The Fermi No-Droop Theorem

As we discussed in class, Shockley made up a model of diode transport assuming that the Fermi-level was constant across the junction space charge. Assume a p+/n junction. Then acceptor doping is 5 x 10^{18}/cm^3 and the donor doping is 10^{16}/cm^3. The junction is forward biased by 1V. Estimate the change in Fermi level across the junction. Does this “droop” make a significant difference in the estimate of injected minority charge at the space charge boundary?