

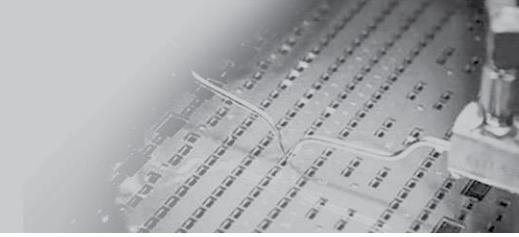
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Overpressure Tolerance Report



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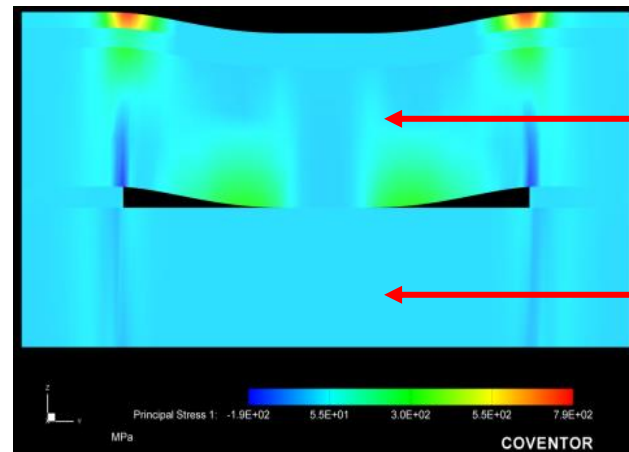


Scope

In this test report, we underline the overpressure tolerance performance of the MEMS capacitive element developed by ES Systems. ES Systems has developed absolute and relative pressure sensors based on a MEMS capacitive process technology. This process technology is exclusively owned by ES Systems.

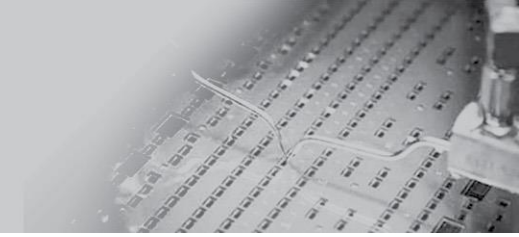
The sensor architecture consists of a fixed bottom plate and a suspended membrane which deforms with pressure. When overpressure is applied the deformation reaches the bottom membrane and inevitably stops without breaking. At the same time due to the distance traveled and the stresses exerted there are no plastic deformations. This translates into an unaffected sensor performance after release of the overpressure. Due to the features described above, the MEMS capacitive elements can withstand more than 100x overpressure.

Background Theory



Top pressure sensitive membrane

Bottom fixed plate



DUT

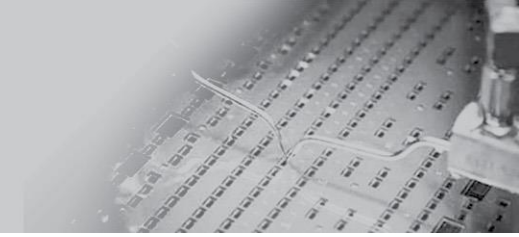


10 bar absolute medium isolated pressure sensor

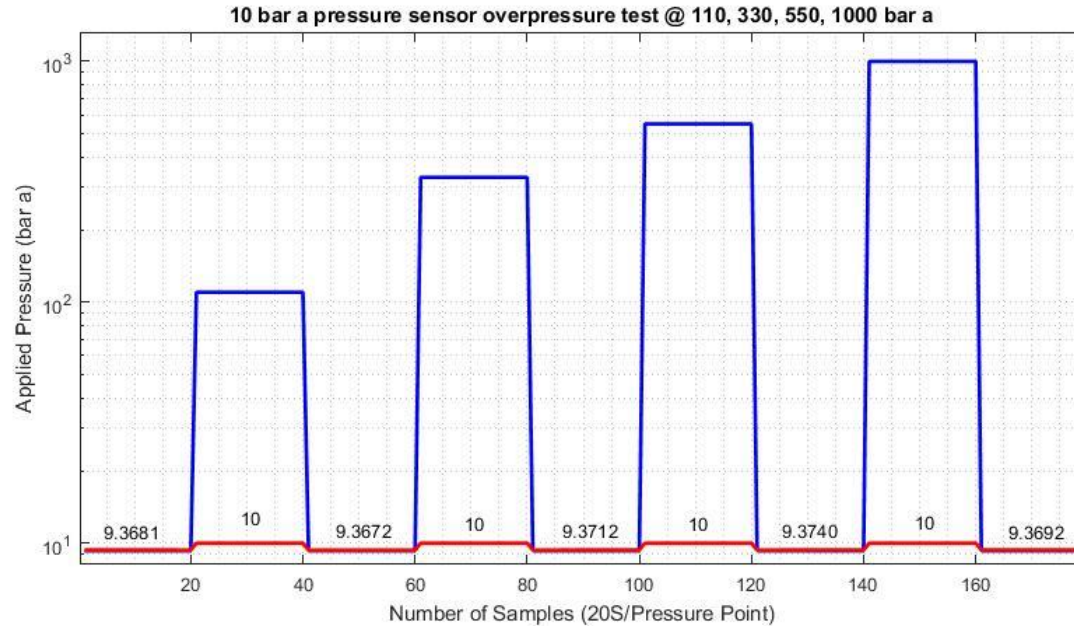
Sensor MEOP (Maximum Expected Operating Pressure) is 10 bar. The sensor is measured at a reference pressure of 9.3 bar abs and then pressurized at the following pressure steps as indicated below

*Experiment &
Data*

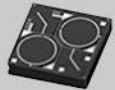
Pressure [bar a]	Over Pressure Factor [x MEOP]	Measurement [bar a]
9.3	0.93 x MEOP	9.3681
110	11 x MEOP	Output Saturated
9.3	0.93 x MEOP	9.3672
330	33 x MEOP	Output Saturated
9.3	0.93 x MEOP	9.3712
550	55 x MEOP	Output Saturated
9.3	0.93 x MEOP	9.3740
1000	100 x MEOP	Output Saturated
9.3	0.93 x MEOP	9.3692



*Experiment &
Data*



As it can be seen from the figure above, the sensor returns to nominal performance even when 100x overpressure is applied for a long period of time.



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