

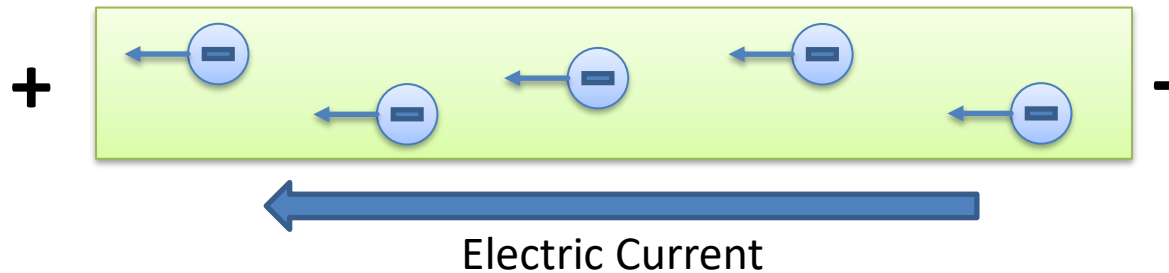
Semiconductors

Digital Electronics

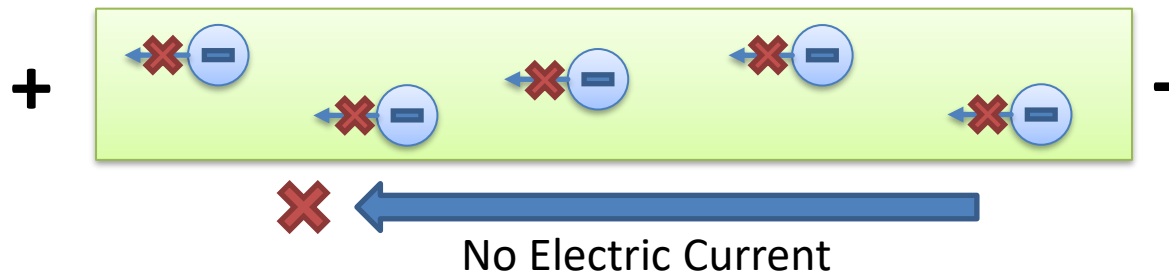
by Wolfgang Neff

Semiconductors (1)

- Conductor

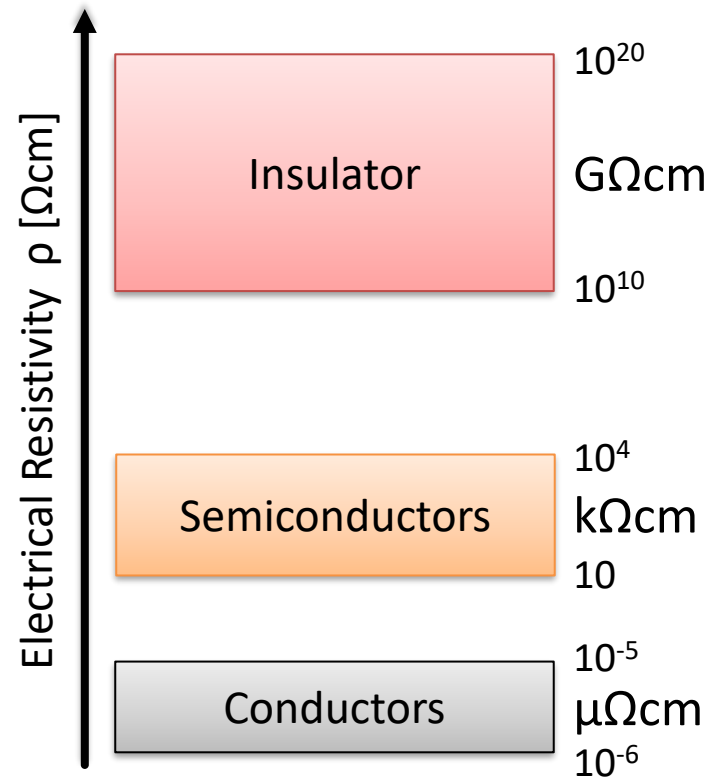


- Insulator



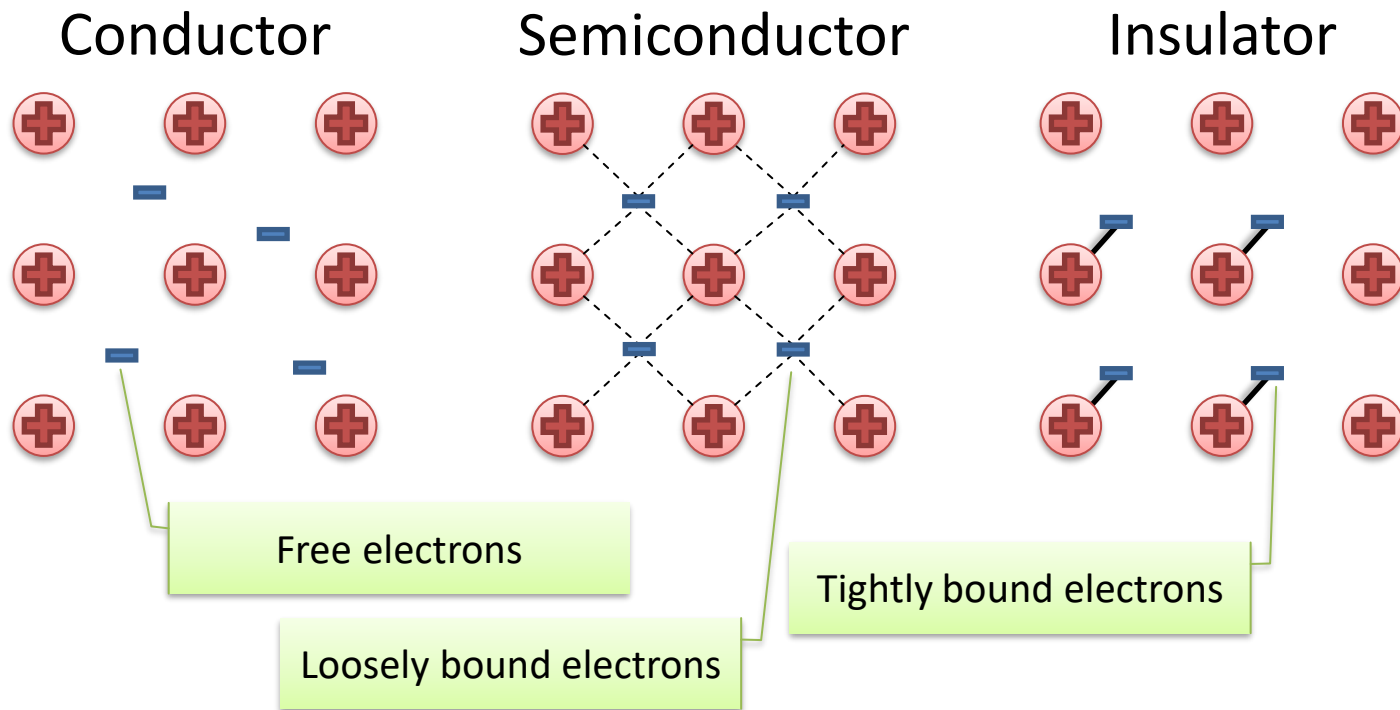
Semiconductors (2)

- Classification
 - Conductor
 - Silver, copper
 - High conductivity
 - Insulator
 - Porcelain, plastics
 - High resistivity
 - Semiconductor
 - Silicon, germanium



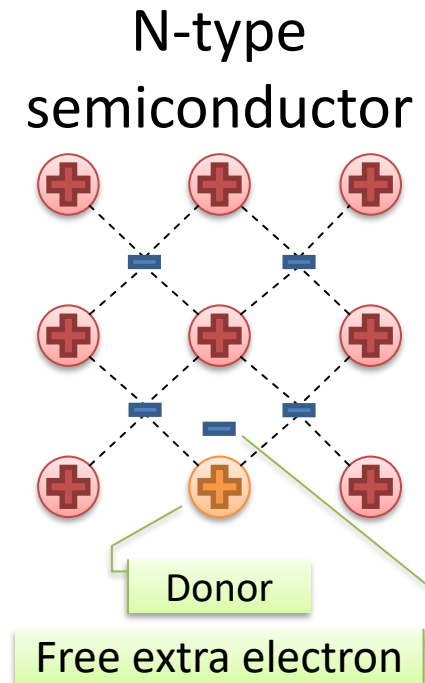
Semiconductors (3)

- Conductivity



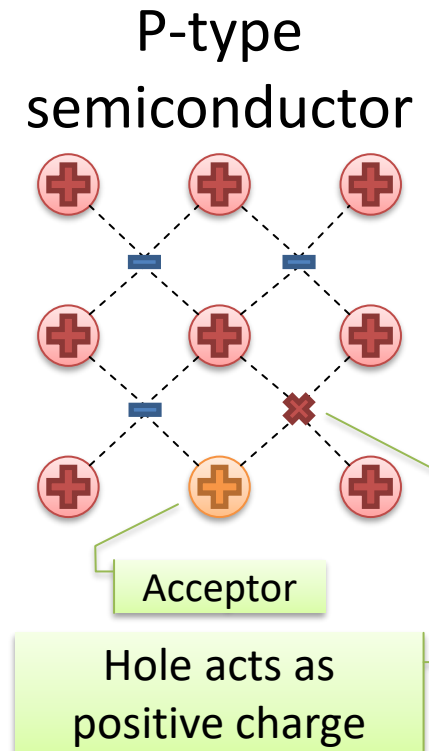
Semiconductors (4)

- Doping: donors
 - Some atoms are replaced by donors
 - Extra electrons
 - Better conductivity
 - N-type doping



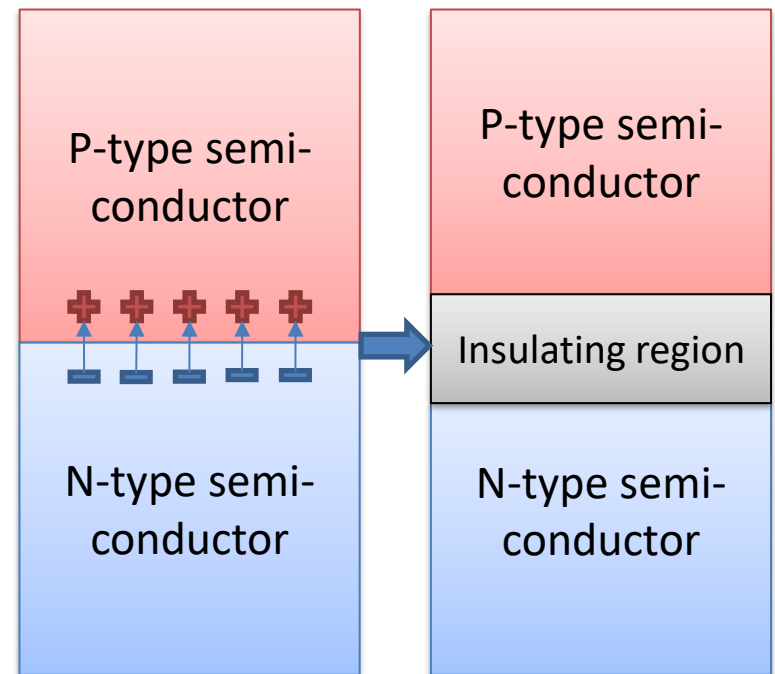
Semiconductors (5)

- Doping: acceptors
 - Some atoms are replaced by acceptors
 - Lack of electrons
 - Better conductivity
 - P-type doping



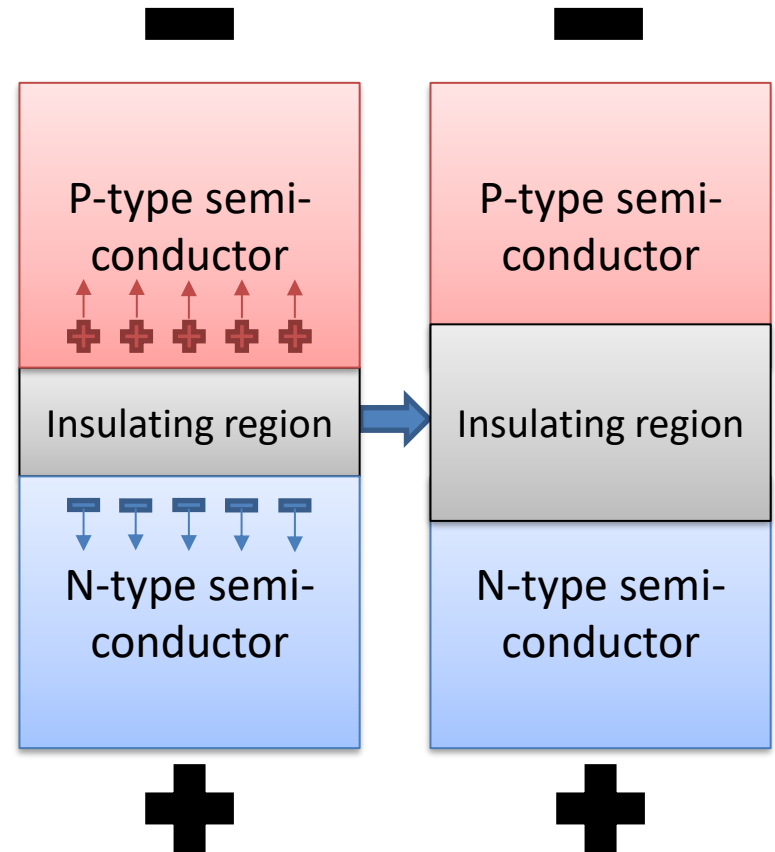
Semiconductors (6)

- P–n junction
 - Electrons jump into the holes
 - There are no longer free charges
 - There is an insulating region



Semiconductors (7)

- P–n junction (continued)
- Power supply
 - P-type side: –
 - N-type side: +
- Insulating region gets even larger



Semiconductors (8)

- P–n junction (*finished*)
- Power supply
 - P-type side: +
 - N-type side: -
- Insulating region gets smaller

