

Tutorial #8

Problem 1 – pn junction diode

1. A one-sided, short-base, p/n+ diode has the following properties: $N_a = 1 \times 10^{16} \text{ cm}^{-3}$, $N_d = 1 \times 10^{19} \text{ cm}^{-3}$, area = $400 \text{ } \mu\text{m}^2$, $W_p = 1.0 \text{ } \mu\text{m}$, and $W_n = 1.0 \text{ } \mu\text{m}$. For $V_D = -2.5\text{V}$ / $V_D = 0\text{V}$ / and $V_D = 0.45\text{V}$,
 - a) What is the depletion layer width?
 - b) What is the maximum electrostatic field in the depletion region?
 - c) What is the minority carrier concentration at the edges of the depletion layer?
 - d) What is the minority carrier concentration at the contacts?

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