1. Calculate the maximum space charge width for a given semiconductor doping concentration. Consider silicon at *T =* 300 K doped to *Na =* 1016 /cm3. The intrinsic carrier concentration is 1.5 x 1010 /cm3.
2. Assume that a forward bias of 0.60 V is applied to the pn junction. Determine the current density in a silicon pn junction at *T =* 300 K. Consider the following parameters in a silicon pn junction:



1. A n-type Silicon has conductivity 2 S/m. Determine hole & electron concentration. Find the change in conductivity if a heat source provides 2 x 1015 electron-hole pairs/ cubic cm.
2. Calculate the thermal equilibrium concentrations of electrons and holes for a given Fermi energy. Consider silicon at *T =* 300 K, Assume that the Fermi energy is 0.22 eV below the conduction band.
3. Analyze the characteristics and modes of operation. Current Gain of device = 50.

