EXPERIMENT -4

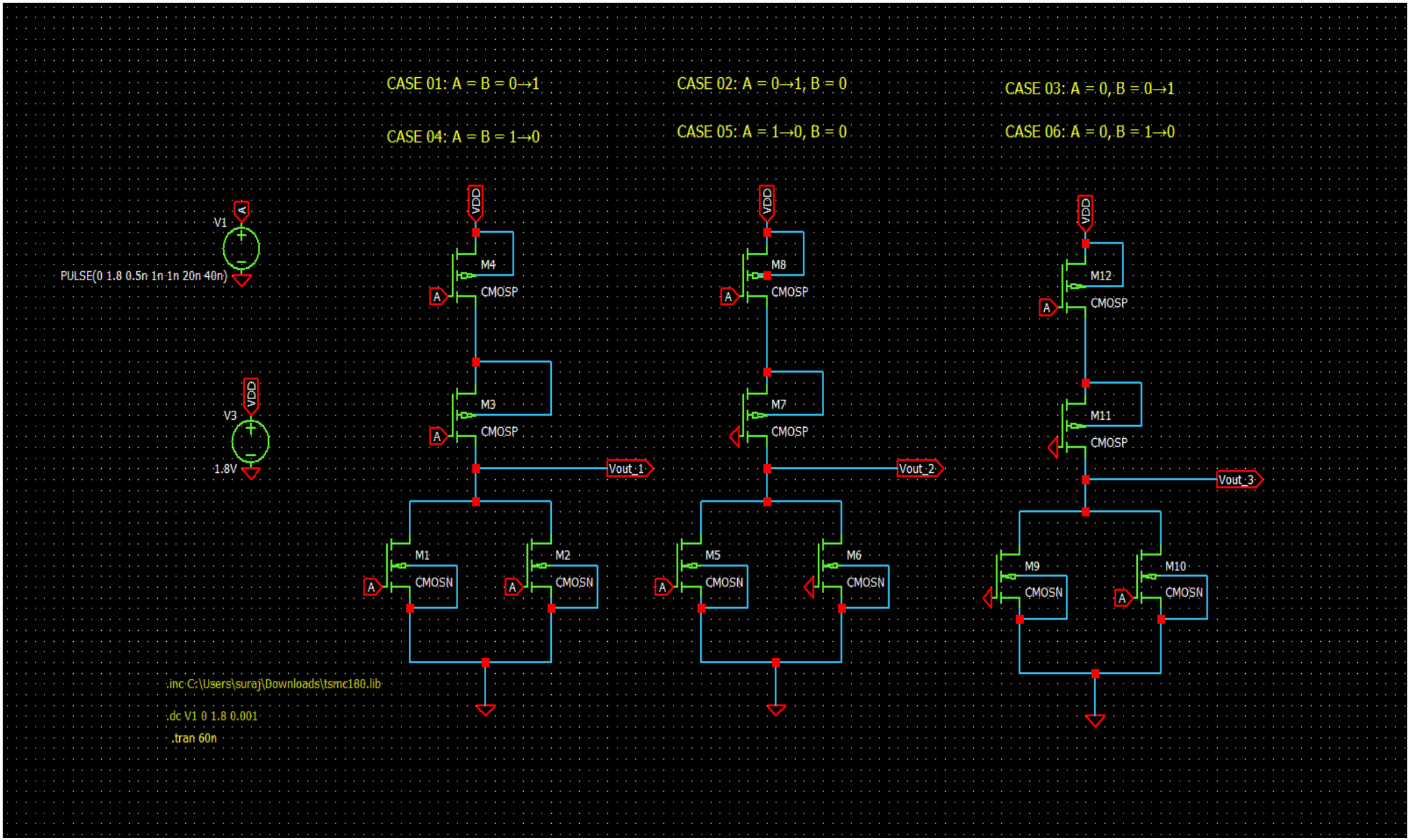
VLSI DESIGN - LAB (EEM 614)

NAME – SURAJ

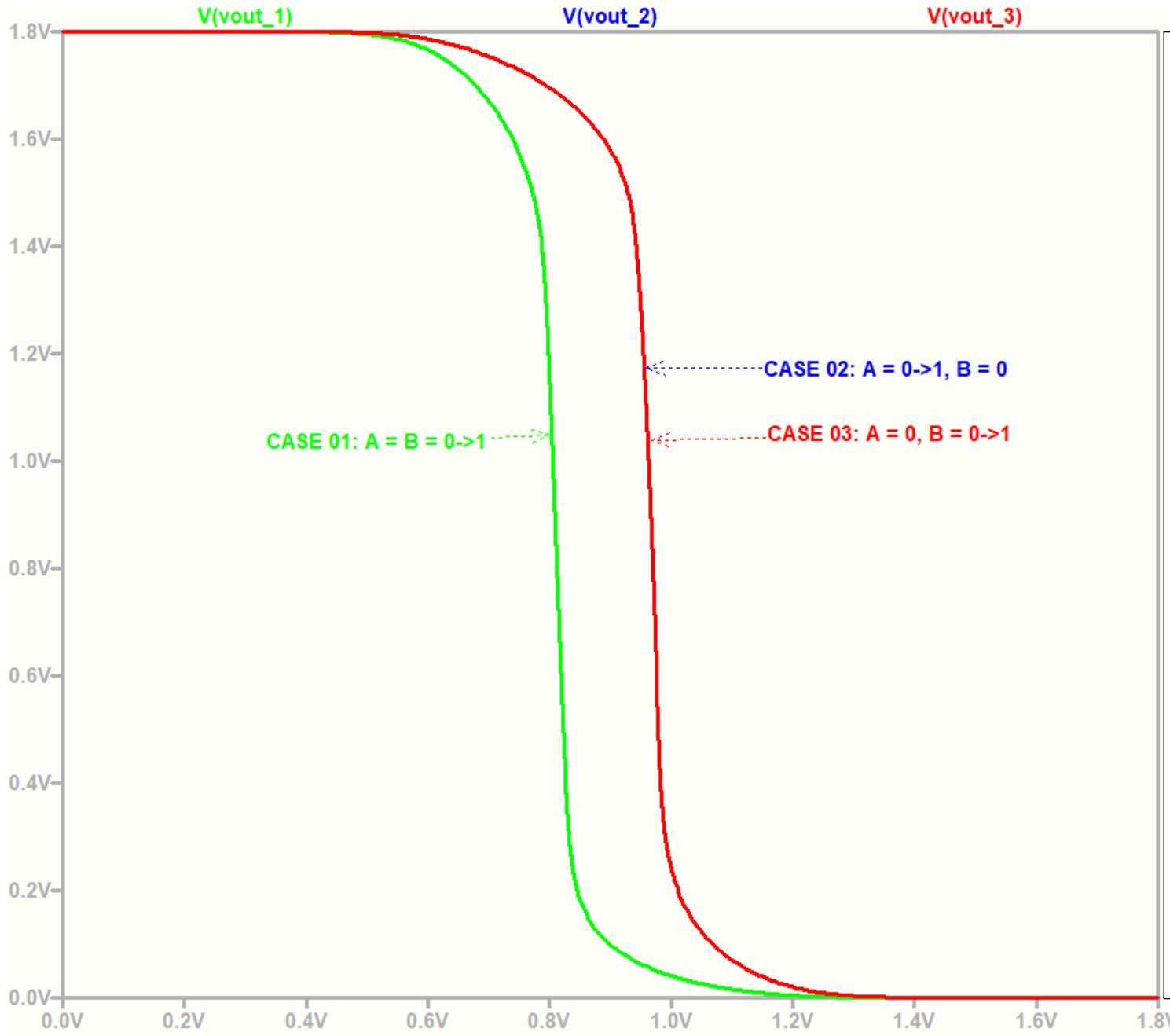
ROLL NO. -2201769

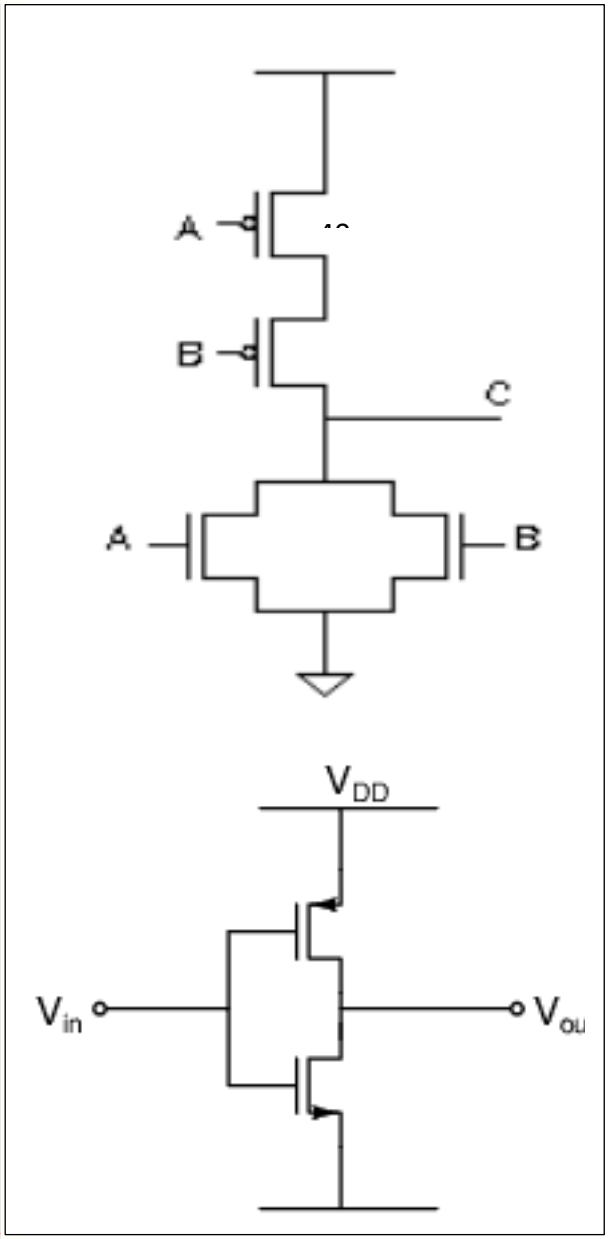
STATIC ANALYSIS OF NOR GATE:

1.CIRCUIT DIAGRAM

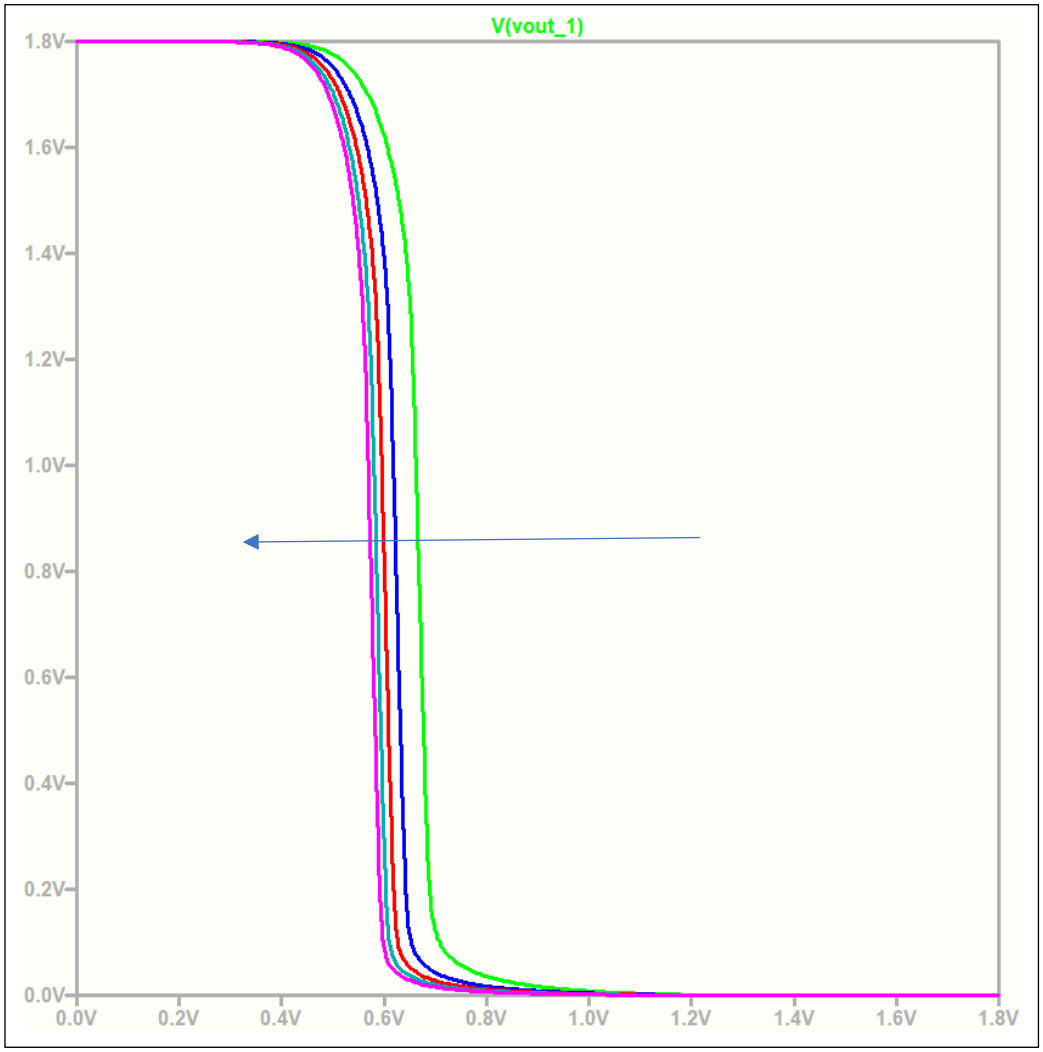


2.STATIC CHARACTERISTICS OF N0R GATE:

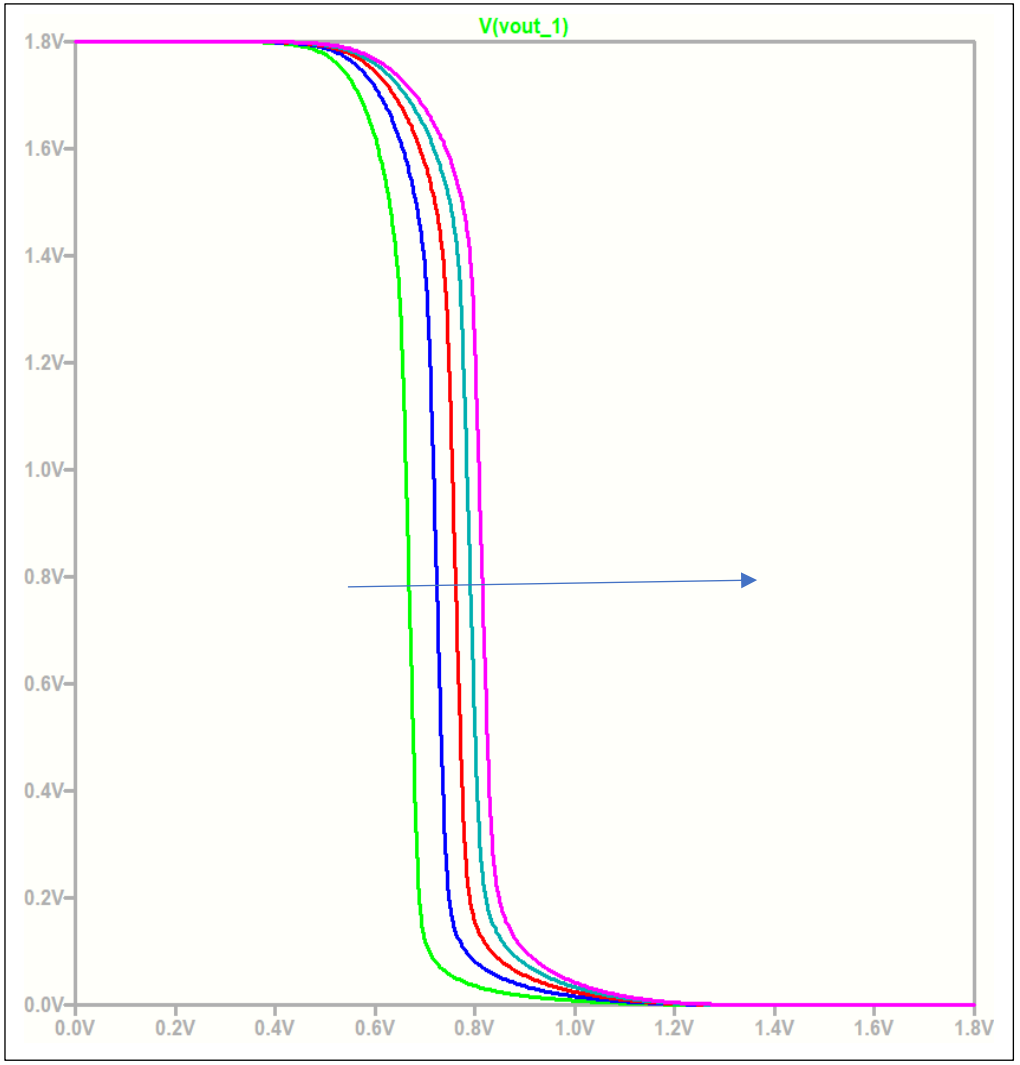




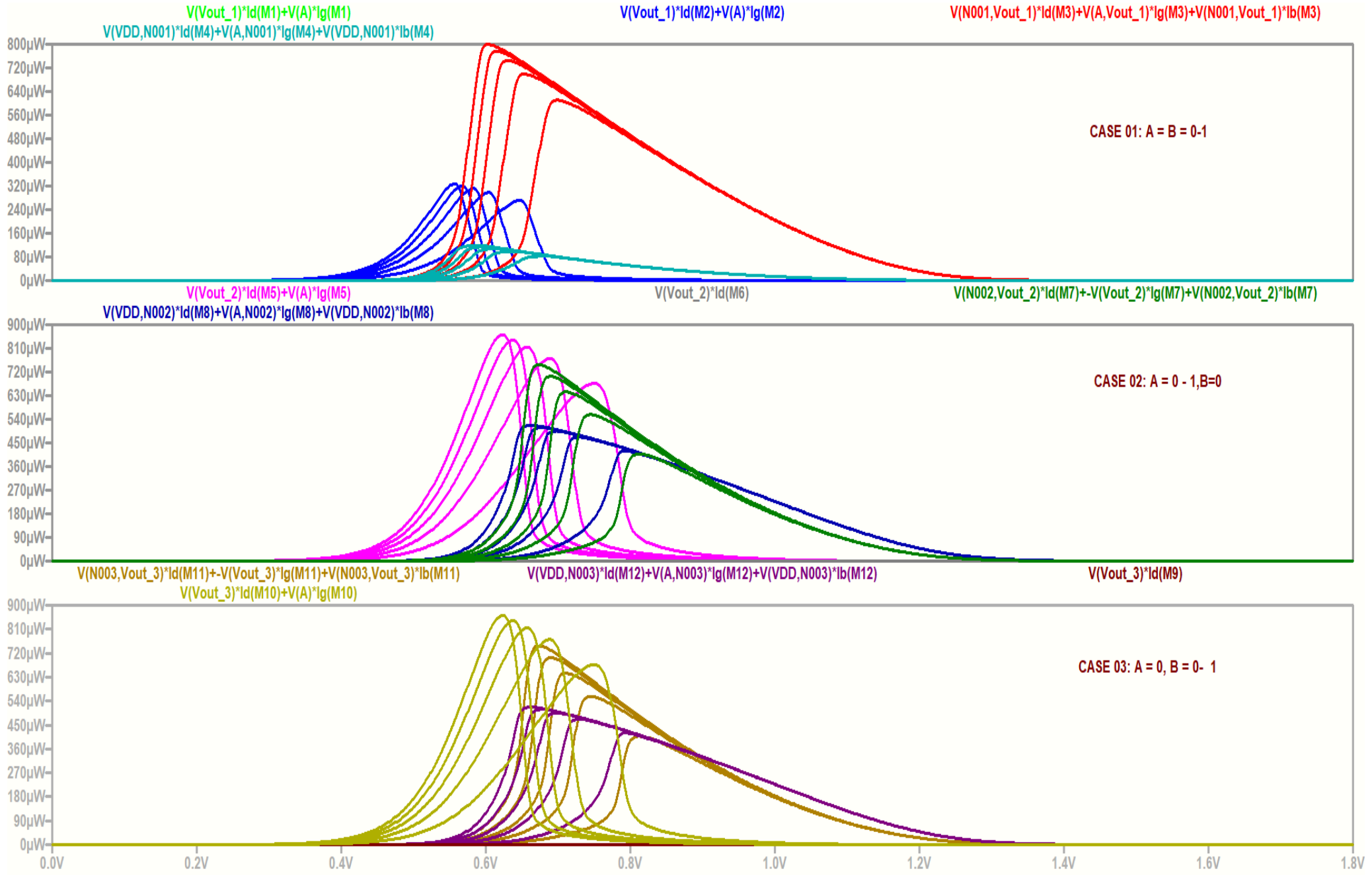
4.EFFECT OF INCREASING W_N



5. EFFECT OF INCREASING W_P



6.STATIC POWER DISSIPATION



CASE- 1: A, B = 0 →1

Sr.No.	Wp (µm)	Vth (V)	V_{IL}	V_{OH}	V_{IH}	V_{OL}	NML	NMH	Power
1.	20	0.725404	0.576002	1.8	0.793	0.000	0.576002	1.00	6.91516e-05
2.	40	0.790747	0.636975	1.8	0.870	0.000	0.636975	0.930	9.88239e-05
3.	60	0.833671	0.686919	1.8	0.923	0.000	0.686919	0.877	0.000117543
4.	80	0.865525	0.728993	1.8	0.962	0.000	0.728993	0.838	0.000130973
5.	100	0.890645	0.764047	1.8	0.993	0.000	0.764047	0.808	0.000141328

CASE -2: A = 0 →1, B = 1

Sr.No.	Wp (µm)	Vth (V)	V_{IL}	V_{OH}	V_{IH}	V_{OL}	NML	NMH	Power
1.	20	0.85788	0.676089	1.8	0.950	0.000	0.676089	0.850	6.91516e-05
2.	40	0.940111	0.803975	1.8	1.040	0.000	0.803975	0.760	9.88239e-05
3.	60	0.986921	0.876091	1.8	1.103	0.000	0.876091	0.670	0.000117543
4.	80	1.01842	0.921933	1.8	1.140	0.000	0.921933	0.66	0.000130973
5.	100	1.04157	0.95307	1.8	1.160	0.000	0.95307	0.64	0.000141328

CASE -3: A = 1, B = 0 →1

Sr.No.	Wp (µm)	Vth (V)	V_{IL}	V_{OH}	V_{IH}	V_{OL}	NML	NMH	Power
1.	20	0.85788	0.676089	1.8	0.950	0.000	0.676089	0.850	6.91516e-05
2.	40	0.940111	0.803975	1.8	1.040	0.000	0.803975	0.760	9.88239e-05
3.	60	0.986921	0.876091	1.8	1.103	0.000	0.876091	0.670	0.000117543
4.	80	1.01842	0.921933	1.8	1.140	0.000	0.921933	0.66	0.000130973
5.	100	1.04157	0.95307	1.8	1.160	0.000	0.95307	0.64	0.000141328

CASE- 1: A, B = 0 →1

Sr.No.	Wp (µm)	Vth (V)	V_{IL}	V_{OH}	V_{IH}	V_{OL}	NML	NMH	Power
1.	10	0.725404	0.576002	1.8	0.792	0.000	0.576002	1.00	5.92916e-05
2.	20	0.67247	0.533029	1.8	0.728	0.000	0.533029	1.072	7.02206e-05
3.	30	0.64581	0.51192	1.8	0.696	0.000	0.51192	1.104	7.63964e-05
4.	40	0.628507	0.497053	1.8	0.676	0.000	0.497053	1.124	8.0695e-05
5.	50	0.615875	0.486909	1.8	0.662	0.000	0.486909	1.138	8.39918e-05

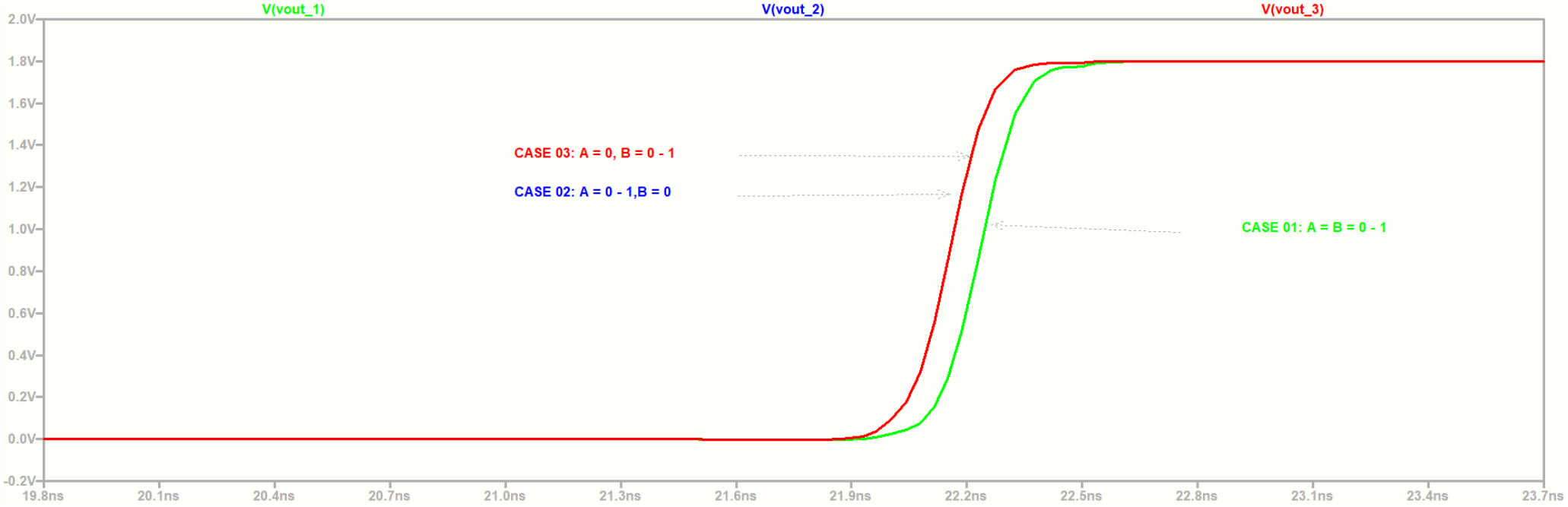
CASE -2: A = 0 →1, B = 1

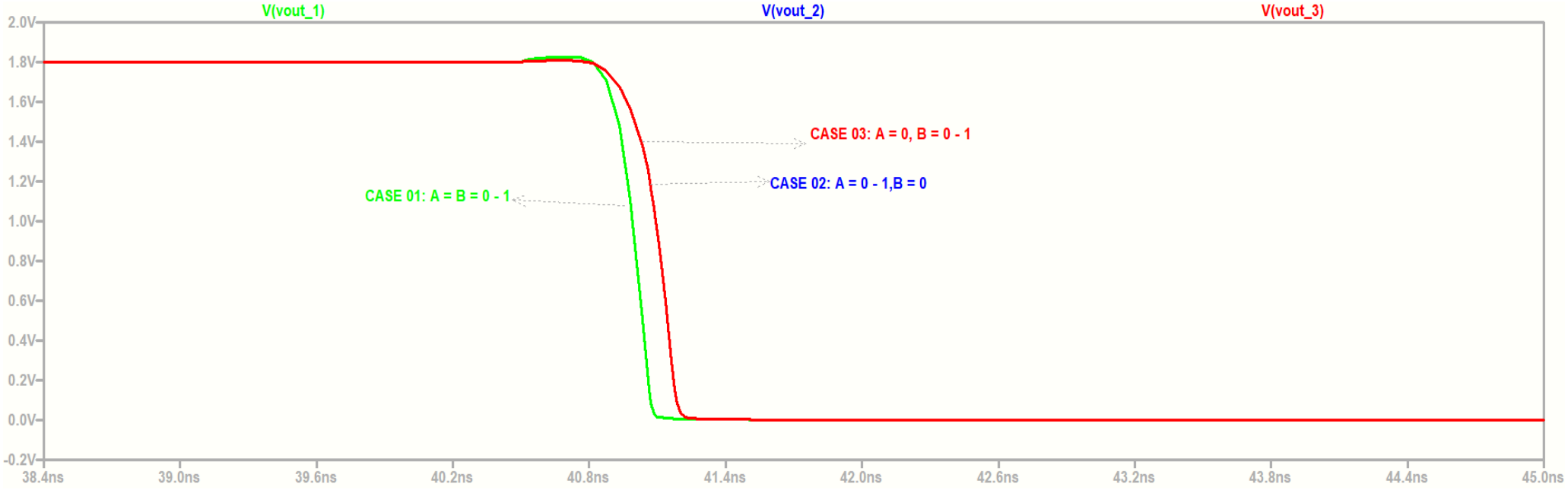
Sr.No.	Wp (µm)	Vth (V)	V_{IL}	V_{OH}	V_{IH}	V_{OL}	NML	NMH	Power
1.	10	0.85788	0.676089	1.8	0.947	0.000	0.676089	0.853	6.91516e-05
2.	20	0.781953	0.597034	1.8	0.856	0.000	0.597034	0.944	8.92667e-05
3.	30	0.742268	0.565922	1.8	0.808	0.000	0.565922	0.992	0.000100813
4.	40	0.716661	0.546921	1.8	0.778	0.000	0.546921	1.022	0.000108763
5.	50	0.698248	0.533032	1.8	0.756	0.000	0.533032	1.044	0.000114772

CASE -3: A = 1, B = 0 →1

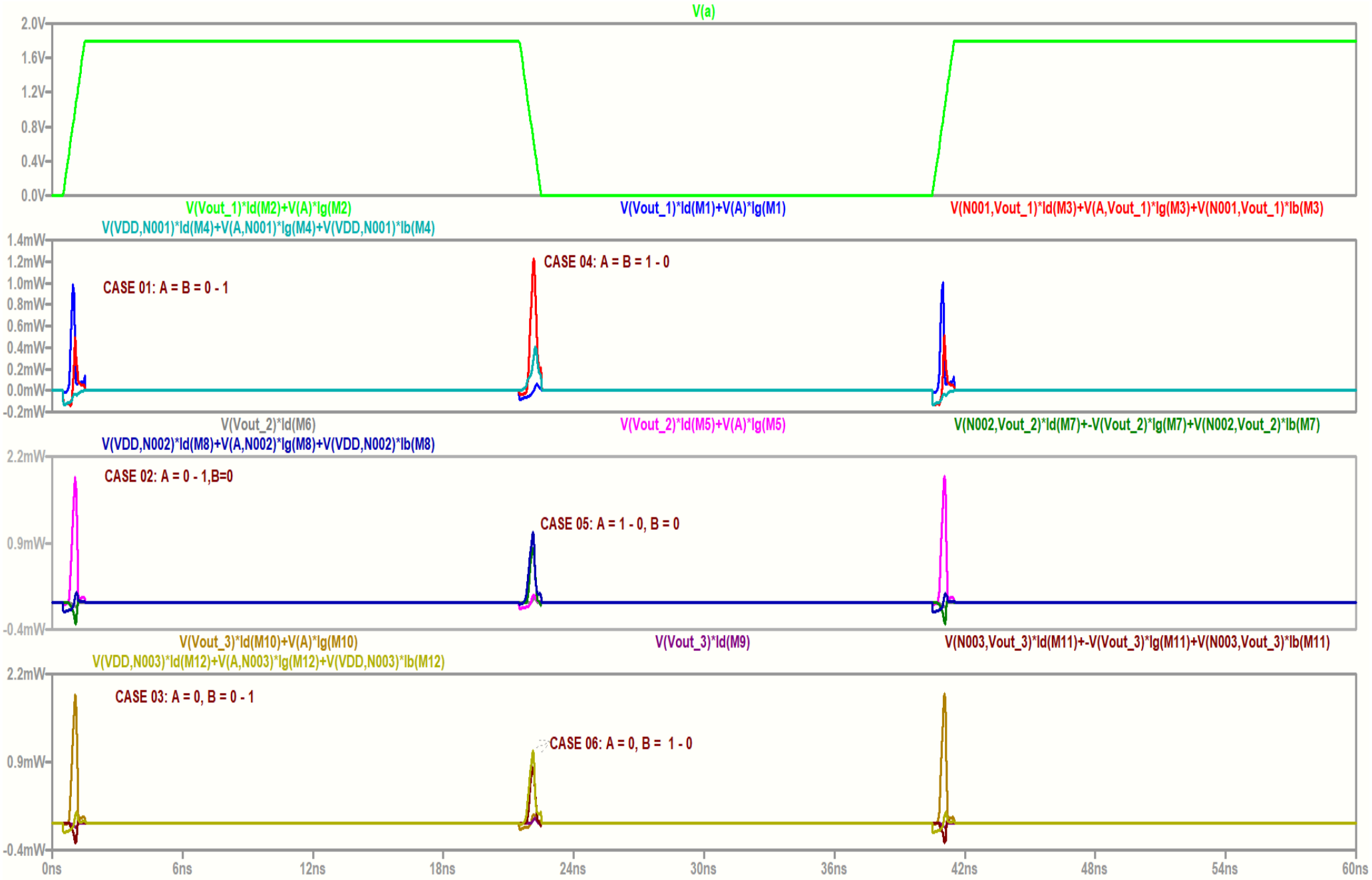
Sr.No.	Wp (µm)	Vth (V)	V_{IL}	V_{OH}	V_{IH}	V_{OL}	NML	NMH	Power
1.	10	0.85788	0.676089	1.8	0.947	0.000	0.85788	0.853	6.91516e-05
2.	20	0.781953	0.597034	1.8	0.856	0.000	0.781953	0.944	8.92667e-05
3.	30	0.742268	0.565922	1.8	0.808	0.000	0.742268	0.992	0.000100813
4.	40	0.716661	0.546921	1.8	0.778	0.000	0.716661	1.022	0.000108763
5.	50	0.698248	0.533032	1.8	0.756	0.000	0.698248	1.044	0.000114772

2.TRANSIENT CHARACTERISTICS OF NOR GATE





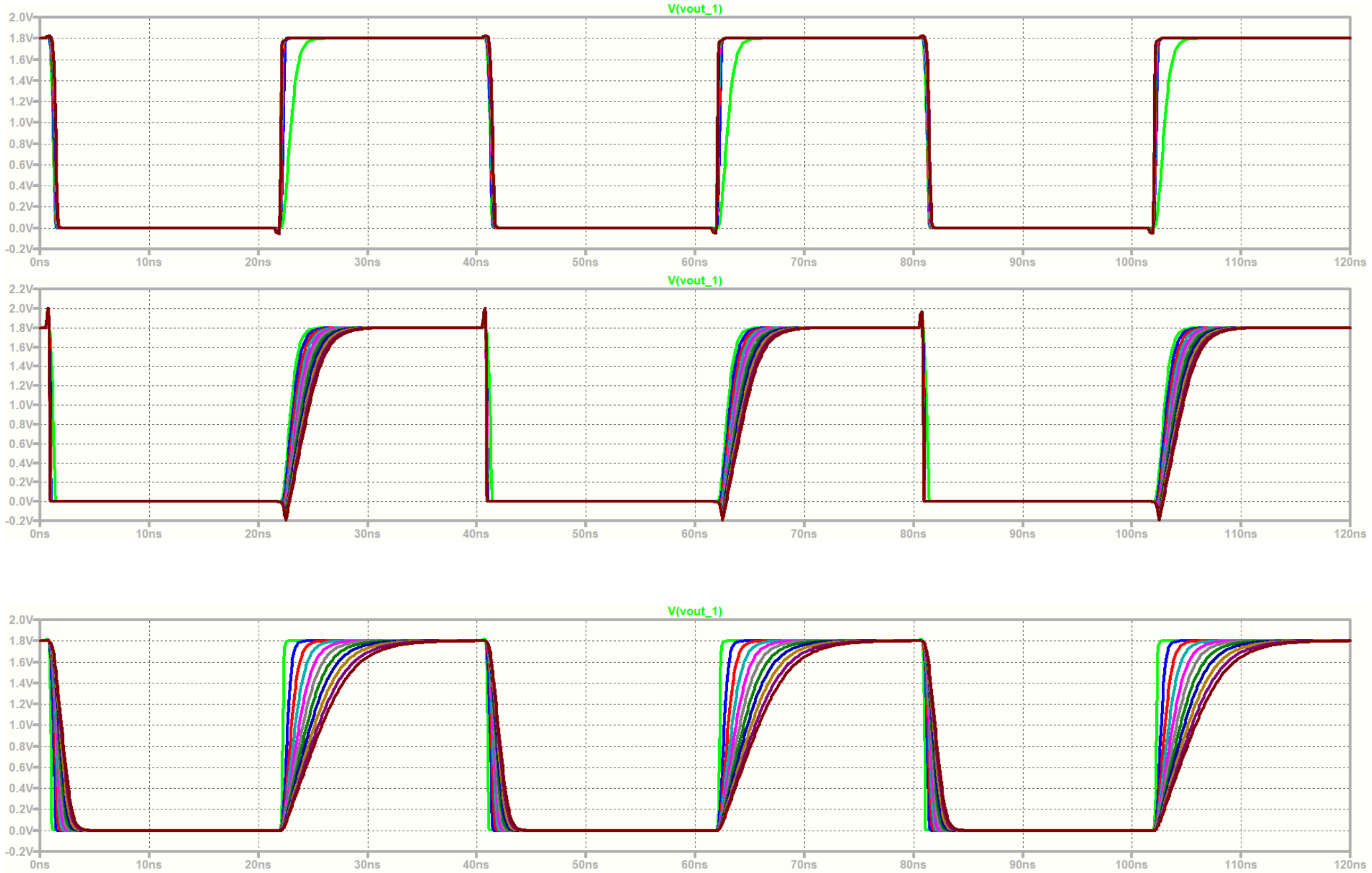
3.DYNAMIC POWER DISSIPATION



RESULT

1. FOR 180nm TECHNOLOGY

Sr.No.	TEST VECTOR	DELAY (ps)	POWER (mW)
1.	**A = B = 0→1**	**54**	**1.23**
2.	**A = 0→1, B=1**	**47**	**1.89**
3.	**A=1, B = 0→1**	**47**	**1.89**
4.	**A = B = 1→0**	**154**	**1.06**
5.	**A = 1→0, B = 1**	**89**	**1.89**
6.	**A = 1, B = 1→0**	**89**	**1.06**



1.EFFECT OF INCREASING W_P ON DELAY

Wp (µm)	A = B = 0->1	A = 0->1, B = 0	A = 0, B = 0->1	A = B = 1->0	A = 1->0, B = 0	A = 0, B = 1->0
10	-5.7108e-11	4.77496e-11	4.77496e-11	1.5466e-10	8.97273e-11	8.97273e-11
20	-1.39293e-11	1.13366e-10	1.13366e-10	1.17484e-10	4.92066e-11	4.92066e-11
30	1.16733e-11	1.56194e-10	1.56194e-10	9.47802e-11	2.96777e-11	2.96777e-11
40	3.77287e-11	1.89512e-10	1.89512e-10	7.97648e-11	1.83394e-11	1.83394e-11
50	5.51621e-11	2.16069e-10	2.16069e-10	6.79425e-11	1.13766e-11	1.13766e-11

2. EFFECT OF INCREASING W_N ON DELAY

Wn (µm)	A = B = 0->1	A = 0->1, B = 0	A = 0, B = 0->1	A = B = 1->0	A = 1->0, B = 0	A = 0, B = 1->0
10	5.7108e-11	-4.77496e-11	-4.77496e-11	1.5466e-10	8.97273e-11	8.97273e-11
20	8.50413e-11	5.47264e-12	5.47264e-12	1.93279e-10	1.32915e-10	1.32915e-10
30	9.79525e-11	3.19959e-11	3.19959e-11	2.19395e-10	1.59046e-10	1.59046e-10
40	1.05699e-10	4.64839e-11	4.64839e-11	2.39489e-10	1.78512e-10	1.78512e-10
50	1.10671e-10	5.62752e-11	5.62752e-11	2.57482e-10	1.94334e-10	1.94334e-10

3. EFFECT OF INCREASING C_L ON DELAY

C_L (fF)	A = B = 0->1	A = 0->1, B = 0	A = 0, B = 0->1	A = B = 1->0	A = 1->0, B = 0	A = 0, B = 1->0
100	3.61784e-11	1.46291e-10	1.46291e-10	2.91559e-10	2.05736e-10	2.05736e-10
200	9.01112e-11	2.13064e-10	2.13064e-10	3.8463e-10	2.88154e-10	2.88154e-10
300	1.35949e-10	2.69134e-10	2.69134e-10	4.60299e-10	3.5917e-10	3.5917e-10
400	1.73977e-10	3.18714e-10	3.18714e-10	5.26148e-10	4.27347e-10	4.27347e-10
500	2.06152e-10	3.6348e-10	3.6348e-10	5.88889e-10	4.90442e-10	4.90442e-10