

# Design and Simulation of 3D MEMS Piezoelectric Gyroscope Using COMSOL Multiphysics®

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## Abstract

MEMS is the leading technology which combines both electronic and mechanical devices on a single microchip. Tracing the position of the object is an important problem in engineering. This can be addressed by Gyroscopes. These sensors are used to find orientation and angular velocity.

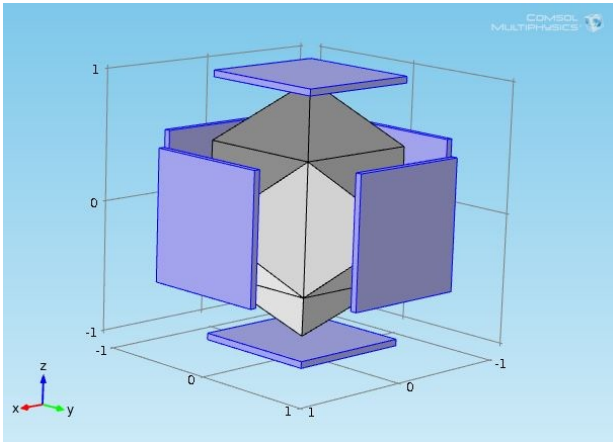
This paper focuses on 3D MEMS Piezoelectric Gyroscope. COMSOL Multiphysics® is used for designing and simulation of the device. It uses piezoelectric effect to detect orientations. Figure 1 shows the project design. Figure 3 shows orientation of body in two dimensions. Figure 4 shows orientation of body in three dimensions. It has wide applications In Space aviation, Military, smart gadgets and makes video gaming live.

Keywords: MEMS, Gyroscope, Piezoelectric devices, Microchip, Sensors.

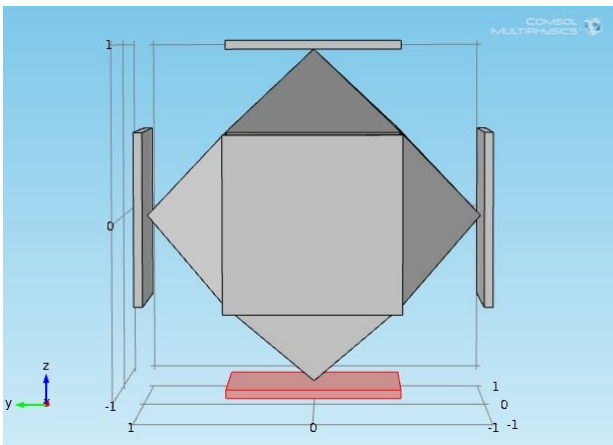
## Reference

T. Juneau, A.P. Pisano, et. al., "Dual Axis Operation of a Micromachined Rate Gyroscope", Transducers'97, Vol. 2, pp. 883-886, 1997.

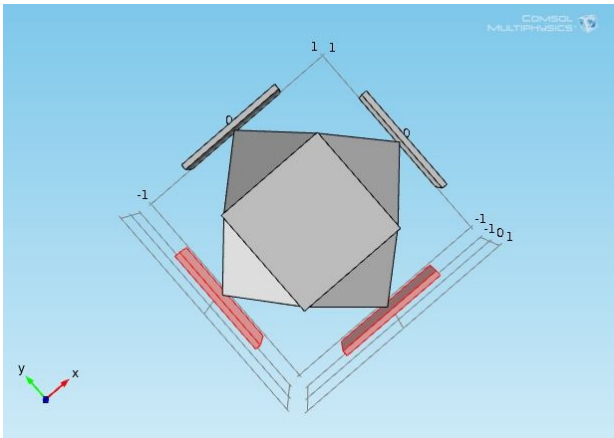
## Figures used in the abstract



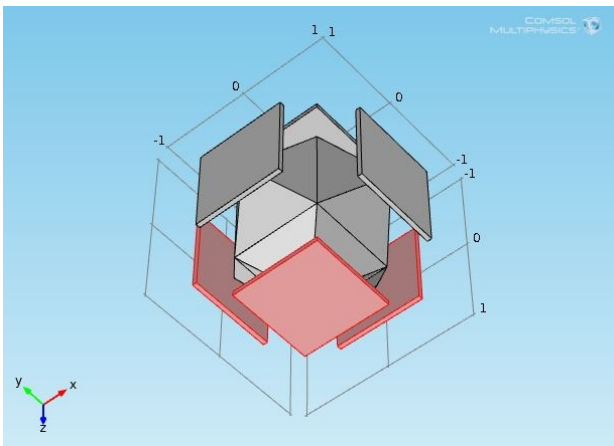
**Figure 1:** Gyroscope Design



**Figure 2:** Response when the body is stable



**Figure 3:** Response when the body is oriented in two dimensions



**Figure 4:** Response when the body is oriented in three dimensions