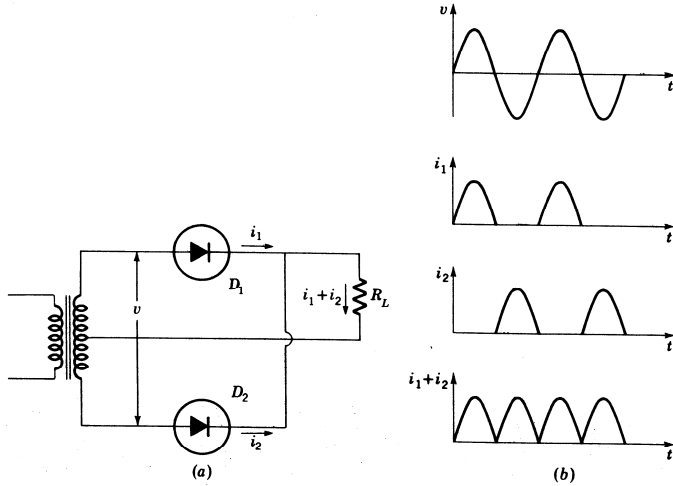


Figure 3-8 (a) Full-wave rectifier and (b) waveforms.

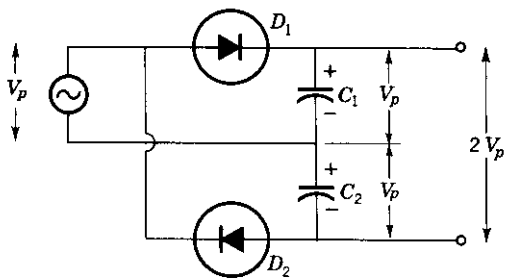


Figure 3-10 Voltage-doubler rectifier yields dc output voltage equal to twice peak input voltage.

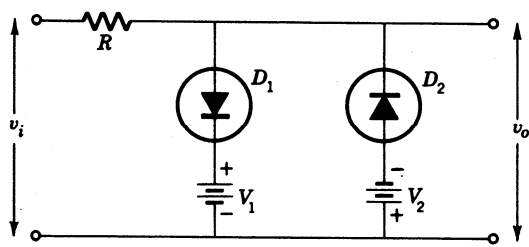


Figure 3-22 Diode clipper.

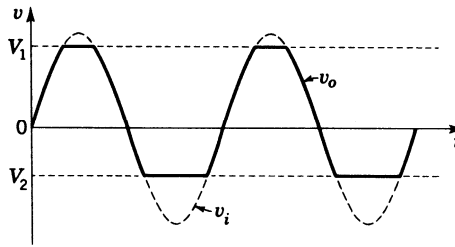


Figure 3-23 Maximum amplitudes in output waveform of diode clipper are limited to values of bias voltage.

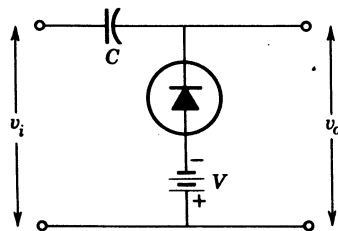


Figure 3-24 Diode clamp.

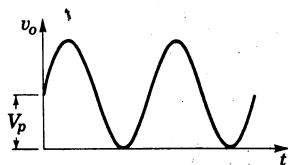


Figure 3-25 Negative peak of output waveform is clamped at zero when $V = 0$ in diode clamp circuit of Fig. 3-24.