

The design and simulation of an optimized MEMS varactor with high Q factor for RF circuits

ABSTRACT

This research concerns on design of high-performance MEMS tuning variable varactor. Varactors can be used as a part of LC-tank of an oscillator. Using MEMS technology causes an improvement in Q factor of varactor to achieve less phase noise and lower power consumption in an oscillator. In this work a two different gap varactor has been used to avoid the pull-in voltage at 2.4 GHz. The expected capacitance is 3 pF. The area and the gaps between the plates achieved based on a basic formula of the capacitor. The design of layout has been done by CoventorWare software 2006. The DC voltage is 2.5 V which is applied to the plates and the results of 3.02 pF could be gained after analyzing. The Q factor of varactor calculated based on a distributed RC line and computed about 376.43 using MATLAB programming. The result is good enough to make low phase noise in VCO.