

PH3244
Experiment - 2
BJT characteristics & applications

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Synopsis

In this experiment we try to see the characteristics of BJT NPN transistor. We also try to construct an oscillator circuit using transistor.

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I. THEORY AND PROCEDURE

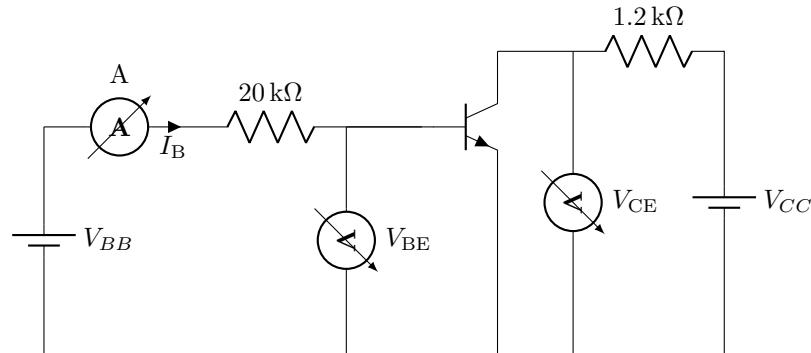
A. Theory

B. Procedure

Testing the side by diode

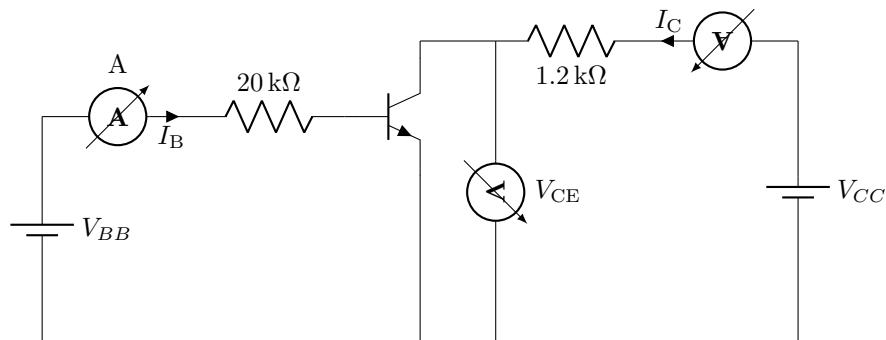
1. Input Characteristics

Test the transistor using the DMM as mentioned above .Connect the transistor in CE mode as per the following circuit- . current gain . voltage gain = . To test the input characteristics plot input current (I_B) versus the input voltage (V_{BE}) for a range of output voltage V_{CE} . To test the output characteristics plot the output current (I_C) versus the output voltage (V_{CE}) for different values of input current I_B



2. Output Characteristics

.Test the transistor using the DMM as mentioned above .Connect the transistor in CE mode as per the following circuit- . current gain . voltage gain = . To test the input characteristics plot input current (I_B) versus the input voltage (V_{BE}) for a range of output voltage V_{CE} . To test the output characteristics plot the output current (I_C) versus the output voltage (V_{CE}) for different values of input current I_B



3. Phase Shift Oscillator

II. OBSERVATION

A. Input Characteristics

TABLE I: For $V_{CE} = 1.00$ V

I_B (μ A)	V_{BE} (mV)
0	3
0	280
0	441
5	632
10	663
15	672
30	675
50	677
80	679
120	683
200	689

I_B (μ A)	V_{BE} (mV)
0	3
0	198
0	358
5	583
10	634
15	636
30	639
50	644
80	649
120	656
200	667

TABLE II: For $V_{CE} = 4.00$ V

TABLE III: For $V_{CE} = 10.00$ V

I_B (μ A)	V_{BE} (mV)
0	3
0	335
0	553
5	636
10	661
15	672
30	696
50	701
80	704
120	706
200	710

B. Output Characteristics

TABLE IV: For $I_B = 80$ mA

V_{CE} (V)	I_C (mA)
0.004	0.00
0.057	2.05
0.106	7.13
0.177	13.84
0.327	17.01
0.529	18.73
0.823	20.32
1.191	20.95
1.958	21.80
3.205	23.09
5.660	25.96
9.680	29.76
16.760	34.46
22.650	38.19

V_{CE} (V)	I_C (mA)
0.005	0.00
0.058	1.24
0.134	7.19
0.208	10.25
0.405	11.04
0.606	12.29
0.844	12.38
1.134	12.44
2.231	12.67
3.262	12.94
4.860	13.54
7.320	14.05

TABLE VI: For $I_B = 20$ mA

V_{CE} (V)	I_C (mA)
0.004	0.00
0.012	0.02
0.067	0.46
0.118	1.64
0.243	2.88
0.338	2.97
0.540	2.97
0.798	2.97
1.214	2.98
1.922	2.99
2.829	3.01
4.910	3.07
9.110	3.16
32.530	4.59

TABLE V: For $I_B = 50$ mA

Comments. about the time taken for stability, and heating of transistors:w

Also add why taken in decreasing order Then add least count of stuff:w

In calc add why did error in graph 1 and not in 2, also the range clarification

III. CALCULATIONS AND CHARACTERISTICS

A. Input Characteristics

FIG. 1: INPUT CHAR

B. Output Characteristics

FIG. 2: OUTPUT CHAR

IV. RESULT AND CONCLUSION

From the graph of input char we can say it works as a normal diode, turning on at between range of 0.67 volts

REFERENCES