Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Effects of Metal Orientation and Alloying on Metal-Semiconductor Schottky Barriers EDUARDO C. SILVA, DOMINGO A. FERRER, J. ISRAEL RAMIREZ, PRANEET ADUSUMILLI, OSCAR D. RESTREPO, RINUS LEE, WONWOO KIM, MURALI KOTA, GlobalFoundries, Malta, NY 12020 USA — The electric resistance of metal-semiconductor (MS) junctions is one of the limiting factors in the aggressive scaling of sub-14 nm semiconductor devices including nanowire field effect transistors (FETs) and FinFETs. The Schottky barrier caused by the charge transfer at MS juntion is the root cause of this interface resistance, which in turn limits the power and performance of semiconductor nanodevices. In this study, we employ density functional theory and a generalized transfer matrix method to study the electronic structure and transport properties of Titanium Silicide / Silicon junctions, as well as the effects of metal orientation and alloying on the metal-semiconductor Schottky barrier for both p- and n-type semiconductor devices. We will comment on the possible ways to effectively modulate the Schottky barriers in order to meet the MS junction resistance targets needed to enable sub-14nm semiconductor technologies.

Murali Kota
GlobalFoundries, Malta, NY 12020 USA

Date submitted: 10 Nov 2016 Electronic form version 1.4