



## Temperature Dependence of Actuated Membranes for RF MEMS Switches

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Condition: New. Publisher/Verlag: VDM Verlag Dr. Müller | Applications for thin film materials in a cryogenic environment | Over the last 10 years, understanding of mechanical properties of thin film material has been essential for improving life-time operations of microelectromechanical systems (MEMS). Although, properties of bulk materials might be well characterized, thin-film properties are considerably different from those of the bulk. It cannot be assumed that mechanical properties using bulk specimens will apply to the same materials when used as a thin film. For many microelectronic thin films, material properties depend strongly on the details of the deposition processes and the growth conditions on its substrate. Temperature dependence of a MEMS switch gold thin film membrane on the pull down voltage as the temperature is varied from room temperature (300 K) to cryogenic temperature (10 K) is determined with RF MEMS shunt switches. The switch is composed of a gold coplanar waveguide structure with a gold bridge membrane suspended above an area of the center conductor which is covered by a dielectric ( $\text{BaTiO}_3$ ). The gold membrane is actuated by an electrostatic force acting between the transmission line and the membrane when a voltage is applied. Over the last 10 years, understanding of mechanical properties of thin film material has been essential for improving life-time operations of microelectromechanical systems (MEMS). Although, properties of bulk materials might...



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