8.1 Drift diffusion model

Model in Comsol

The attached file is a model P-N diodes made of silicon for simulation environment COMSOL Multiphysics in version 3.5. 1D model represents the structure of the doping profile identical to fig. **8.1B.1**. The equations (8.1B.31) and boundary conditions for ohmic contact (8.1B.37) and (8.1B.41) are implemented in the model. The SRH recombination model and table the value of mobility carriers at 300K is used.

After opening the model in COMSOL program plots the uniform mesh of the model. In the *Solve* menu, click on *Solve Problem* which run the default simulation, which is based on calculating the potential and the concentration of carriers, depending on the applied voltage on the diode, which is varied in range from 0 to 2 V.

In the *Postprocessing* menu, click on *Plot Parameters*. In the *Line* tab in menu *Predefined Quantities* select variable whose distribution along the diode we want to plot

- *psi* electric potential
- *cn* concentrations of electrons
- *cp* concentration of holes

In the *General* tab in the menu *Predefined Value* select the specific value of applied voltage, for which we want to plot the distribution. The appropriate quantity is plotted by clicking on button Ok.

V-A characteristics is available in the menu *Postprocessing*/ *Domain Plot Variables*, where the in the *Point* tab select the *Boundary Selection* No. 1, check if there is the *Ic* term in *Expression* field, and click Ok.