

# Tunable Micro Electromechanical Inductor

**R**esearchers at the University of South Florida have developed a novel micro-machined tunable inductor.

The design of microwave and millimeter wave electronics requires components that provide a capability for impedance matching. Two of the most common types of components used for impedance matching are capacitors and inductors. Radio frequency (RF) micro electromechanical (MEMS) techniques have in the past been used to fabricate state-of-the-art tunable capacitors in a variety of different forms. Inductors are integral components in RF front end architectures. However, to date much less progress has been made in developing RF MEMS tunable inductors.

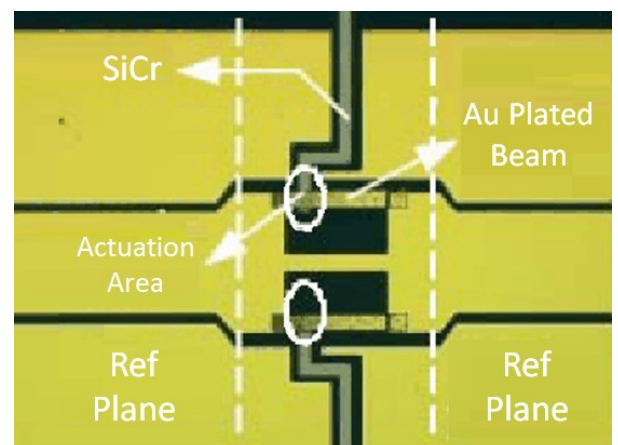
Our invention provides a distributed tunable inductor using DC contact MEMS switches. A high inductance value is realized using a small length of high impedance line, while low inductance is realized by reconfiguring the same circuit to yield a low impedance line using DC-contact switches. The resulting inductor is compact in size and provides very fine resolution in its tuning states.

This novel inductor can be applied in a variety of different circuit applications like true-time-delay phase shifters, impedance matching networks for amplifiers, and tuning networks for couplers and filters.

### ADVANTAGES:

- Very fine resolution in tuning state
- Compact design
- Inductance ratio of  $\sim 1.8$  at 30 GHz

*A NOVEL, COMPACT AND FINE  
RESOLUTION INDUCTOR*



*Schematic of Tunable MEMS Inductor*

**Tech ID # 04A049 Patent #: [7,274,278](#); [7,741,936](#)**