Emitter up

Collector up

Alternative: $10^7 \cdot 10^7$

$C_n = C_{eb\text{depl}} + C_{eb\text{diff}} \approx C_{eb\text{diff}}$

$\Omega_1$
\[ C_t = C_{eb,\text{dep}} + C_{eb,\text{diff}} \]
\[ \propto A_{eb} \propto I_c \]

\[ C_t \rightarrow C_{eb,\text{diff}} \text{ at large } I_c \]
Normally in BJT - homo-j

\[ N_{de} \gg N_{ab} \gg N_{dc} \]

- to increase emitter injection
  i.e. for large \( V_e \)
- to minimize base width modulation

In heterojunction BJT:

\[ N_{de} \ll N_{ab} \ll N_{dc} \]

- SHBT: \( N - p^+ - n \)
- DHBT: \( n - p^+ - n \)
$I^{2} L$

\[+V\]

$Q_{E_{PNP}}$

$C_{Q_{PNP}}$

$Q_{C_{PNP}}$

$V_{C_{PNP}}$

$Lateral\ PNP$

\[\text{Merged Transistor Logic (MTL)}\]