**Theoretical formulation to evaluate capacitance for before and after touch point MEMS capacitive pressure sensors**


ABSTRACT

Micro-electromechanical systems (MEMS) have received a great deal of attention in recent years. This is due to the great promise of increased miniaturization and Performance of MEMS devices over conventional devices. MEMS pressure sensors currently dominate the market for greater than atmospheric pressure sensors. In this paper, a theoretical and finite elements analysis (FEA) solution for Micro-electromechanical systems (MEMS) pressure sensor to evaluate capacitance for before and after touch point is proposed. By looking at MEMS devices, when the diaphragm starts touching the fixed electrode by applying loads, it will have a major effect on the overall of the capacitance. Therefore, one should consider the effect of touch mode capacitance value in the system to evaluate good linearity, large operating pressure range and large overload protection at output. As of so far the evaluation for capacitance value of touch point and after touch point has not been evaluated in the literatures. This paper presents the new analytical formula to approach for including the touch-down effect capacitance value of Microsystems. The proposed MEMS capacitive pressure sensor demonstrated diaphragm with radius of , the gap depth of and the sensor exhibit linear response with pressure from 0.01 Mpa to 1.7 Mpa.



**Keyword:** MEMS pressure sensor; Touch mode; Circular diaphragm