Abstract:

We have investigated the performance of Gallium Nitride (GaN) based Double-Gate (DG) Metal-Oxide-Semiconductor Field-Effect Transistor (MOSFET). Atlas Device Simulation Framework -Silvaco has been used to access Non-Equilibrium Green Function to distinguish the transfer characteristics curve, ON state current (ION), OFF-state current (IOFF), Drain Induced Barrier Lowering (DIBL), Subthreshold Swing, Electron Current Density, Conduction Band Energy and Electric Field. The concept of Solid state device physics on the effect of gate length studied for the next generation logic applications. GaN-based DG MOSFETs shows better performance than Si-based Single gate MOSFETs. The proposed device has drawn the attention over conventional SG-MOSFET due to fas switching performance. The device turn on and turn off voltage is respectively VGS=1V(On state) and VGS-0V(OFF State). To validate our simulation tool and model results, previous research model has been investigated using Silvaco Atlas and the results obtained are compared to the previous results.

Keywords: GaN, DG-MOSFET, DIBL, SS, Silvaco Atlas, SCE, Gate Length