Voltage Controlled Ring Oscillator for RF Applications in 0.18 µm CMOS Technology

Authors : Mohammad Arif Sobhan Bhuiyan, Zainal Abidin Nordin, Mamun Bin Ibne Reaz

Abstract : A compact and power efficient high performance Voltage Controlled Oscillator (VCO) is a must in analog and digital circuits especially in the communication system, but the best trade-off among the performance parameters is a challenge for researchers. In this paper, a design of a compact 3-stage differential voltage controlled ring oscillator (VCRO) with low phase noise, low power and higher tuning bandwidth is proposed in 0.18 µm CMOS technology. The VCRO is designed with symmetric load and positive feedback techniques to achieve higher gain and minimum delay. The proposed VCRO can operate at tuning range of 3.9-5.0 GHz at 1.6 V supply voltage. The circuit consumes only 1.0757 mW of power and produces -129 dbc/Hz. The total active area of the proposed VCRO is only 11.74 x 37.73 µm2. Such a VCO can be the best choice for compact and low-power RF applications.

Keywords : CMOS, VCO, VCRO, oscillator Conference Title : ICEMP 2014 : International Conference on Electronics and Materials Physics Conference Location : Zurich, Switzerland Conference Dates : July 30-31, 2014