

Fabrication and Characterization of 0.24 Micron CMOS Device by Using Simulation

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ABSTRACT

Simulation and analyzing the electrical characteristics of 0.24 micron CMOS device was done by using Silvaco TCAD. Electrical characteristics were carried out by using Atlas device simulator; while for simulation the process was carried out by using Athena process simulator to modify theoretical values and obtain more accurate process parameters. The electrical parameter was extracted to investigate the device characteristics. Several design analyses were performed to investigate the effectiveness of the advanced method in order to prevent the varying of threshold voltage. The electrical characteristics produce the graph of drain current versus drain voltage, I_D-V_D and drain current versus gate voltage, I_D-V_G . From I_D-V_G can be obtained the threshold voltage, V_T in which V_T for NMOS transistor is lower than V_T for PMOS transistor which is 0.6695V and -0.9683 V respectively. The gate length L_G obtained from the simulation for NMOS and PMOS is the same which is 0.235 micron and it is nearest to the scale for this research work.

Keywords: *P-channel MOS (PMOS), N-channel MOS (NMOS), 0.24 micron, drain current (I_D), drain voltage (V_D), and gate voltage (V_G).*