

## **Body doping analysis of vertical strained-SiGe Impact Ionization MOSFET incorporating dielectric pocket (VESIMOS-DP)**

### **Abstrak**

The Vertical Strained Silicon Germanium (SiGe) Impact Ionization MOSFET with Dielectric Pocket (VESIMOS-DP) has been successfully developed and analyzed in this paper. There are significant drop in subthreshold slope (S) while threshold voltage is increase as the body doping concentration increases. It is notable that for body doping concentration above  $10^{20}$ , the S values keep increasing which is not recommended as the switching speed getting higher distracting performance of the device. An improved stability of threshold voltage,  $V_{TH}$  was found for VESIMOS-DP device of various DP size ranging from 20nm to 80nm. The stability is due to the reducing charge sharing effects between source and drain region. In addition, the output characteristic was also highlighted a very good drain current at different gate voltage with the increasing of drain voltage for VESIMOS-DP with high body doping concentration. VESIMOS-DP with low body doping concentration suffers PBT effect that prevents the device from being able to switch off. Hence, high body doping concentrations are imperative for obtaining better device characteristics and ensure the device works in II mode.