

# Numerical Simulation and Parameters Variation of Silicon Based Self-Switching Diode (SSD) and the Effect to the Physical and Electrical Properties

## Abstract

Investigation of SOI based self-switching diode (SSD) by numerical simulation for RF -DC harvesting application is presented. The rectification performance of the SSD is based on the curvature coefficient,  $\gamma$  and current responsivity,  $\beta$  which are closely related to the I-V characteristic of a non-linear device. In this work, the structural parameters are varied to observe the electrical and physical characteristics with the aid of ATLAS Silvaco simulation tools. The rectification performance in each variation is then compared, with the highest value of  $\gamma$  and  $\beta$  observed at 25.20 V and 12.60 V, respectively. By identifying and understanding these control factors and their effects, distinctive variations of the structural parameters by using a more deliberate optimization method can be proposed for further improvement on the rectification performance.