

Homework Assignment No. 1

Due on Wednesday, January 19, 2005

1.) Problem P1.7 of the text.

[Answers - a.) 10ns, b.) 20ns or 50MHz]

2.) Problem P1.8 of the text.

[Answers - a.) 866ps, b.) $t = \infty$, and c.) 2.88ns]

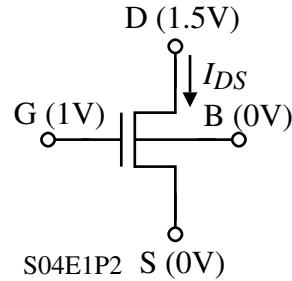
3.) Problem P1.9 of the text.

[Answers – a.) $t_{down} = 8.66\text{ms}$, b.) $t_{up} = 20.8\text{ms}$ and c.) $t_{ratio} = 2.4$ or 0.42]

4.) Problem P2.1 of the text.

[a.) For the NMOS, $V_{TO} = 0.018\text{V}$, for the PMOS, $V_{TO} = -0.138\text{V}$, b.) $V_{TO} = -1.24\text{V}$, and c.) From part a.) $N_i = 3.82 \times 10^{12} \text{ ions/cm}^2$ (p-type), $N_i = 2.62 \times 10^{12} \text{ ions/cm}^2$ (n-type) and from part b.) $N_i = 8.4 \times 10^{12} \text{ ions/cm}^2$ (p-type)]

5.) Solve for the dc value of the drain current, I_{DS} , for the NMOS transistor shown assuming $0.18\mu\text{m}$ CMOS technology. The W and L for this transistor are $0.6\mu\text{m}$ and $0.2\mu\text{m}$.



S04E1P2 S (0V)