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G_m/I_D Approach for Low Power Sustaining Amplifier Circuit for GHz Range MEMS SAW Oscillator (Conference Paper)

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Abstract

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This paper presents the design and simulation of microelectromechanical system (MEMS) based oscillator based on CMOS MEMS surface acoustic wave (SAW) resonator and regulated cascode configuration (RGC) transimpedance amplifier (TIA). The proposed TIA is designed in a standard 0.18 \mu\mathrm{m} Silterra CMOS prosess via Cadence Virtuoso software. G_m/I_D technique is used to achieve higher gain and low power TIA. The simulation result shows that the voltage gain of the design circuit is 35.5dB and 2.08 GHz -3dB bandwidth. The circuit consume 1.6mW power at 1.8 V supply voltage. When integrate with 1.4GHz resonator, the phase noise of this oscillator is -105.27 dB_c/Hz at 1kHz and -116.03 dB_c/Hz 10kHz. © 2019 IEEE.

SciVal Topic Prominence

Topic: Resonators | MEMS | Motional resistance

Prominence percentile: 95.489

Author keywords

MEMS SAW Oscillator | SAW Resonator | Transimpedance amplifier

Indexed keywords

Engineering controlled terms: Acoustic surface wave devices | Acoustic waves | Cascode amplifiers | CMOS integrated circuits | Electromechanical devices | Integrated circuit design | Low power electronics | MEMS | Nanoelectronics | Operational amplifiers | Oscillators (electronic) | Phase noise | Resonators | Timing circuits

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