The Spiral RF MEMS Switch in COMSOL Multiphysics

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Introduction: To develop electrostatically actuated spiral switch, which can be actuated at lower voltages as compared to conventional RF MEMS switches by using serpentine structure. The proposed design is capable of producing better deflections for lower voltages

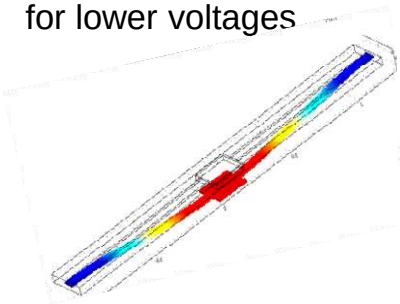


Figure 1 Plate suspended by two anchors

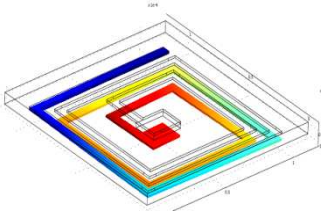
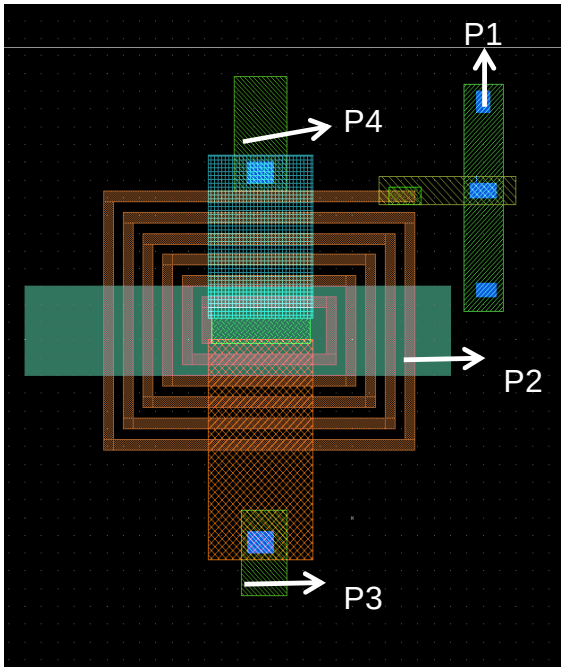


Figure 2. Serpentine switch

Design of Spiral switch:



P1 is input voltage pad ('5' volts)
P2 is grounded pad
P3 is Signal input pad
P4 is Signal output pad

Figure 3. Electrostatically actuated spiral RFMEMS switch in Layout Editor showing CPW.

Results: From the simulation result it is observed that as the number of serpentine structure increases the electrostatic deflection increases.

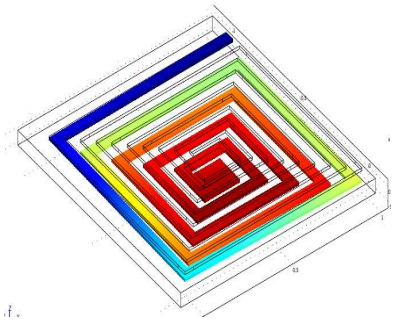


Figure 3. Proposed switch in COMSOL showing displacement

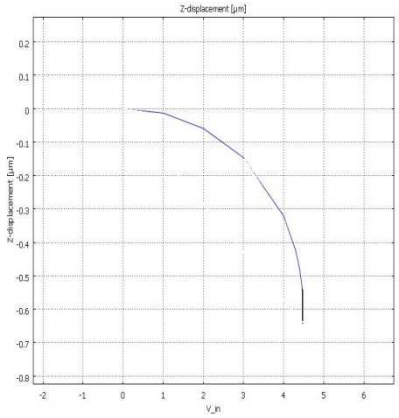


Figure 4. Title of the figure

Conclusions: The serpentine structure is suitable for low actuation switch is modeled and simulated in COMSOL. This developed switch has pull-in voltage compared to other two geometries as shown in Figure 1, 2 and 3.

References:

1. Stephen D. Sentruria, "Microsystem Design", *Kluwer Academic Publishers,* 2001
2. Kamal Jit Rangra. "Electrostatic Low Actuation Voltage RF MEMS Switches for Telecommunications". International Doctorate School in Information and Communication Technologies DIT - University of Trento