

Balanced SAW Oscillator in Composite Configuration with Colpitts and Cross-Coupled Pair

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Abstract

The balanced SAW oscillator in the modified Colpitts configuration is studied. To enhance the start up a cross-coupled pair is embedded. Owing to the insulating feature of SAW resonator, the problem of latch may happen. With a careful design in the aspect ratio of CMOS transistors between main amplifier and cross coupled pair, this problem is solved. By the aid of inherent opposite polarity of cross-coupled pair appeared on the terminals of SAW resonator, the start up grows much fast 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. The power consumption and phase noise are also indicated.

Keyword : SAW, Balanced Oscillator, Cross Couple, CMOS.