Design and Simulation of MEMS Capacitive Pressure Sensor Array for Wide Range Pressure Measurement

Abstract

The major breakthrough for future in MEMS is to integrate micro sensors, micro actuators and micro electronics and other technologies on a single chip. MEMS pressure sensor are the very first MEMS components that have emerged in the micro system world. MEMS pressure sensors are widely being adopted in many applications for their high performance, low cost and small size. This paper presents novel design of MEMS capacitive pressure sensor array. The proposed MEMS capacitive pressure sensor array is demonstrated with each sensor having diaphragm of side length 60µm and gap depth of 3µm but with different diaphragm thickness of viz., 1.5µm, 2µm, 2.5µm and 3µm. The linearity of each MEMS capacitive pressure sensor in the array is studied and the output within good linearity is read out using combinational switching mechanism available in COMSOL and MATLAB Simulink. This proposed work makes possible to measure pressure over a large range of about 0-33.25MPa and can be even varied by varying diaphragm thickness of each sensor in an array or by varying the number of array elements. Hence this design can possibly be called universal pressure sensor and can be used...
Design and Simulation of MEMS Capacitive Pressure Sensor Array for Wide Range Pressure Measurement in variety of applications.

References

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Index Terms

Computer Science

Information Systems

Keywords
MEMS pressure sensor array, Polysilicon, Linearity, Switching, COMSOL, Simulink, Diaphragm thickness.