

Phase Noise Improvement in Balanced SAW Oscillators

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Abstract

SAW oscillators as stable clock sources are received a number of applications in information and communication industry. As the frequency is raised up several hundred MHz and GHz range, the output with differential waveform such as LVDS has many advantages for power supply noise rejection and direct match to the preceded stages of mixer and phase detector as in the clock and data recovery applications. However, the configuration of the oscillator normally adopts the Pierce or Colpitts oscillators, which needs a single to differential converter. Here, a balanced SAW oscillator is first presented. The differential outputs possess inherently 180° out of phase in odd harmonics and in phase in even harmonics. By using these features, the powers of combined signal and noise are raised 6dB and 3dB, respectively. Thus, the phase noise of the combined signal can be improved at least 3dB, which is useful in low phase noise applications.

Keyword : SAW, Balanced Oscillator, Phase noise, Colpitts