

## **An optimized 2.4 GHz VCO circuit design and simulation with high-Q MEMS LC-tank**

### **ABSTRACT**

This paper focuses on design of high-performance MEMS LC-tank circuit for use in CMOS voltage controlled oscillators (VCO) operating at 2.4 GHz. The high-Q air suspended inductor has been designed by inductance of 2.87 nH using MEMS technology to reduce the resistive loss and the substrate loss. A MEMS two-gap tunable capacitor has been designed. The DC voltage is 2.5 V which is applied to the plates and the results of 2.04 pF could be achieved. The pull-in voltage has been optimized to achieve low phase noise, low power consumption VCO. Through this optimization, less phase noise ( $-117.7$  dBc/Hz at 100 KHz) and lower power consumption (11 mW) have been obtained.

**Keyword:** MEMS LC Tank, VCO, Inductor, Varactor, Q Factor