Mems variable capacitor device

What are the applications of variable MEMS capacitors and switches?
One of the applications of the variable MEMS capacitors and switches is the use of tunable resonators and filters to tune the resonance or central frequency,respectively. Hence,the combination of these MEMS components with a variety of transmission lines has been presented.

Can a variable MEMS capacitor be used in hmsiw structures?
To avoid the problems of integration and noise,a new variable MEMS capacitor is designed to use in the HMSIW structures,for the first time. Hence,two basic and specific designs are presented and the mechanical behaviour of them is analysed and simulated using the FEM.

What is the tuning range of a MEMS variable capacitor?
According to (10),the tuning range of the basic MEMS variable capacitor is 26%while this parameter for the proposed MEMS variable capacitor is 29%. Then,the proposed MEMS capacitor is placed on the HMSIW-CSRR resonator (see Figs. 2a and b).

Do MEMS based digital variable capacitors with multi-cantilevers and double-clamped beams increase capacitance?
Conclusions MEMS based digital variable capacitors with multi-cantilevers and double-clamped beams were analyzed and designed. By applying the bias voltage between two electrodes,an increased electrostatic force pulls-in the cantilever beams one by one,realizing a digital increase in capacitance.

What are MEMS based switches & capacitors?
The MEMS based switches (dc- and ac-modes) and capacitors are the most important components for RF applications. They have a mechanical structure that isolates the control circuit from the signal circuit,and a mechanical inertia that prevents modulation of the capacitance value by RF signal,and provides good linearity.

What is MEMS capacitive structure?
Devices based on MEMS capacitive structure have recently been considered in the microwave circuits particularly for the support of switching and tuning functions due to its low loss and high performance. The variable MEMS capacitor is the best alternative to the solid-state varactors.

In this paper, an on-chip variable MEMS capacitor, with designing of new special arms that cause uniform movement, is presented for use on the HMSIW-CSRR (half mode substrate integrated waveguide-complementary split-ring resonator) to ...

A novel MEMS based digital variable capacitor was designed and fabricated. The device ...

An RF MEMS variable capacitor, fabricated in the PolyMUMPS process and tuned electrostatically,

possessing a linear capacitance-voltage response is reported. The measured quality factor of the device was 17 at 1 GHz, while the tuning range was 1.2:1 and was achieved at an actuation DC voltage of 8 V only. Further, the linear regression ...

We have proposed a new RF MEMS variable capacitor to achieve high ...

In this paper, we present a new structure of a micromachined tunable capacitor using a combination of piezoelectric and electrostatic parallel-plate actuators. Electrostatic parallel-plate capacitors have a low capacitive tuning ratio due to the "pull-in" instability.

In this paper, an on-chip variable MEMS capacitor, with designing of new special arms that cause uniform movement, is presented for use on the HMSIW-CSRR (half mode substrate integrated waveguide ...

A novel MEMS based digital variable capacitor was designed and fabricated. The device consists of a multi-cantilever (or bridge) with variable length, suspended over a bottom electrode. By applying a voltage between the electrodes, the electrostatic force pulls the beams in one-by-one, realizing a digital increase in capacitance. A high-

Variable capacitors can benefit from the microelectromechanical systems (MEMS) technology, to be equipped with attractive characteristics such as high quality factor and wide tuning range. One of the design goals for MEMS varactors has been to realize linear capacitance-voltage (C-V) characteristics, for which a design method is proposed in ...

This work presents a variable RF MEMS capacitor based on five cantilever shunt switches for the first time. Conceptually, the proposed varactor design comprises five identical cantilever shunt switches, which allow the creation of 32 discrete capacitance values ranging from 0.091 to 6.04 pF. The latter translates to a tuning range of around 67. The overall ...

tuning device improves the phase noise of the VCOs. This paper reports that the single-crystal silicon MEMS variable capacitor which can be linearly tunable have nominal capacitance of 1.4 pF and 10% tuning range at 8 V. To predict the frequency response of the VCOs that the proposed capacitor will be applied to, the capacitor model is also

Here, a new design of a variable micro electromechanical system (MEMS) capacitor is introduced to use in telecommunication systems. For the first time, an on-chip MEMS component has been used in the substrate integrated waveguide (SIW) structures to avoid discrete and non-integrated connection problems and high noise levels and affects the ...

Figure 1 shows three-dimensional and top view of the variable capacitor using a novel nonplanar bridge structure suspended by four torsion beams, which are mechanically anchored on the substrate. The device can be divided into two parts: a plate capacitor and two electrostatic torsion micro-actuators. The plate capacitor

structure consists of a central and ...

This study presents the design and simulation of an RF MEMS variable capacitor with a high tuning ratio and high linearity factor of capacitance-voltage response. An electrostatic torsion actuator with planar and non-planar structures is presented to obtain the high tuning ratio by avoiding the occurrence of pull-in point. In the proposed ...

A novel MEMS based digital variable capacitor was designed and fabricated. ...

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