

Dielectric Charging Alleviation in RF MEMS Capacitive Switch

Khushbu^{1,2}, Deepak Bansal^{1,2}, Anuroop^{1,2}, Kamaljit Rangra^{1,2}

¹Transducer and Actuator Group, CSIR- Central Electronics Engineering Research Institute, Pilani, Raj. India

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, Uttar Pradesh, India

Abstract

RF MEMS switches have tremendous applications in defence and commercial area due to low loss, low power consumption and better RF response. However, the reliability concern of RF MEMS switches has limited its widespread use in cell phones, base stations, etc. The presence of dielectric charging in RF MEMS capacitive switch causes stiction and drift in the pull-in voltage. A design to alleviate charging has been proposed. Fabricated switch has pull-in voltage of <20V and pull-up voltage of 17V with a switching time of 78 μ s. The switch has completed 600 million cycles. The resonant frequency of the device is 8.4 kHz. Insertion loss and isolation of the switch are better than 0.1 and 17 dB respectively.