PROPERTIES of Ge, Si, and GaAs at 300 K

Properties	Ge	Si	GaAs
Atoms/cm^3	4.42×10^{22}	5.0×10^{22}	4.42×10^{22}
Atomic weight	72.60	28.09	144.63
Breakdown field (V/cm)	$\sim10^5$	$\sim3\times10^5$	$\sim4\times10^5$
Crystal structure	Diamond	Diamond	Zincblende
Density (g/cm^3)	5.3267	2.328	5.32
Dielectric constant	16.0	11.9	13.1
Effective density of states in conduction band, N_C (cm^{-3})	1.04×10^{19}	2.8×10^{19}	4.7×10^{17}
Effective density of states in valence band, N_V (cm^{-3})	6.0×10^{18}	1.04×10^{19}	7.0×10^{17}
Effective Mass, m^*/m_0 Electrons	$m_l^* = 1.64$ $m_t^* = 0.082$	$m_l^* = 0.98$ $m_t^* = 0.19$	0.067
Effective Mass, m^*/m_0 Holes	$m_{lh}^* = 0.044$ $m_{hh}^* = 0.28$	$m_{lh}^* = 0.16$ $m_{hh}^* = 0.49$	$m_{lh}^* = 0.082$ $m_{hh}^* = 0.45$
Electron affinity, χ(V)	4.0	4.05	4.07
Energy gap (eV) at 300K	0.66	1.12	1.424
Intrinsic carrier concentration (cm^{-3})	2.4×10^{13}	1.45×10^{10}	1.79×10^6
Intrinsic Debye length (μm)	0.68	24	2250
Intrinsic resistivity (Ω-cm)	47	2.3×10^5	10^8
Lattice constant (Å)	5.64613	5.43095	5.6533
Linear coefficient of thermal expansion, $\Delta L/L\Delta T$ (ºC^{-1})	5.8×10^{-6}	2.6×10^{-6}	6.86×10^{-6}
Melting point (ºC)	937	1415	1238
Minority carrier lifetime (s)	10^{-3}	2.5×10^{-3}	$\sim10^{-8}$
Mobility (drift) (cm^2/V-s)	3900 1900	1500 450	8500 400
Optical-phonon energy (eV)	0.037	0.063	0.035
Phonon mean free path λ_0 (Å)	105	76 (electron) 55 (hole)	58
Specific heat (J/g-ºC)	0.31	0.7	0.35
Thermal conductivity at 300 K (W/cm-ºC)	0.6	1.5	0.46
Thermal diffusivity (cm^2/s)	0.36	0.9	0.24
Vapor pressure (Pa)	1 at 1330ºC 10^{-6} at 760ºC	1 at 1650ºC 10^{-6} at 900ºC	100 at 1050ºC 1 at 900ºC

Source: Sze, S.M. Physics of Semiconductor Devices, 2nd Ed.