1. Conductors, semiconductors, and insulators

Materials can be divided into three categories according to their ability to conduct an electric current:

- Conductors: Materials that easily conduct electricity (i.e., materials with high electrical conductivity and low electrical resistivity)
- Semiconductors: Materials with an electrical conductivity value that falls between that of a conductor and that of an insulator
- Insulators: Materials that do not readily conduct electricity (i.e., materials with high electrical resistivity)

Conductors have electrical resistivity on the order of 10^{-8} to 10^{-4} Ωcm whereas insulators have electrical resistivity on the order of 10^{8} to 10^{18} Ωcm. Semiconductors have an electrical resistivity value between those of conductors and insulators—10^{-4} to 10^{8} Ωcm.

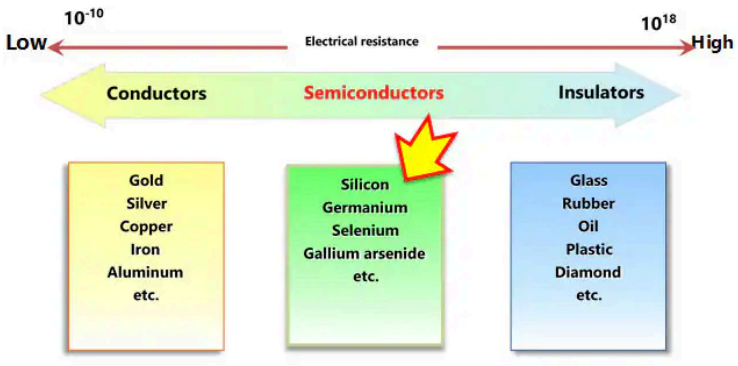

Figure 1-1 Categories of materials according to their electrical resistivity

Electrical resistance (R) is the resistance to a flow of electric current through a material. The electrical resistance of a material is proportional to its length (l) and inversely proportional to its cross-sectional area (A). Each material has also an intrinsic property called electrical resistivity (ρ). Electrical resistance (R) is expressed as follows as a function of ρ, l and A. Electrical resistivity (ρ) is determined by the energy level (band) of the electrons in the outermost shell of an atom, crystalline states, and other factors.

$$R = \rho \times \frac{l}{A}$$

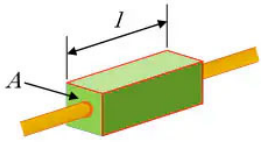

Figure 1-2 Definition of the electrical resistance of a material

Chapter1 Basics of Schottky Barrier Diodes (Basic of Semiconductor Device)

1-1. Energy band diagram	1-2. Characteristics of an intrinsic silicon semiconductor	1-3. pn junction	1-3-1. Forward biasing	1-3-2. Reverse biasing
Details	Details	Details	Details	Details

Chapter2 Basics of Schottky Barrier Diodes (Basic of Metal-semiconductor junction)

Chapter3 Basics of Schottky Barrier Diodes

Related information

- **Products**
  Schottky Barrier Diodes
- **Applidcation Notes**
  Application Notes
- **FAQs**
  Diodes
- **Parametric Search**
  Schottky Barrier Diodes
- **Stock Check & Purchase**
  Stock Check & Purchase

Back to Basics of Schottky Barrier Diodes