

Semiconductor Parameters

Material	E_g (eV)	B (cm ⁻³ K ^{-3/2})	n_i (cm ⁻³) @ RT
Si	1.1	5.23×10^{15}	1.5×10^{10}
GaAs	1.4	2.10×10^{14}	1.8×10^6
Ge	0.66	1.66×10^{15}	2.4×10^{13}

k - Boltzmann's Constant

$$k = 1.38 \times 10^{-23} \text{ m}^2 \text{ kg s}^{-2} \text{ K}^{-1}$$

q - electron charge

$$q = 1.60 \times 10^{-19} \text{ coulombs} \quad (\text{As})$$

T - Temperature in Kelvin

$$70^\circ\text{F} \rightarrow 21^\circ\text{C} \rightarrow 294\text{K}$$

Typically call Room Temp (RT) 300K (80 °F)

Diffusion coefficient electrons Si $\leq 36 \text{ cm}^2/\text{s}$

Diffusion coefficient holes Si $\leq 12 \text{ cm}^2/\text{s}$

Mobility electrons Si $\leq 1400 \text{ cm}^2 / \text{V s}$

Mobility holes Si $\leq 450 \text{ cm}^2 / \text{V s}$