Department of Robotics Tanaka (S) / Tsukamoto Lab.

MEMS (Micro Electro Mechanical Systems) is a micro machine made by semiconductor microfabrication process.

A lot of MEMS devices such as microphone, motion sensor, pressure sensor, RF filter and oscillator are already used in many applications : Smart phone, digital camera, drone, car, etc.

High accuracy gyroscope



Advanced control system implemented in FPGA





High performance MEMS

resonator using FEM

Miniature varifocal liquid lens



Highly reliable packaging

Silicon migration under high temperature





Wafer-level packaging MEMS device with high-

Successfully achieved high vacuum encapsulation

Filters in smartphone

 \bigcap

The upper frequency of standard structure is 3.2 GHz. But, 8 GHz harmonic frequency respose was excited by grooved electrode in the piezoelectric substrate.

RF filter for next generation mobile

Computer simulation

communication device



Measured characteristics of (left) resonator and (right) filter π -type ladder filter (P1)







Q = 56.5k

below 1 Pa by accurately evaluating the internal vacuum with the Q-factor of the MEMS resonator.



We are studying about MEMS devices such as gyroscope, ultrasonic sensor, microphone, etc. as well as cutting-edge materials such as single crystal PZT thin film.

Visit us for details



