III. Bipolar Junction Transistor (BJT)

Symbol	Description	Unit
N_{DE}	Donor concentration in the emitter of an npn BJT	cm^{-3}
N_{AB}	Acceptor concentration in the base of an npn BJT	cm^{-3}
N_{DC}	Donor concentration in the collector of an npn BJT	cm^{-3}
N_{AE}	Acceptor concentration in the emitter of a pnp BJT	cm^{-3}
N_{DB}	Donor concentration in the base of a pnp BJT	cm^{-3}
N_{AC}	Acceptor concentration in the collector of a pnp BJT	cm^{-3}
v_{BE}	Voltage applied across the base and emitter of a BJT	V
v_{BC}	Voltage applied across the base and collector of a BJT	V
i_E	Emitter current of a BJT	A
i_B	Base current of a BJT	A
i_C	Collector current of a BJT	A
i_{En}	Current component due to the injection of electrons from the emitter into the base of an npn BJT	A
i_{B1}	Current component due to the injection of holes from the base into the emitter of an npn BJT	A
i_{B2}	Current component due to the recombination of electrons and holes in the base of an npn BJT.	A
w_B	Width of the neutral region of the base of a BJT	μm
w_E	Width of the neutral region of the emitter of a BJT	μm
L_n	Electron diffusion length	μm
L_p	Hole diffusion length	μm
D_p	Hole diffusion coefficient or diffusivity	cm^2/s
D_n	Electron diffusion coefficient or diffusivity	cm^2/s
I_S	Collector saturation current of a BJT*	A
β	Common emitter current gain of a BJT	no unit
α	Common base current gain of a BJT	no unit
V_A	Early voltage of a BJT*	V
g_m	Transconductance in the small signal model of a BJT	A/V
r_π	Input resistance in the small signal model of a BJT	Ω
r_o	Output resistance in the small signal model of a BJT	Ω

* V_A is also used to denote the Early voltage of a MOSFET.
* I_S is also used to denote the saturation current in a p-n junction

Notations for total (instantaneous) current (or voltages), d.c. currents (or voltages) and small signal (a.c.) currents (or voltages) :

e.g. $i_C = I_C + i_c$

i_C: total current; I_C: d.c. component of i_C; i_c: small signal (a.c.) component of i_C