

LIST OF SYMBOLS

Symbol	Details
E_g	Bandgap
μ	Reduced mass
ϵ_s	Static dielectric constant
E_B	Exciton binding energy
a_o, a_b	Bohr radius of hydrogen atom, material of interest
K_{et}	Rate of electron transfer
$ V_{12} ^2$	Electronic coupling matrix between initial and final states of transition on resonance
ΔE^*	Total reorganization energy for the quantum dots
ΔG^o	Free energy change between initial and final states
r_1, r_2	radii of two quantum dots
n_{total}	Total carrier density
$R(E)$	Hopping rate
n_{free}	Free carrier density
μ_{eff}	Effective carrier mobility
E_v	Valance band
E_c	Conduction band
h	Plank's constant
$\alpha_{n,l}$	n^{th} zero of the Bessel function
m_{eff}^v	Effective mass of the free particle
n	Refractive index
k	Extinction coefficient
t_r	Rise time
t_f	Fall time
λ	Wavelength
$I_{ph}(\lambda, V)$	Photocurrent
$I_{dark}(\lambda, V)$	Dark current or noise current
$J_{ph}(\lambda, V)$	Photocurrent density
$P_{opt}(\lambda)$	Optical power density
$R_e(\lambda, V)$	Responsivity
$D^*(\lambda, V)$	Detectivity
RA	Resistance Area product
N_d	Donor Concentration

ε	Effective dielectric constant
q	Electron charge
ϕ	Built-in potential
ψ	Wave function
b	Natural separation length of electron-hole pair
W	Width of depletion region
ε_r	Real part of dielectric constant
ε_i	Imaginary part of dielectric constant
$\phi_{B,eff}$	Effective barrier height
η_i	Ideality factor
A^*	Richardson constant
E	Electric field
H	Magnetic field
c	Speed of light
Γ	Reflection coefficient
τ	Transmission coefficient
η	Intrinsic impedance of medium
σ	Conductivity
μ	Permeability
α	Absorption coefficient

LIST OF ABBREVIATIONS

Abbreviation	Details
QDs	Quantum Dots
SRH	Shockley–Read–Hall
MBE	Molecular Beam Epitaxy
MOCVD	Metal-Organic Chemical Vapour Deposition
3-D	Three Dimensional
DOS	Density of States
2-D	Two Dimensional
1-D	One Dimensional
0-D	Zero Dimensional
TEM	Transmission Electron Microscopy
SAED	Selected Area Electron Diffraction
DFT	Discrete Fourier transform
FFT	Fast Fourier transform
PL	Photoluminescence
I-V	Current – Voltage
C-V	Capacitance – Voltage
IR	Infrared
UV	Ultraviolet
ETL	Electron transport Layer
EQE	External Quantum Efficiency
FWHM	Full Width at Half Maximum
PD	Photodetector
pH	Power of Hydrogen

TFT	Thin Film Transistor
DI	Deionized
PVDF	Polyvinylidene Fluoride
MGB	Mid-Gap Band
J-V	Current density - Voltage
RCA	Radio Corporation of America
HTL	Hole Transport Layer
PLE	Photoluminescence Excitation
LED	Light Emitting Diode
CVD	Chemical Vapor Deposition