

A 2 GHz low power, highly tunable and low phase noise monolithic LC VCO in 0.35 μ m CMOS technology

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Abstract: In this paper, a fully integrated 2 GHz low phase noise LC-tank VCO, designed in 0.35 μ m CMOS technology is presented and analyzed. The phase noise of the VCO has been greatly reduced by means of integrated source degeneration inductors. The phase noise achieved is -108, -125 dBc/Hz and -139 dBc/Hz at 100 kHz, 600 kHz and 3 MHz offsets respectively from the carrier frequency of 2 GHz, with 2.5 V power supply voltage and giving a power consumption of 10.35 mW. A 20.3% wide tuning range is achieved by means of PMOS varactors and a degeneration resistor. The tunability of the designed oscillator covers 380 MHz, from 1.68 GHz up to 2.06 GHz with a VCO gain of 280 MHz/V. The proposed VCO is fully operational under variable conditions including temperature and supply voltage variations from -40°C to 85°C and 2.5 V \pm 10%, respectively.

Keywords : inductors, low phase noise, 0.35 μ m CMOS technology