Abstracts

Fully integrated 5.35-GHz CMOS VCOs and prescalers

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Two 5.35-GHz monolithic voltage-controlled oscillators (VCOs) and two prescalers have been fabricated in a digital 0.25-/spl mu/m CMOS process. One VCO uses p/sup +//n-well diodes, while the other uses MOS varactors, Q of 57 at 5.5 GHz and 0 V bias (low-Q condition) for a p/sup +//n-well varactor has been achieved. For an MOS varactor, it is possible to achieve a quality factor of 140 at 5.5 GHz. The tuning ranges of the VCOs are >310 MHz, and their phase noise is <-116.5 dBc/Hz at a 1-MHz offset while consuming /spl sim/7 mW power at V/sub DD/=1.5 V. The low phase noise is achieved by using only PMOS transistors in the VCO core and by optimizing the resonator layout. The prescalers utilize a variation of the source-coupled logic. The power consumption is 4.1 mW at 1.5-V V/sub DD/ and 5.4 GHz. By widening the transistors in the first three divide-by-two stages, the maximum operating frequency is increased to 9.96 GHz at V/sub DD/=2.5 V.

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