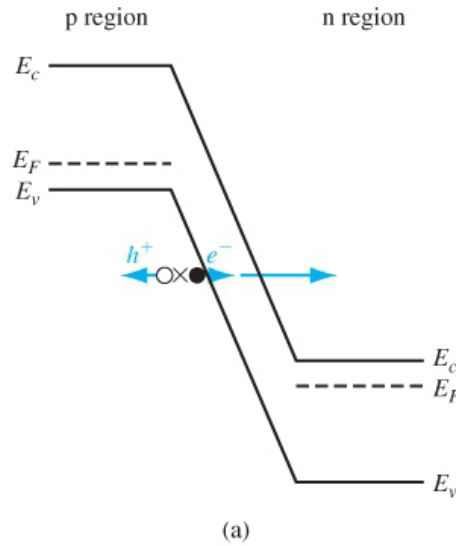
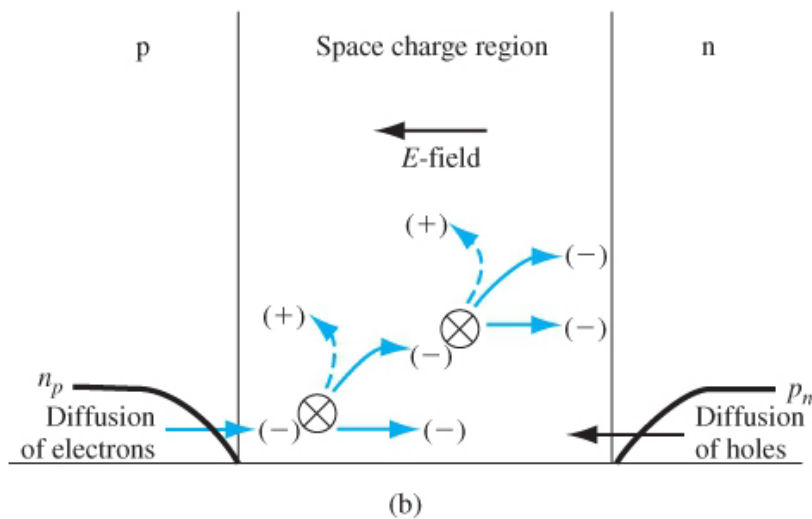


From *Semiconductor Physics and Devices: Basic Principles* (4th Edition), Donald A. Neamen, McGraw Hill, 2012, ISBN 978-0-07-352958-5.



**Figure 7.12** | (a) Zener breakdown mechanism in a reverse-biased pn junction

- Tunneling can occur in sufficient quantities for appreciable reverse current as  $E_c$  and  $E_v$  on either side of pn junction become close under reverse bias.



**Figure 7.12** | (b) avalanche breakdown process in a reverse-biased pn junction.

- Electrons (left) and holes (right) diffusing into depletion region knock loose electrons/holes from atoms. These move under influence of electric field to give reverse current. In turn, they can knock loose further electrons/holes (‘avalanche effect’).