

# Balanced SAW Oscillators with Cross-Coupled CMOS Pair

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## Abstract

The cross-coupled pairs in CMOS are employed to the voltage controlled oscillator with surface acoustic wave (SAW) resonator. The problem of latch, which is not encountered in conventional LC oscillator, is essential in our case. With a careful design in bias this problem is solved. This oscillator has the advantage of inherent opposite polarity appeared on the terminals of SAW resonator, which leads to fast growing amplitude during transition. As compared to the well known Colpitts oscillator, the transition period is significantly shrunk. For completeness three kinds of oscillator with single ended, balanced Colpitts, and cross coupled one are compared in terms of figure of merit (FOM) under the same magnitude across the resonator. Also the power consumption and phase noise are indicated.

Keyword : SAW, Oscillator, differential, balance, colpitts, phase noise