Freescale Semiconductor

MPXC12DT1
Rev 0, 11/2010

10 kPa Uncompensated Silicon Pressure Sensor

Freescale Semiconductor has developed a low cost, high volume, miniature pressure sensor package which is ideal as a sub-module component or a disposable unit. The unique concept of the Chip Pak allows great flexibility in system design while allowing an economic solution for the designer.This standard, low cost, uncompensated sensor permits manufacturers to design and add their own external temperature compensating and signal conditioning networks. Compensation techniques are simplified because of Freescale's single element strain gauge design.

Features

- Low Cost
- Ratiometric to Supply Voltage
- Polysulfone Case Material (ISO 10993)
- Provided in Easy-to-Use Tape and Reel
- Patented Silicon Shear Stress Strain Gauge Design

MPXC12DT1

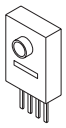
Pressure Sensor
55 mV Full Scale Span (Typical)
0 to 10 kPa

Application Examples

- Respiratory Diagnostics

ORDERING INFORMATION						
Device Name	Package Options	Case No.	Pressure Type			Device Marking
			Gauge	Differential	Absolute	
MPXC12DTI	Tape and Reel	423A		•		Date Code, Lot ID

CHIP PAK PACKAGE



MPXC12DT1
CASE 423A

NOTE: The die and wire bonds are exposed on the front side of the Chip Pak (pressure is applied to the backside of the device). Front side die and wire protection must be provided in the customer's housing. Use caution when handling the devices during all processes.

Freescale Semiconductor's Bio-compatible Pressure Sensors have been designed for medical usage by combining the performance of Freescale Semiconductor's shear stress pressure sensor design and the use of biomedically approved materials. Materials with a proven history in medical situations have been chosen to provide a sensor that can be used with confidence in applications, such as invasive blood pressure monitoring. It can be sterilized using ethylene oxide. The portions of the pressure sensor that are required to be biomedically approved are the rigid housing and the gel coating.

The rigid housing is molded from a white, medical grade polysulfone that has passed extensive biological testing including: 10993-5:1999, 10993-10:2002, and 10993-11:1993.

These sensors contain a silicone dielectric gel which covers the silicon piezoresistive sensing element. The gel is a nontoxic, nonallergenic elastomer system which meets all USP XX Biological Testing Class V requirements. The properties of the gel allow it to transmit pressure uniformly to the diaphragm surface, while isolating the internal electrical connections from the corrosive effects of fluids, such as saline solution. The gel provides electrical isolation sufficient to withstand defibrillation testing, as specified in the proposed Association for the Advancement of Medical Instrumentation (AAMI) Standard for blood pressure transducers. A biomedically approved opaque filler in the gel prevents bright operating room lights from affecting the performance of the sensor.

The MPXC12DT1 is a no-gel option.

MAXIMUM RATINGS

Table 1. Maximum Ratings[1]

Rating	Symbol	Value	Unit
Maximum Pressure (Backside)	P_{max}	75	kPa
Storage Temperature	T_{stg}	-25 to +85	°C
Operating Temperature	T_A	+15 to +40	°C

1. Exposure beyond the specified limits may cause permanent damage or degradation to the device.

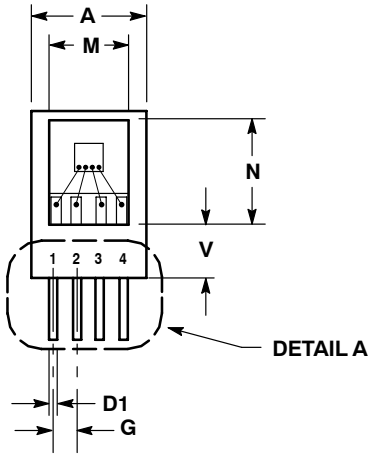
OPERATING CHARACTERISTICS

Table 2. Operating Characteristics (V_S = 3.0 Vdc, T_A = 25°C unless otherwise noted, P1 > P2)

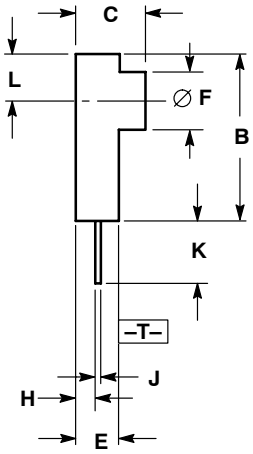
Characteristic	Symbol	Min	Typ	Max	Unit
Pressure Range[1]	P_{OP}	0	—	10	kPa
Supply Voltage[2]	V_S	—	3	10	Vdc
Supply Current	I_o	—	6.0	—	mAdc
Full Scale Span[3]	V_{FSS}	45	65	80	mV
Offset[4]	V_{off}	0	20	35	mV
Sensitivity	ΔV/ΔP	—	6.5	—	mV/kPa
Linearity	—	0	—	10	$\%V_{FSS}$
Pressure Hysteresis (0 to 10 kPa)	—	—	±0.1	—	$\%V_{FSS}$
Temperature Hysteresis (+15°C to +40°C)	—	—	±0.1	—	$\%V_{FSS}$
Input Impedance	Z_{in}	400	—	550	Ω
Output Impedance	Z_{out}	750	—	1250	Ω
Response Time[5] (10% to 90%)	t_R	—	1.0	—	ms
Warm-Up[6]	—	—	20	v	ms
Offset Stability[7]	—	—	±0.5	—	$\%V_{FSS}$

1. 1.0 kPa (kiloPascal) equals 0.145 psi.
2. Device is ratiometric within this specified excitation range. Operating the device above the specified excitation range may induce additional error due to device self-heating.
3. Full Scale Span (V_{FSS}) is defined as the algebraic difference between the output voltage at full rated pressure and the output voltage at the minimum rated pressure.
4. Offset (V_{off}) is defined as the output voltage at the minimum rated pressure.
5. Response Time is defined as the time for the incremental change in the output to go from 10% to 90% of its final value when subjected to a specified step change in pressure.
6. Warm-up Time is defined as the time required for the product to meet the specified output voltage after the pressure is stabilized.
7. Offset stability is the product's output deviation when subjected to 1000 hours of Pulsed Pressure, Temperature Cycling with Bias Test.

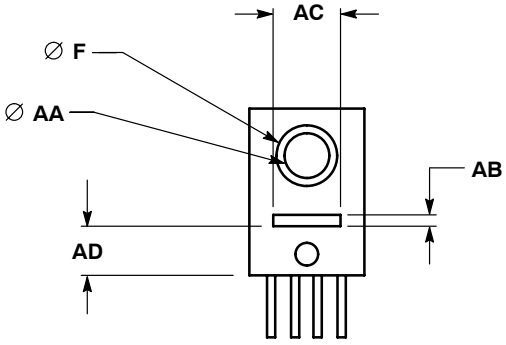
PACKAGE DIMENSIONS



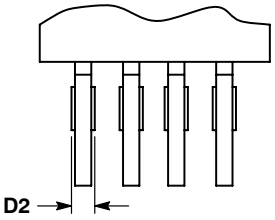
FRONT VIEW



END VIEW



BACK VIEW



DETAIL A

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.240	0.260	6.10	6.60
B	0.350	0.370	8.89	9.40
C	0.140	0.150	3.56	3.81
D1	0.012	0.020	0.30	0.51
D2	0.014	0.022	0.36	0.56
E	0.088	0.102	2.24	2.59
F	0.123	0.128	3.12	3.25
G	0.045	0.055	1.14	1.40
H	0.037	0.047	0.94	1.19
J	0.007	0.011	0.18	0.28
K	0.120	0.140	3.05	3.56
L	0.095	0.105	2.41	2.67
M	0.165	0.175	4.19	4.45
N	0.223	0.239	5.66	6.07
V	0.105	0.115	2.67	2.92
AA	0.095	0.107	2.41	2.72
AB	0.015	0.035	0.38	0.89
AC	0.120	0.175	3.05	4.45
AD	0.100	0.115	2.54	2.92

STYLE 2:
PIN 1. GND
2. S+
3. Vs
4. S-

CASE 423A-03
ISSUE C
CHIP PAK PACKAGE

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