

# **Simulation of the effect of doping concentration level in source, drain and channel's areas of metal-oxide semiconductor transistors on the transconductance in Silvaco simulator in order to performance investigation**

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A study on MOSFET seeks analog and digital applications. In analog application,  $g_m$  and cut off frequency properties are very significant. Due to the fact that  $g_m$  is an even more important cut off frequency, it determines transistor gain apart being a cut off frequency. Consequently, the higher the  $g_m$  is, the higher the transistor gain will be. Therefore, we seek a strategy to raise transistor gain or transconductance. A kind of metal-oxide semiconductor field-effect transistor of is simulated in this study by Silvaco TCAD. By applying changes on the arrangement of source areas, drain and channel, its effect on the drain flow curve and transistor gate voltage will be obtained. Hence, the transconductance ( $g_m$ ) is calculated. An analysis of how the changes are applied and solutions for increasing the efficiency of the device will be conducted  $g_m$  viewpoint. Results of transconductance will be analyzed by applying changes on the arrangement of source areas, transistor channel and drain and also by engineering the oxide.

**Keywords : Key Words : MOSFET - Doping - Transconductance - Simulation**

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