PN Diode Exercise: PIN Diode

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In this exercise we will examine the operation of a pin-diode under forward and reverse bias conditions. The p-side doping is $N_A=10^{17}$ cm^{-3} and the n-side doping is $N_D=10^{17}$ cm^{-3}. The length of the p-side and the n-side region is 0.2 um. The intrinsic region width is varying from 0.1 to 0.4 um, in an increment of 0.1 um. For this device structure

(a) Plot the total charge density under equilibrium conditions for all devices with different intrinsic region width.

(b) Plot the electric field profile for applied bias on the anode of 0.6 V for the three widths of the intrinsic region.

(c) Plot the electric field profile for applied bias on the anode of -2 V for the three widths of the intrinsic region.