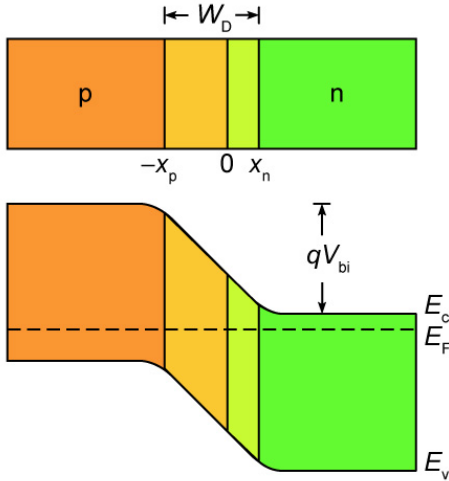
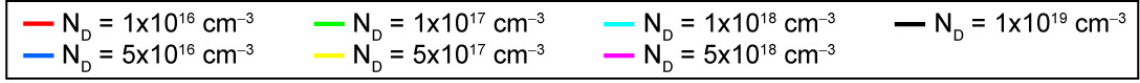
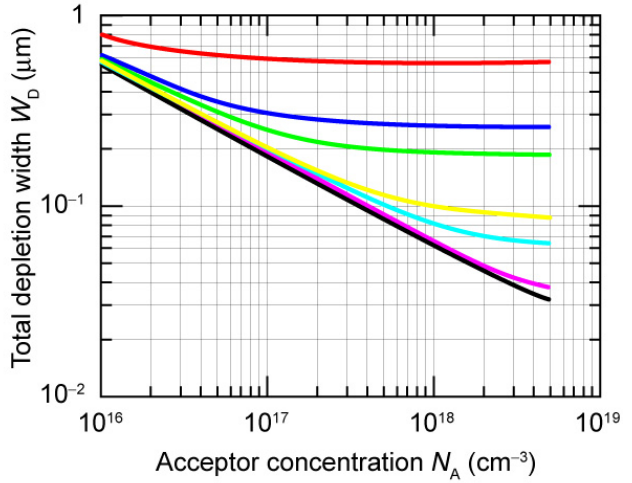


Depletion width for p-n junctions and metal–semiconductor contacts

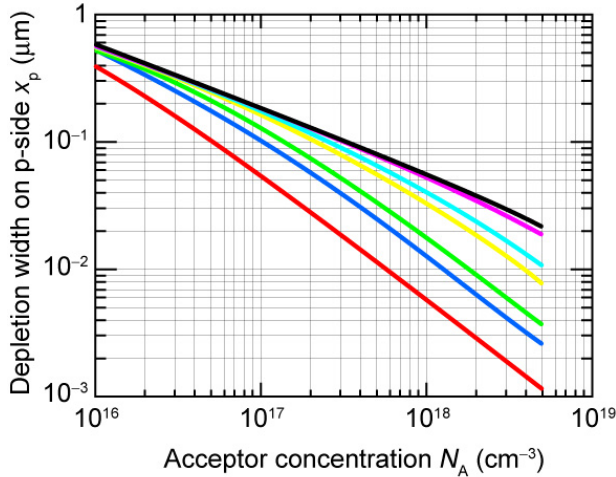
- Depletion width in pn junctions



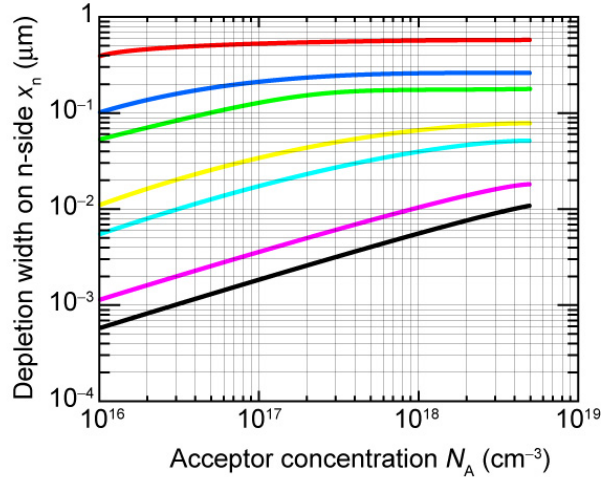
Schematic structure of a p-n junction and energy band diagram at thermal equilibrium



Total depletion width for a GaN p-n junction as a function of the acceptor concentration for different donor concentrations



Depletion width on p-side for a GaN p-n junction as a function of the acceptor concentration for different donor concentrations



Depletion width on n-side for a GaN p-n junction as a function of the acceptor concentration for different donor concentrations

- The following equations were used for the plots:

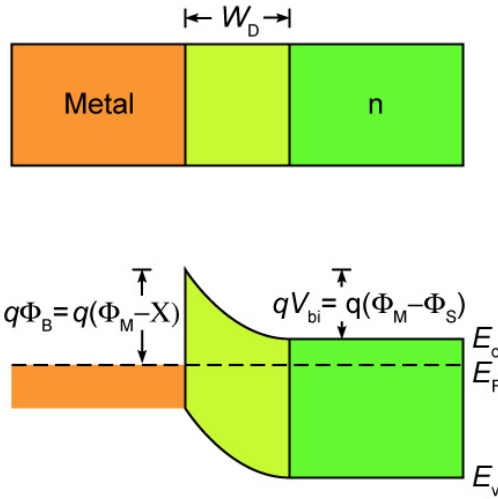
$$V_{bi} = \frac{kT}{e} \ln \left(\frac{N_A N_D}{n_i^2} \right)$$

$$W_D = \sqrt{\frac{2\epsilon V_{bi}}{e} \left(\frac{1}{N_A} + \frac{1}{N_D} \right)}$$

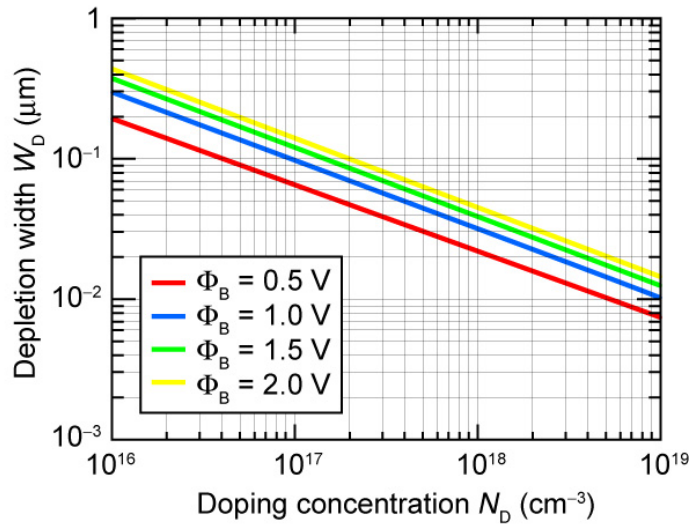
$$x_n = \sqrt{\frac{2\varepsilon V_{bi}}{eN_D \left(1 + \frac{N_D}{N_A}\right)}}$$

$$x_p = \sqrt{\frac{2\varepsilon V_{bi}}{eN_A \left(1 + \frac{N_A}{N_D}\right)}}$$

- Depletion width in Schottky junctions



Schematic structure of a metal–semiconductor junction and the energy band diagram at thermal equilibrium



Depletion width for a metal–n-type GaN junction as a function of doping concentration for different values of barrier height

- The following equations were used for the plot:

$$V_{bi} = \Phi_B - \left(\frac{E_C - E_F}{e}\right) = \frac{kT}{e} \ln \frac{N_c}{N_D}$$

$$W_D = \sqrt{\frac{2\varepsilon V_{bi}}{eN_D}}$$