



Insulator Charging in RF Mems Capacitive Switches (Paperback)

By Jay F Kucko

Biblioscholar, United States, 2012. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****. While capacitive radio frequency microelectromechanical (RF MEM) switches are poised to provide a low cost, low power alternative to current RF switch technologies, there are still reliability issues limiting switch lifetime. Previous research identified insulator charging as a primary cause of switch failure. Changes in switch pull-in and release voltages were measured to provide insight into the mechanisms responsible for charging and switch failure. A spatial and temporal dependent model was developed to describe silicon nitride s time-dependent charging as a function of applied bias. This model was verified by applying constant biases to metal-silicon nitride-silicon capacitors and tracking flatband voltage shifts. This knowledge of silicon nitride was then applied to MEM switches. Using novel waveforms and exploiting differences in actuation characteristics allowed the determination of charging characteristics and the investigation of switch failure. Results show tunneling is responsible for changes in the pull-in voltages - this includes a super-saturation effect explained by a steady-state trap charge and discharge condition. A program that models switch actuation was enhanced to include the time-dependent tunneling model. Finally, it was discovered insulator charging cannot explain...



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