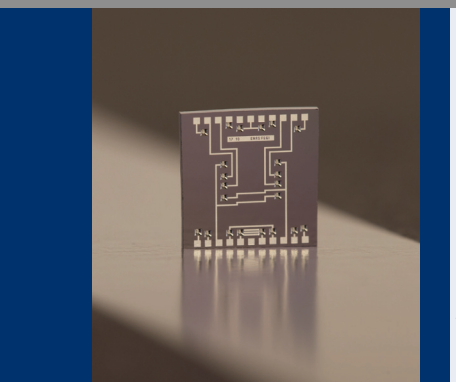
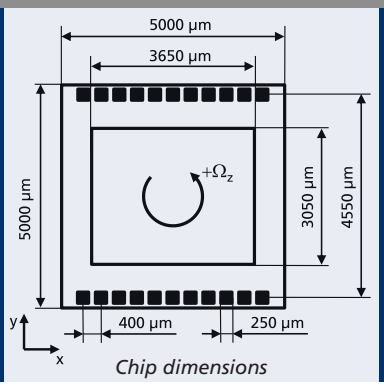
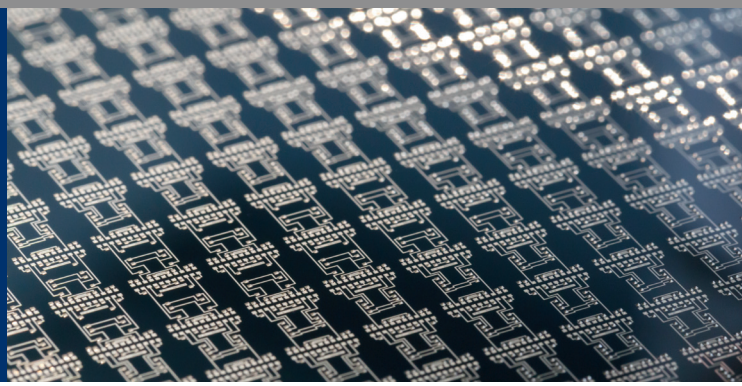
Fraunhofer
ENAS

FRAUNHOFER INSTITUTE FOR ELECTRONIC NANO SYSTEMS ENAS





Chip dimensions



ANGULAR RATE SENSOR ELEMENT FG6

The FG6 is a micromechanical sensor element for the measurement of rotational velocity about the z-axis. The MEMS sensor element consists of a tuning fork mechanical structure with double decoupled drive and sense modes. The primary mode (drive) is excited in anti-phase x-direction. The secondary mode (sense) is a movement in y-direction. With the presence of an external rate about the z-axis, the precession of the Coriolis masses lead to an anti-phase movement in y-direction which is the measure for the angular rate signal.

The working principle of the vibrating mass gyroscope is based on capacitance changes. The MEMS itself is a full-silicon stack with a height of approx. 650 µm.

Parameters

- Highly doped silicon (0.01 ... 0.05 Ωcm)
- Sensitive to angular velocity about z-axis
- Working frequency 12 kHz
- Quality factor > 160,000
- Differential output sensitivity ≈ 0.3 fF/°/s

	Drive mode		Sense Mode		
	Exc	**Det**	**Exc**	**Det**	**Unit**
# of accessible electrodes	1	2	4	2	
C0 per electrode	7.82	1.03	1.05	3.39	pF
Sensitivity	220	30	460	1480	fF/µm

Fraunhofer ENAS is part of
Forschungsfabrik Mikroelektronik Deutschland

Fraunhofer Institute for Electronic Nano Systems ENAS

Technologie-Campus 3
09126 Chemnitz | Germany

Contact persons

Dr. Roman Forke
Phone +49 371 45001-254
roman.forke@enas.fraunhofer.de

Prof. Dr. Karla Hiller
Phone: +49 371 45001-400
karla.hiller@enas.fraunhofer.de

www.enas.fraunhofer.de

In cooperation with

ZfM Zentrum für Mikrotechnologien
TECHNISCHE UNIVERSITÄT CHEMNITZ

Photo acknowledgments: Fraunhofer ENAS