II. *pn* Junction

Symbol	Description	Unit
p_p	Hole concentration in *p*-type semiconductor (majority carrier)	cm^{-3}
n_p	Electron concentration in *p*-type semiconductor (minority carrier)	cm^{-3}
p_n	Hole concentration in *n*-type semiconductor (minority carrier)	cm^{-3}
n_n	Electron concentration in *n*-type semiconductor (majority carrier)	cm^{-3}
p_{p0}	Hole concentration in *p*-type semiconductor at thermal equilibrium	cm^{-3}
n_{p0}	Electron concentration in *p*-type semiconductor at thermal equilibrium	cm^{-3}
p_{n0}	Hole concentration in *n*-type semiconductor at thermal equilibrium	cm^{-3}
n_{n0}	Electron concentration in *n*-type semiconductor at thermal equilibrium	cm^{-3}
Δp_n	Excess hole concentration in a *n*-type semiconductor (minority carrier)	cm^{-3}
Δn_p	Excess electron concentration in a *p*-type semiconductor (minority carrier)	cm^{-3}
V_o	Built-in voltage of a *pn* junction	V
W_{dep}	Depletion region width of a *pn* junction	μm
x_p	Depletion region width on the *p*-side of a *pn* junction	μm
x_n	Depletion region width on the *n*-side of a *pn* junction	μm
q_j	Charge stored in either side of the depletion region of a *pn* junction	C
ε_o	Permittivity of free space ($\varepsilon_o = 8.854 \times 10^{-14}$ F/cm)	F/cm
ε_r	Relative permittivity ($\varepsilon_r = 11.7$ for Si)	
ε_s	Permittivity of semiconductor ($\varepsilon_s = \varepsilon_r \varepsilon_o = 11.7 \times 8.854 \times 10^{-14}$ F/cm for Si)	F/cm
V_{ZK}	Breakdown (knee) voltage of a *pn* junction	V
V_Z	Breakdown voltage of a Zener diode	V
L_p	Hole diffusion length	μm
L_n	Electron diffusion length	μm
I_S	Saturation current of a *pn* junction	A
n	Exponential factor in the current-voltage relation of a *pn* junction*	
C_j	Depletion/junction capacitance of a *pn* junction	F
C_d	Diffusion capacitance of a *pn* junction	F
m	Grading coefficient of a *pn* junction	
i_D	Total current of a *pn* junction = $I_D + i_d$	A
v_D	Total voltage across a *pn* junction = $V_D + v_d$	V
I_D	dc current of a *pn* junction	A
V_D	dc voltage of a *pn* junction	V
i_d	small-signal ac current of a *pn* junction	A
v_d	small-signal ac voltage across a *pn* junction#	V
V_{DO}	Turn-on (knee) voltage of the piecewise-linear model of a *pn* junction	V
r_D	Resistance of the piecewise-linear model of a *pn* junction	Ω
r_d	Small-signal resistance of a *pn* junction	Ω
r_s	Series resistance of the neutral regions of a *pn* junction	Ω

*n is also used to denote electron concentration

#v_d is also used to denote the drift velocity of charge carriers