



EXPERIMENT REPORT

Extraction of DC Characteristics of BJT and MOSFET

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150200097

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Experiment 1.1.

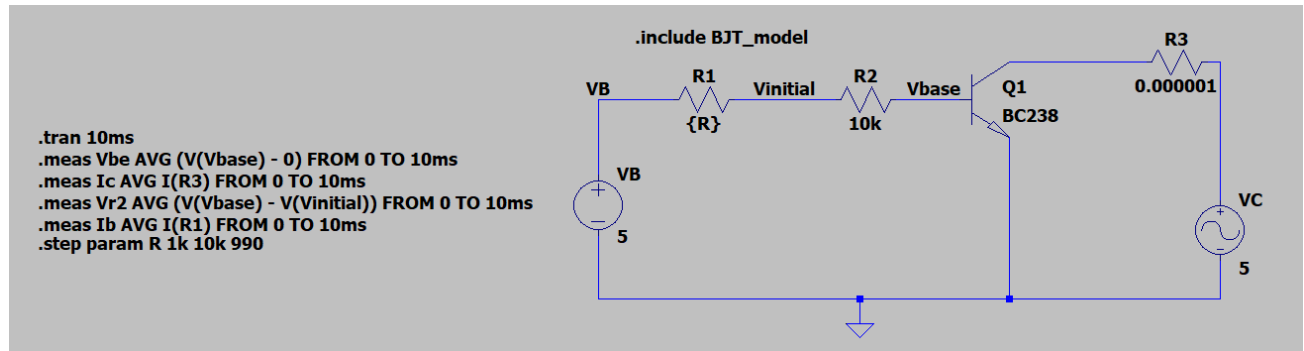


Figure 1: Circuit of the Experiment 1

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R_1	V_{BE}	I_C	V_{R2}	I_B	β
1000	0.816084	0.0856622	-3.80356	0.000380356	225.2159
101000	0.710338	0.0119597	-0.386456	3.86456e-05	3.09E+02
201000	0.689574	0.0063376	-0.204286	2.04286e-05	310.2317
301000	0.677738	0.00426573	-0.138979	1.38979e-05	3.07E+02
401000	0.66943	0.00319428	-0.105367	1.05367e-05	303.1575
501000	0.663023	0.00254204	-0.0848724	8.48723e-06	3.00E+02
601000	0.657803	0.00210439	-0.071067	7.1067e-06	296.1135
701000	0.653396	0.00179101	-0.0611337	6.11337e-06	2.93E+02
801000	0.649579	0.00155592	-0.0536427	5.36427e-06	290.0525
901000	0.646212	0.00137327	-0.0477913	4.77913e-06	287.3473
1M	0.643228	0.00122872	-0.0431364	4.31364e-06	2.85E+02

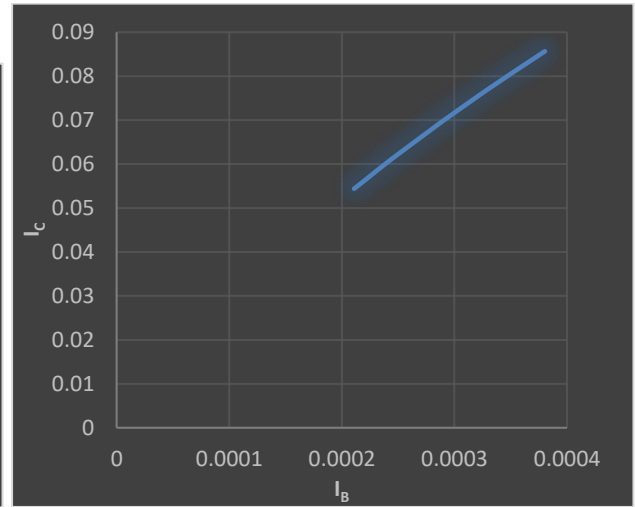
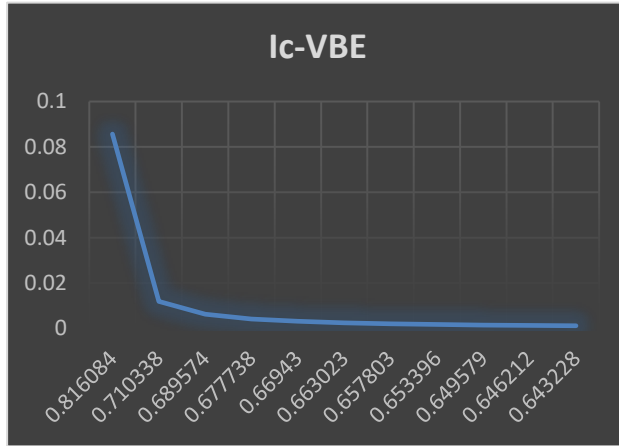


Figure 2: $I_C - V_{BE}$ and $I_C - I_B$ graphs

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Experiment 1.2.

	V_{BE}	V_{CE}	I_B	I_C	β
Forward active mode	0.795407	5.0000000	0.000271264	0.0663208	244.4880264244 43
Reverse active mode	0.693712	0.0833691	0.000430629	0.0049166	11.41732210324 9
Saturation	0.706612	0.0182481	0.000429339	0.0049818	11.60330181977 41

Experiment 1.3.

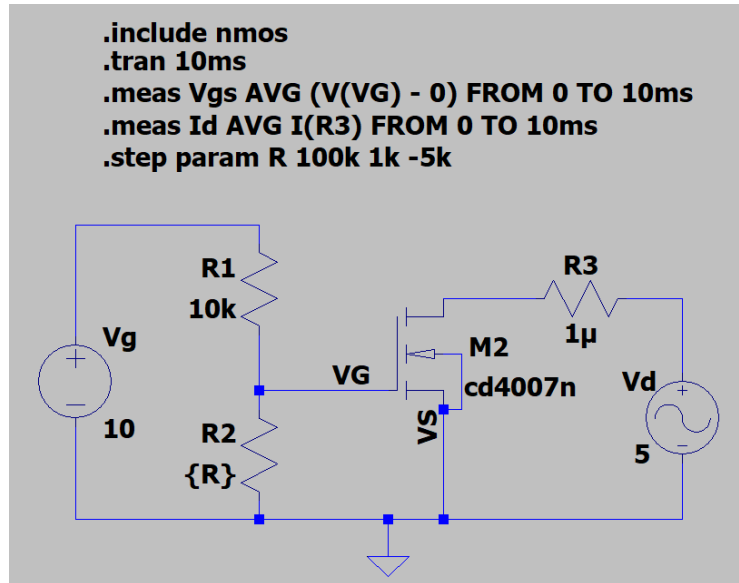


Figure 3: Circuit of the Experiment 3

R_2	V_{GS}	I_D
1000	0.909091	4.42E-10
5000	3.33333	0.000482063
10000	5	0.00171545
15000	6	0.00312347
20000	6.66667	0.00438712
25000	7.14286	0.00524129
30000	7.5	0.00582068
35000	7.77778	0.00623572
40000	8	0.00654634
45000	8.18182	0.00678689
50000	8.33333	0.00697833
55000	8.46154	0.00713411
60000	8.57143	0.00726321
65000	8.66667	0.00737188
70000	8.75	0.00746342
75000	8.82353	0.00751557
80000	8.88889	0.00754578
85000	8.94737	0.00756679
90000	9	0.00758277
95000	9.04762	0.00759557
100000	9.09091	0.00760617

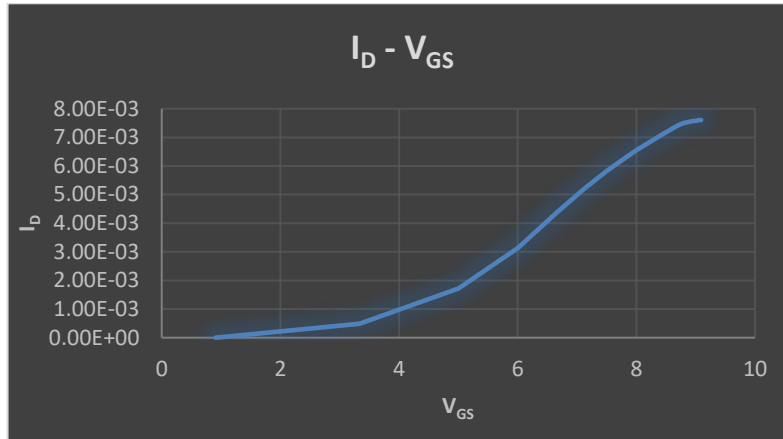


Figure 4: $I_D - V_{GS}$ curve

V_{TH} is near 1.5V as seen in Figure 4.

Experiment 1.4.

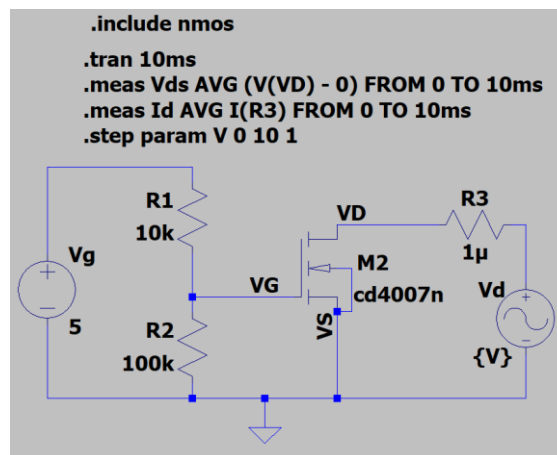


Figure 5: Circuit of the Experiment 4

V_D	V_{DS}	I_D
0	-7.66E-32	7.66E-26
1	1	0.000845816
2	2	0.0011941
3	3	0.00125531
4	4	0.00126696
5	5	0.00127338
6	6	0.0012787
7	7	0.00128367
8	8	0.00128848
9	9	0.0012932
10	10	0.00129789

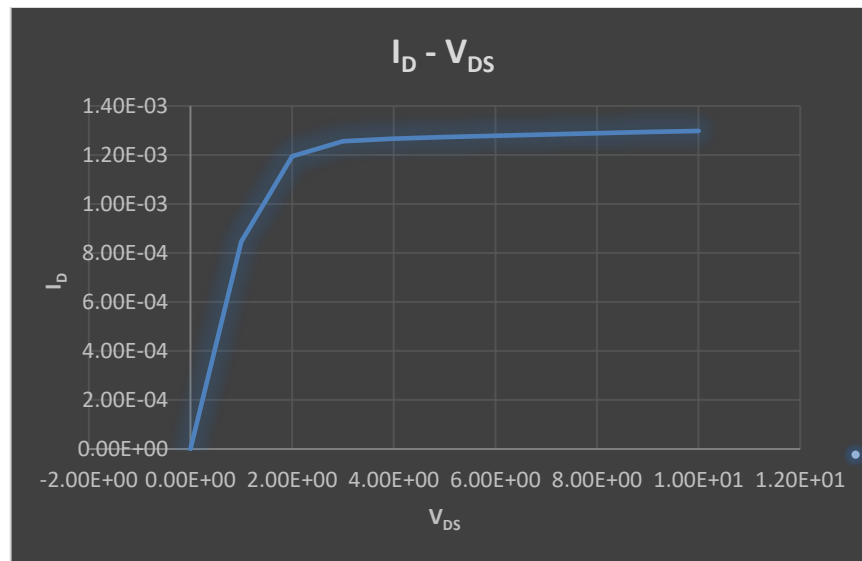


Figure 6: $I_D - V_{DS}$ curve

In Figure 6, the V_{DS} value categorizes into three regions:

1. Below 0 is the cut-off region.
2. From 0 to nearly 2 represents the saturation region.
3. Above 2 corresponds to the linear region.