



BUENAVENTURA ELECTRON DEVICES SOCIETY CHAPTER

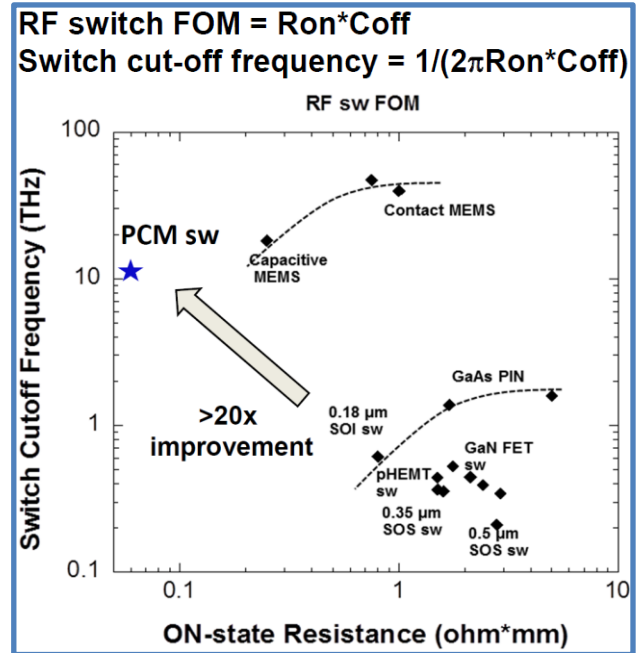
Phase-Change Materials for RF Applications

Speaker: *Dr. Jeong-Sun Moon, HRL*

September 27, 2016 at 6:30 PM

Location: Skyworks Solutions, Newbury Park, CA

Phase change materials (PCMs) based on the chalcogenides are a class of solids that can be transitioned by thermal actuation between a crystalline phase, which is highly electrically conductive, and an amorphous phase, which is highly electrically insulating. In particular, germanium telluride (GeTe)-based PCMs have demonstrated a very high amorphous-to-crystalline resistance ratio and a very low crystalline-state resistance. This resistance state is non-volatile and is naturally applicable for latching RF/microwave switches. A PCM device has an actuation mechanism that is fundamentally different from traditional semiconductor switch technologies. Switches have been reported that show a switch figure of merit (i.e., cutoff frequency $f_c = 1/(2\pi \cdot \text{Ron} \cdot \text{Coff})$) equal to 12.5 THz. Latching RF Switches made from PCMs offer the promise for realizing IC-integrable components that can enable new classes of adaptive, reconfigurable and tunable networks. In addition to RF devices, PCMs could be used to create reconfigurable metallic surfaces, transmission lines, and antennas. The presentation will discuss materials development, device design, device modeling, thermal actuation techniques, and explore the application space for these devices.



Dr. Jeong-Sun Moon (F'14) received the B.S and M.S. degrees from Seoul National University, Korea, and the Ph.D. degree from Michigan State University, East Lansing, MI, in 1995, where he studied electron quantum transport in nanoscale devices and software-defined digital transceivers. In 1995, he joined Sandia National Laboratories as a postdoctoral scholar, where he worked on III-V semiconductor nanoscale devices including 2D-2D resonant tunneling transistors. In 2000, he joined HRL Laboratories, Malibu, CA, and he is a Senior Research Scientist at HRL Laboratories. He has managed numerous research contracts from DARPA, ONR, NRO, JPL and NASA. His research focuses on emerging materials/devices and RF/high-speed devices/circuits including GaN, InP, GaSb, SiGe, Graphene, and phase-change material, as well as optical devices. He has published two book chapters and has authored or co-authored more than 100 papers and holds 20 patents. Dr. Moon is a Fellow of the IEEE and a recipient of the George Abraham Outstanding Paper Award from Government Microcircuit Applications and Critical Technology Conference (GOMACTech) in 2014, and the NASA SPACE ACT Board Award in 2009.



Location

Skyworks Solutions

649 Lawrence Drive, Newbury Park, CA 91320

Intersection of West Hillcrest Drive and Lawrence Drive

(not the main building, please use link below to arrow that pinpoints building)

<http://maps.google.com/maps?q=34.187542,-118.930994&num=1&t=h&vpsrc=0&ie=UTF8&z=18&iwloc=A>

Directions

From Los Angeles

Highway 101 North

Take exit 47A for Rancho Conejo Blvd

Use the left lane to turn right onto Rancho Conejo Blvd

Turn left onto W Hillcrest Dr.

Destination will be on the right

From Ventura

Highway 101 South

Take exit 47B for Wendy Dr. toward Newbury Park

Turn right onto N Wendy Drive

Continue onto Camino Dos Rios

Turn right onto W Hillcrest Drive

Destination will be on the left.

