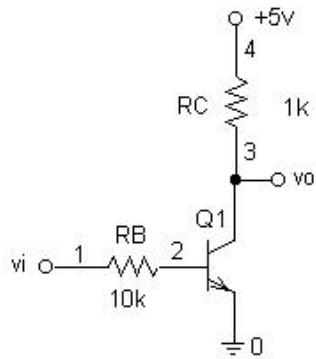


1. BJT INVERTER



RTL Inverter

*Pulsed Input voltage.

VIN 1 0 PULSE (0 5 0 0 0 .5MS 1MS)

VCC 4 0 DC 5V

*BJT's with model QN

Q1 3 2 0 QN

* Model for NPN BJT's with model QN

.MODEL QN NPN (BF=70 BR=0.2)

*.MODEL QN NPN (BF=70 RB=100 RC=40 CCS=6PF TF=0.3NS TR=10NS VAF=50V)

* Model for Diode

RB 1 2 10K

RC 4 3 1K

*DC sweep for 0 to 3V with 0.01V increment

.DC VIN 0 2.5 0.01

*Transient analysis for 0 to 2ms with 10ns increment

*.TRAN 10NS 2MS

*Plot the results of the dc analysis at node 6 versus VIN

*.PLOT DC V(3)

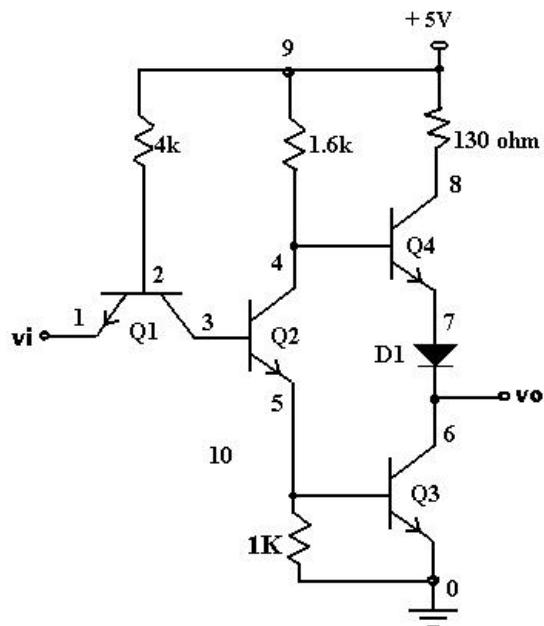
*Plot the result of transient analysis for voltages at nodes 6 and 1

*.PLOT TRAN V(3) V(1)

.PROBE

.END

2. TTL INVERTER



TTL Inverter DC SWEEP

VIN 1 0 5V

VCC 9 0 DC 5V

*BJT's with model QN and substrate connected to ground by default

Q1 3 2 1 QN

Q2 4 3 5 QN

Q3 6 5 0 QN

Q4 8 4 7 QN

D1 7 6 DIODE

* Model for NPN BJT's with model QN

.MODEL QN NPN (BF=70 BR=0.2)

*.MODEL QN NPN (BF=50 RB=70 RC=40 CCS=2PF TF=0.1NS TR=10NS VAF=50V)

* Model for Diode

.MODEL DIODE D

R1 9 2 4K

R2 9 4 1.6K

R3 5 0 1K

R4 9 8 130

*DC sweep for 0 to 3V with 0.01V increment

.DC VIN 0 2 0.01

*Plot the results of the dc analysis at node 4 versus VIN

.PLOT DC V(4)

.PROBE

.END