PN Junction (1A)

- Drift Current
- Diffusion Current

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Electron & Hole Concentration

$$n = N_c e^{\left(\frac{E_f - E_c}{kT}\right)}$$

$$E_c < E_f < Ev$$

$$f(E) \approx e^{\left(\frac{E - E_f}{kT}\right)}$$

$$n = N_c e^{\left(\frac{E_f - E_c}{kT}\right)}$$

$$n = N_c e^{\left(\frac{E_f - E_c}{kT}\right)}$$

$$E_c < E_f < Ev$$

$$1 - f(E) \approx e^{\left(\frac{E - E_f}{kT}\right)}$$

$$p = N_v e^{\left(\frac{E_f - E_c}{kT}\right)}$$

Electron & Hole Concentration

$$n = p$$

$$N_c e^{\left(\frac{E_f - E_c}{kT}\right)} = N_v e^{\left(\frac{E_f - E_c}{kT}\right)}$$

$$E_{fo} = \frac{1}{2}(E_c + E_v) + \frac{3}{4}kT \log \frac{m_v}{m^*}$$

$$n^2 = p^2 = n_i^2$$

$$n = p = n_i = (N_c N_v)^{1/2} e^{\left(\frac{-E_g}{2kT}\right)}$$

References

[1] http://en.wikipedia.org/