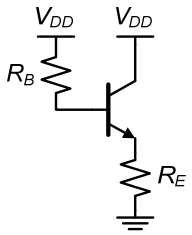
NPN Large Signal (Assume FAR)

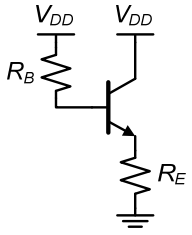


VDD = 10V
Beta = 100
VA = infinity
RB=1k
RE=1k
VBEon=0.7V
VCEsat=0.5V

Solve for IC

1. Substitute large-signal FAR model
2. Solve for IC
3. Check assumption

NPN Large Signal (Assume SAT)

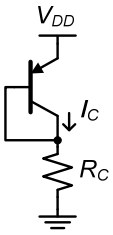


VDD = 10V
Beta = 100
VA = infinity
RB=1k
RE=1k
VBEon=0.7V
VCEsat=0.5V

Solve for IC

1. Substitute large-signal SAT model
2. Solve for IC
3. Check assumption

PNP Large Signal (1)

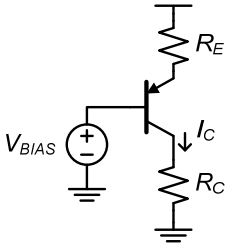


VDD = 10V
Beta = 100
VA = infinity
RC=1k
VBEon=-0.7V
VCEsat=-0.5V

Solve for IC

1. Choose region of operation
2. Substitute model
3. Solve for IC
4. Check assumption

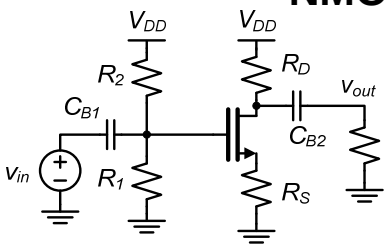
PNP Large Signal (2)



Find expression for IC

1. Choose region of operation
2. Substitute model
3. Find expression for IC

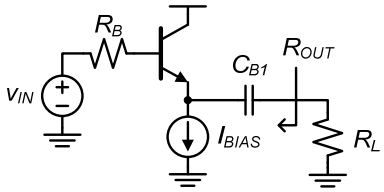
NMOS DC Model



Find expression for ID

1. Choose region of operation
2. Substitute model
3. Find expression for ID

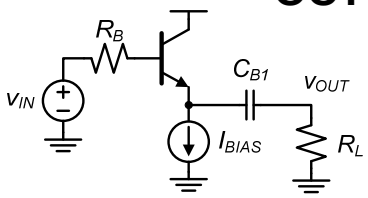
NPN Small Signal Rout



Neglect r_o in BJT model

1. Find small signal AC model
2. Apply test source to measure Rout
3. Rout = vt/it

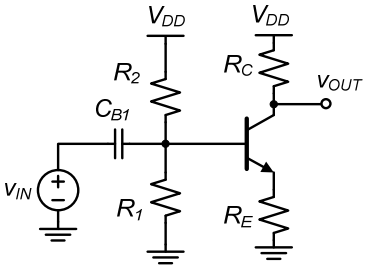
OCTC to Find f_L



Neglect r_o in BJT model

1. Find small signal low-freq model
2. Apply OCTC

NPN Design Example (1)



Find relationship between Power, DC bias stability, and gain

NPN Design Example (2)