Draft1

Ic[Q1]

5.0mA	
4.5mA	
4.0mA	
3.5mA	
3.0mA	
2.5mA	
2.0mA	
1.5mA	
1.0mA	
0.5mA	
0.0mA	

0.1V 0.6V 1.1V 1.6V 2.1V 2.6V 3.1V 3.6V 4.1V 4.6V

Draft1

R1
Vout 1k

Vcc

Q1
NPN105

Vi

5

1
Rser=10k

.dc Vi 0.1 5 0.01

.model npn105 npn(is = 10fA bf = 100 vaf = 100V)

EN ?

Draft1

Ib(Q1)

440 μA	
400 μA	
360 μA	
320 μA	
280 μA	
240 μA	
200 μA	
160 μA	
120 μA	
80 μA	
40 μA	
0 μA	
-40 μA	

0.1V 0.6V 1.1V 1.6V 2.1V 2.6V 3.1V 3.6V 4.1V 4.6V

Draft1

R1
Vout 1k

Vcc

Q1
NPN105

Vi

5

1
Rser=10k

.dc Vi 0.1 5 0.01

.model npn105 npn(is = 10fA bf = 100 vaf = 100V)

EN ?

Draft1

Ic(Q1)/Ib(Q1)

1.0K	
0.9K	
0.8K	
0.7K	
0.6K	
0.5K	
0.4K	
0.3K	
0.2K	
0.1K	
0.0K	
-0.1K	
-0.2K	
-0.3K	
-0.4K	

0.1V 0.6V 1.1V 1.6V 2.1V 2.6V 3.1V 3.6V 4.1V 4.6V

Draft1

R1
Vout 1k

Vcc

Q1
NPN105

Vi

5

1
Rser=10k

.dc Vi 0.1 5 0.01

.model npn105 npn(is = 10fA bf = 100 vaf = 100V)

EN ?

Screenshot 1

Draft1 — plot window

V(vout)

Y-axis: 5.0V, 4.5V, 4.0V, 3.5V, 3.0V, 2.5V, 2.0V, 1.5V, 1.0V, 0.5V, 0.0V

X-axis: 0.1V, 0.6V, 1.1V, 1.6V, 2.1V, 2.6V, 3.1V, 3.6V, 4.1V, 4.6V

Draft1 — schematic

R1 1k
Vout
Vcc 5
Q1 NPN105
Vi
1
Rser=10k
.dc Vi 0.1 5 0.01
.model npn105 npn(is = 10fA bf = 100 vaf = 100V)

EN

Screenshot 2

Draft1 — plot window

V(vout)/Vi

Y-axis: 50, 45, 40, 35, 30, 25, 20, 15, 10, 5, 0

X-axis: 0.1V, 0.6V, 1.1V, 1.6V, 2.1V, 2.6V, 3.1V, 3.6V, 4.1V, 4.6V

Draft1 — schematic

R1 1k
Vout
Vcc 5
Q1 NPN105
Vi
1
Rser=10k
.dc Vi 0.1 5 0.01
.model npn105 npn(is = 10fA bf = 100 vaf = 100V)

EN

Screenshot 3

Draft1 — plot window

-d(V(vout))

Y-axis: 9.9, 9.0, 8.1, 7.2, 6.3, 5.4, 4.5, 3.6, 2.7, 1.8, 0.9, 0.0

X-axis: 0.1V, 0.6V, 1.1V, 1.6V, 2.1V, 2.6V, 3.1V, 3.6V, 4.1V, 4.6V

Draft1 — schematic

R1 1k
Vout
Vcc 5
Q1 NPN105
Vi
1
Rser=10k
.dc Vi 0.1 5 0.01
.model npn105 npn(is = 10fA bf = 100 vaf = 100V)

EN

Draft1 — -d(V(vout))

Graph axis: 9.9, 9.0, 8.1, 7.2, 6.3, 5.4, 4.5, 3.6, 2.7, 1.8, 0.9, 0.0

X-axis: 0.0V, 0.5V, 1.0V, 1.5V, 2.0V, 2.5V, 3.0V, 3.5V, 4.0V, 4.5V, 5.0V — V(vout)

Draft1 (schematic)

R1 1k
Vout
Vcc
Q1
NPN105
Vi
1
Rser=10k
.dc Vi 0.1 5 0.01
.model npn105 npn(is = 10fA bf = 100 vaf = 100V)
EN

```
       --- Transfer Function ---

Transfer_function:            -19.6015      transfer
vi#Input_impedance:           253195        impedance
output_impedance_at_V(vout):  49741.5       impedance
```

Draft1 — Ic(Q1)

Graph axis: 5.0mA, 4.5mA, 4.0mA, 3.5mA, 3.0mA, 2.5mA, 2.0mA, 1.5mA, 1.0mA, 0.5mA, 0.0mA

X-axis: 0.0V, 0.5V, 1.0V, 1.5V, 2.0V, 2.5V, 3.0V, 3.5V, 4.0V, 4.5V, 5.0V — V(vout)

Draft1 (schematic)

R1 1k
Vout
Vcc
Q1
NPN105
Vi
1
Rser=0
.dc Vi 0.1 1 0.01
.model npn105 npn(is = 10fA bf = 100 vaf = 100V)
EN

Draft3 — Id(M1)

Graph axis: 1.5mA, 1.3mA, 1.1mA, 0.9mA, 0.7mA, 0.5mA, 0.3mA, 0.1mA, -0.1mA

X-axis: 0V, 1V, 2V, 3V, 4V, 5V, 6V, 7V, 8V, 9V, 10V

V(vout)

−d(V(vout))

V(Vout)

Draft10.raw

x = 681.664mV   y = 2.52871V

V(vout)

Cursor 1:

V(vout)

Horz: 678.14375mV   Vert: 2.5001118V

Cursor 2:

Horz: -- N/A --   Vert: -- N/A --

Diff(Cursor 2- Cursor 1):

Horz: -- N/A --   Vert: -- N/A --

Slope: -- N/A --

NPN1

Re

Rc

Vcc

5

.model npn105 npn(is = 10fA bf = 100 vaf = 100V)
.dc Vi 676m 680m 10u

the circuits such that *Vout = Vcc/2 = 2.5V* so that the circuit will give us the maximum output swing. What is the *Ic, Ib?*

Rc
50k

Vout

Q1

NPN105

Vi

Re

678.14375m   2k

Vcc

5

.model npn105 npn(is = 10fA b...
.op

* C:\Users\didichi\AppData\Local\Temp\Draft2.asc

--- Operating Point ---

V(n002):   0.678144   voltage
V(n001):   5   voltage
V(vout):   2.50011   voltage
V(p001):   0.100978   voltage
Ic(Q1):   4.99978e-005 device_current
Ib(Q1):   4.9103e-007   device_current
Ie(Q1):   -5.04888e-005 device_current
I(Re):   5.04888e-005 device_current
I(Rc):   4.99978e-005 device_current
I(Vcc):   -4.99978e-005 device_current
I(Vi):   -4.9103e-007 device_current

RL

Vcc

1k

Vout

M1

NMOS105

Rs

Vgs

5Meg

Vi

;dc Vcc 0 10 0.1 Vi 0 0.9 0.1

.model nmos105 nmos(leve

.ac dec 20 10k 1G

584mV

AC 1

5