EE471 Useful Constants and Material Property Values

Quantity	Symbol	Value
Boltzmann's constant	k	1.38×10^{-23} Joules/°K
Elementary charge	q	1.6×10^{-19} Coulombs
Electron volt	eV	$1\text{ eV} = 1.6\times10^{-19}$ Joules
Permittivity in vacuum	ε_0	8.85×10^{-14} Farads/cm
Plank's constant	h	6.63×10^{-34} Joule - sec
Speed of light in vacuum	c	3.00×10^{10} cm/sec
Thermal voltage at 300°K	$V_T = kT/q$	0.026 V
Thermal energy at 300°K	$E_{th} = kT$	0.026 eV
Bandgap of Si at 300°K	$E_{g(Si)}$	1.1 eV
Intrinsic carrier conc. of Si at 300°K	n_i	$10^{10}\ cm^{-3}$
Effective density of states in conduction band in Si at 300°K	N_c	$2.8\times10^{19}\ cm^{-3}$
Effective density of states in valence band in Si at 300°K	N_v	$1.04\times10^{19}\ cm^{-3}$
Mobility of electrons in Si under light doping ($< 10^{16}\ cm^{-3}$) at 300°K	μ_n	$1400\ cm^2/V.s$
Mobility of holes in Si under light doping ($< 10^{16}\ cm^{-3}$)) at 300°K	μ_p	$470\ cm^2/V.s$
Dielectric constant of Si	ε_s	11.9
Dielectric constant of SiO_2	ε_{ox}	3.9