

Novel Parametric-Effect MEMS Amplifiers/Transducers

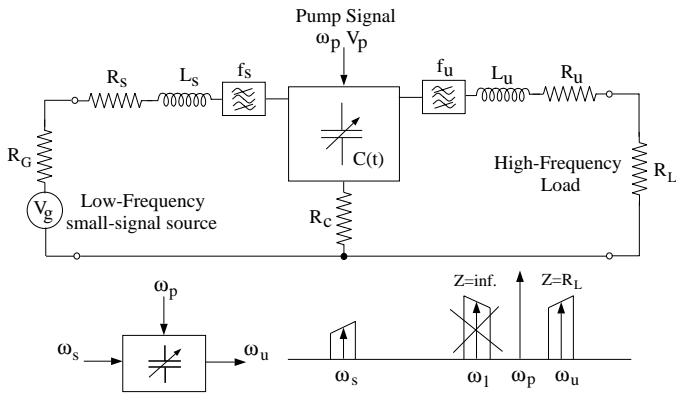


Fig. 1. Scheme and spectra for the MEMS parametric up-converter.

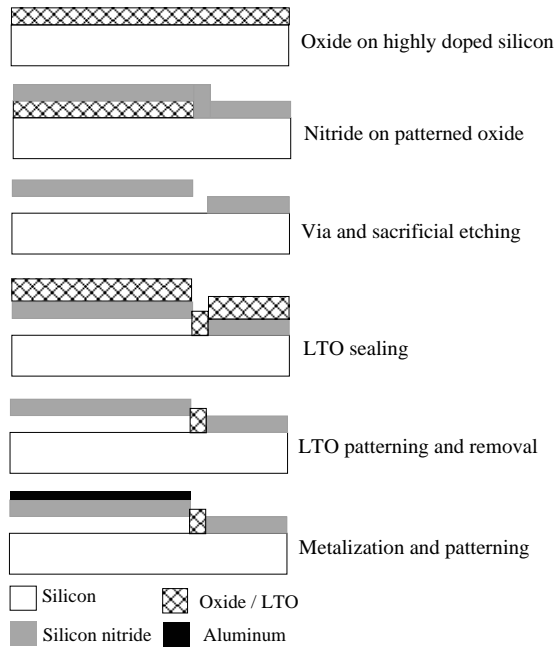


Fig. 2. Fabrication steps of the MEMS capacitor array.

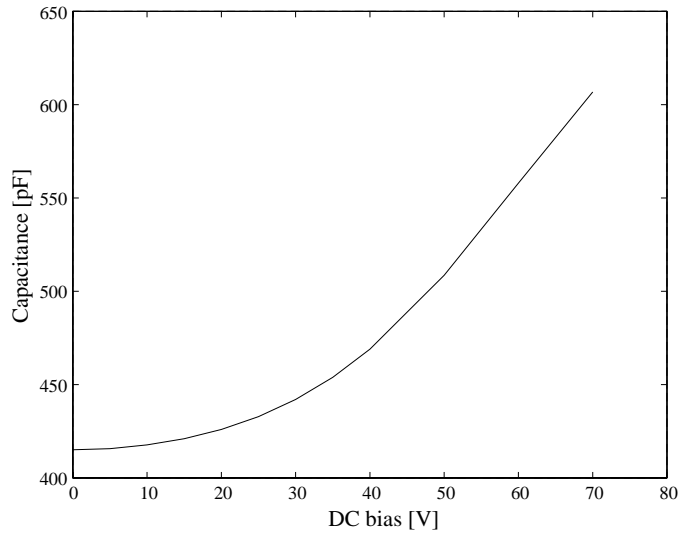


Fig. 3. Measured capacitance variation vs dc voltage.

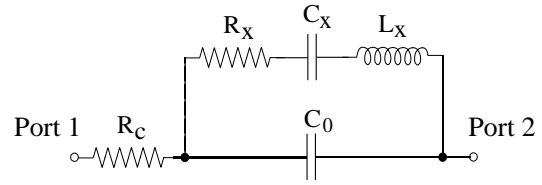


Fig. 4. Small-signal electrical model of the MEMS capacitor.

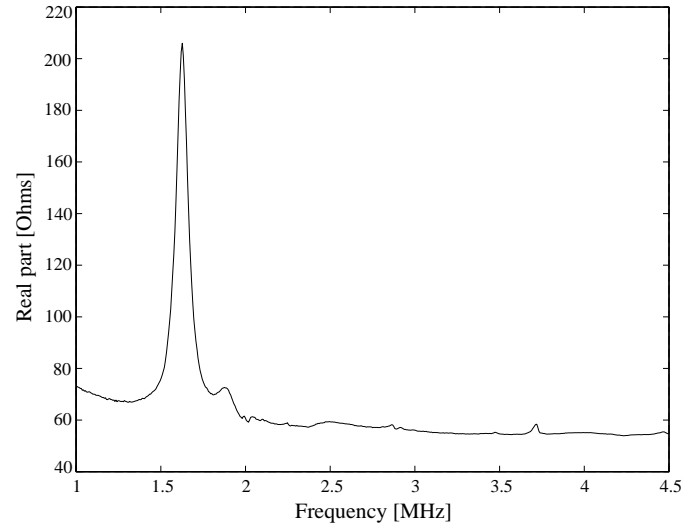


Fig. 5. Measured real part of $1/Y_{12}$ vs frequency. Extracted value of R_c is 52Ω .

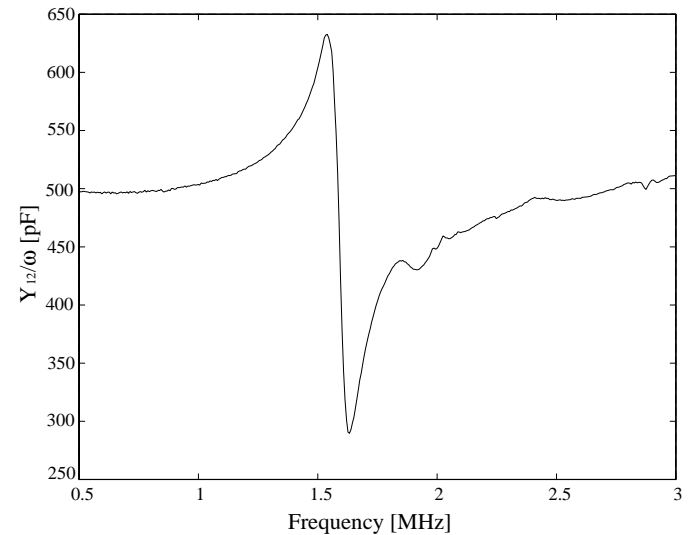


Fig. 6. Measured extracted equivalent capacitance (Y_{12}/ω) around the resonance frequency from the measurements. Extracted values of C_0 , C_x , L_x and R_x are, respectively, 500 pF, 32.5 pF, 0.29 mH and 166 Ω .

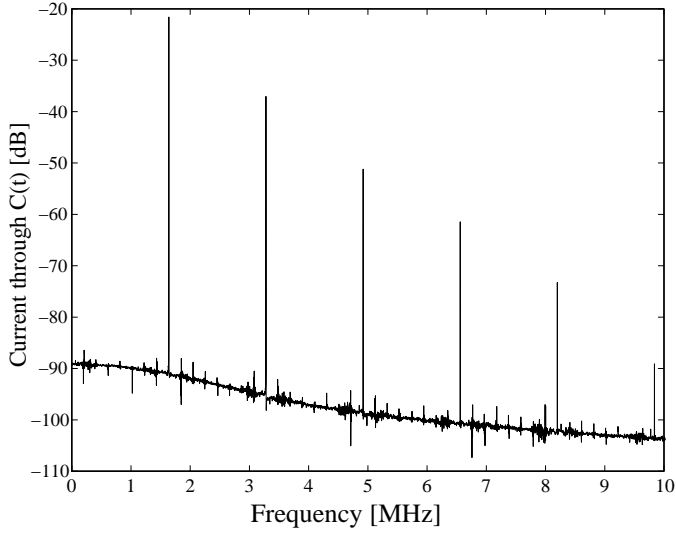


Fig. 7. Measured spectrum of the current flowing through the MEMS time-varying capacitor for $V_{dc}=60$ V and $V_P = 15 \cdot \cos(2\pi f_p t)$ with $f_p = 1.64$ MHz.

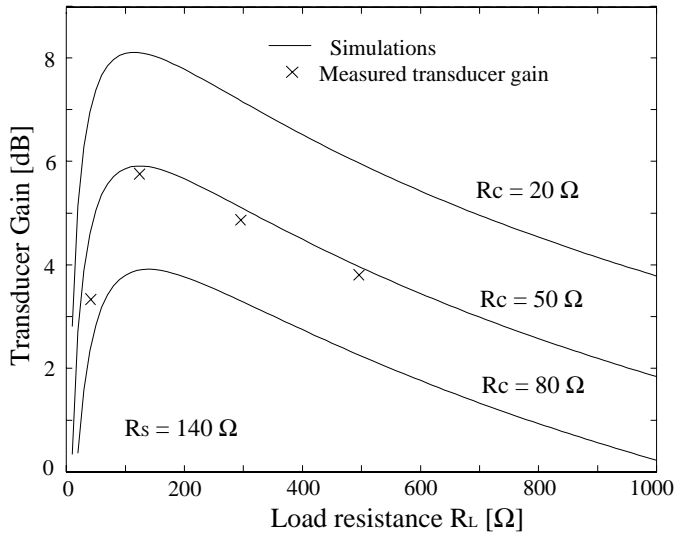


Fig. 8. Measured parametric up-converter transducer gain vs the load resistance value ($f_s = 200$ kHz and $f_p = 1.64$ MHz).

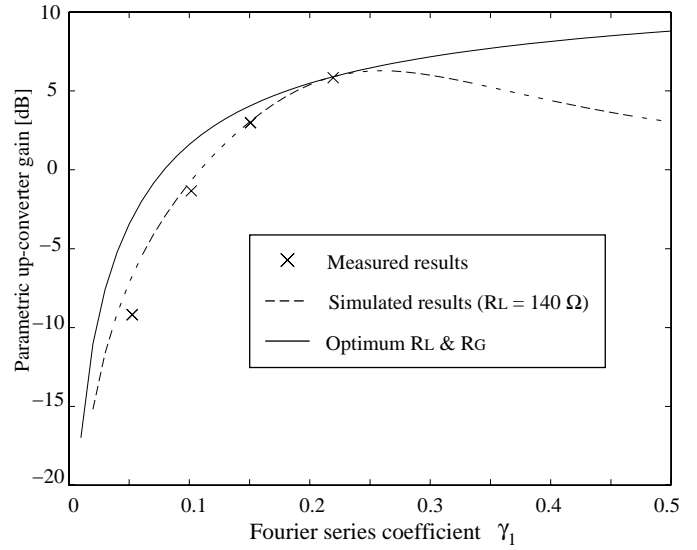


Fig. 9. Measured parametric up-converter transducer gain vs γ_1 ($f_s = 200$ kHz and $f_p = 1.64$ MHz) .