Abstracts

Low contact resistance series MEMS switches

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This paper reports on the design and development of a novel DC-contact MEMS switch for microwave applications. The switching operation utilizes two different forces: electrostatic and stress-induced forces. The former is employed as the actuation force, while the latter is responsible for achieving the actual DC contact. In particular, when no bias voltage is applied, the deformation of a metallic cantilever beam caused by residual gradient stress leads to a metal-to-metal contact. On the other hand, when a DC-voltage is applied between the cantilever beam and an actuation electrode, the cantilever deflects due to electrostatic force and the metallic contact ceases to exist. Contact resistance of less than 1 /spl Omega/ is demonstrated with this technique in the closed position, which corresponds to an RF insertion loss of 0.1-0.2 dB up to 40 GHz. In this switch the contact force does not depend on the actuation voltage and there is no DC potential across the closed contact, which constitute the main advantages of this design.

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