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硅谐振梁式压力微传感器边界结构参数优化

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OPTIMIZATION OF THE BOUNDARY STRUCTURAL PARAMETERS OF A SILICON RESONANT BEAM PRESSURE MICROSENSOR

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摘要 对一种硅谐振式压力微传感器敏感结构的边界结构参数进行了优化设计。所讨论的敏感结构以方形硅膜片作为一次敏感元件，直接感受被测压力。在膜片的上表面制作浅槽和硅梁，以硅梁作为二次敏感元件，间接感受被测压力。为减少敏感结构内外能量耦合，提高振子的Q值，采用有限元仿真分析的方法，优化敏感边界结构参数。

关键词：

Abstract： The boundary structural parameters of a silicon resonant pressure microsensor are optimized in this paper. The preliminary sensing unit of the above sensor is a square silicon diaphragm, which senses the measured pressure directly. And the final sensing unit of the above sensor is a silicon beam resonator, which is attached on the upper surface of the above diaphragm. The above silicon beam senses the measured pressure indirectly. Based on reducing the boundary structural disturbances of the sensing structure for the above microsensor and increasing the Q factor of the beam resonator, the boundary structural parameters of the sensing structure are optimized by using the finite element method.

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