MEMS SMD Device (Vibration Isolator)

Measured Transmissibility

![Graph showing measured mechanical frequency response](image)
Device mounted over PCB with a 100µm thick plastic spacer. Round electrode under center of proof mass. Proof mass centered over surrounding electrode. Outer electrode matches height of other electrodes for spacer.

Plastic Spacer
Velocity sensor interface circuit (amplifier circuit follows)

![Circuit Diagram]

Velocity sensor’s response (theoretical)

![Graph: Normalized Sensor Response as a Function of $x_o/x_A$]
Spectral response of the sensor (theoretical)

![Theoretical Spectral Response](image1)

Spectral response of the sensor (test data) for $x_0/x_A=8.4$

![Test Spectral Response](image2)
Total harmonic distortion of the sensor (theoretical)

**THD Vs. \( \frac{x_0}{x_a} \)**

Velocity sensor’s output for a sinusoidal (vibrational) input at \( \omega_n \)

**Theoretical and Calibrated Sensor Output and Calculated Time Derivative of the Measured Displacement Data**
Closing the loop for active Q control

Device model

Feedback technique is nonlinear: turn the actuator on fully whenever the electrodes are moving away from each other – drains energy from the system, lowers Q
Sensor and feedback electronics

Electronics on backside of PCB
Comparison of open loop and closed loop response