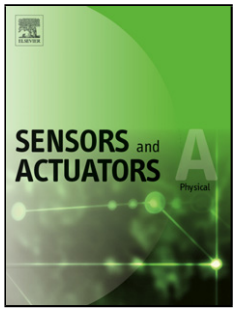

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A Second Harmonic Based Resonance Characterization Method for MEMS Electrostatic Resonators

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HIGHLIGHTS

- A second harmonic based characterization method for MEMS electrostatic resonators
- Elimination of resistive and capacitive feedthrough currents without differential topologies
- Enhancement of the quality factor (Q) of the resonating system at the same time
- Experimental verification of the proposed method with a lateral-mode MEMS resonator
- Measured enhancement of the Q by 65% and of signal-to-background ratio by 34.6 dB

Abstract

This paper presents a novel read-out approach both for eliminating parasitic feedthrough current and for enhancing the quality-factor (Q) of the resonating system at the same time. A new resonance characterization method based on sensing second harmonic component of the resonators was developed. Utilizing this method, the feedthrough current was eliminated and signal-to-background ratio was increased from 0.9dB to 35.5dB. Furthermore, the Q of the