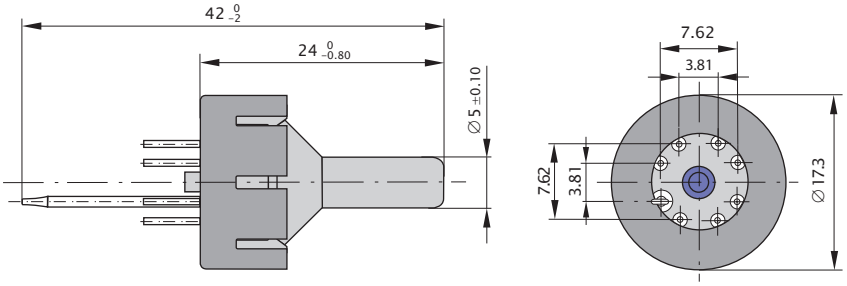
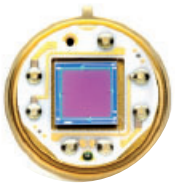
First Sensor

Pressure Sensor Module Differential Measurements





Component delivery form
Weight approx. 4.5g; Protection cap is suitable for applying pressure up to 10bar

Overview

The pressure sensor module K–series STARe has specifications similar to the sense die of our High Stability Line STARe. The die is mounted on TO–8 header and used for differential pressure measurements (V–, L– and M–Layout).

Note: The sensor consist of silicon, glass, glue and gold.
Therefore, substances which might react with these materials should be tested before use.

Applications

- Industrial transmitter
- Measurement and control

Features

- Very high long term stability
- Very low pressure and temperature hysteresis
- High static pressure applicable
- Fast response
- High bridge resistance
- Fatigue free monocrystalline silicon diaphragm giving high load cycle stability
- Temperature sensor (spreading resistance)
- Filling volume consists of ceramic components (no swelling in oil)

Order No.

K10 - HS20XB - XXXX - X YY
1 2 3 4 5

1. Product Code
   K-Series STARe D
2. Outside Dimension
   V: 4.75 X 4.75mm (3kPa…10kPa)
   L: 2.75 X 2.75mm (35kPa…100kPa)
   M: 2.15 X 2.15mm (250kPa…1MPa)
3. Pressure Range [Pa]
   03k0: 3kPa = 30mbar
   01M0: 1MPa = 10bar
4. Type (X)
   D: Differential (Si)
5. Thickness Dies Back Plate
   YY: 05 (0.53mm Back Plate)

Common Characteristics

Type	Pressure range	Parameter	min.	typ.	max.	Unit
K10-HS20VB-03k0-D05	3kPa		50	80	120	
K10-HS20VB-06k0-DXX	6kPa					
K10-HS20VB-10k0-DXX	10kPa					
K10-HS20LB-35k0-DXX	35kPa					
K10-HS20LB-100k-DXX	100kPa	Span voltage	60	100	140	mV at 5V
K10-HS20MB-250k-DXX	250kPa					
K10-HS20MB-500k-DXX	500kPa					
K10-HS20MB-01M0-DXX	1.0MPa					

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Electrical Characteristics
(measured at 5V supply and 25°C, unless otherwise specified)

Parameter	min.	typ.	max.	Unit
Bridge resistance	5,000	6,000	7,000	Ω
Offset voltage	-25	0	+25	mV
Temperature coefficient of bridge resistance[1]	+0.07	+0.09	+0.11	%/K
Temperature coefficient of offset[1]	-0.05	±0.01	+0.05	%F.S.S./K
Temperature coefficient of span[1]	-0.23	-0.20	-0.17	
Temperature hysteresis[1]	–	<0.05	–	±%F.S.S.
Pressure hysteresis	–	<0.02	–	
Linearity error[2] (higher than 10 kPa) p-range: higher than 10MPa	–	<0.30 <1.00	0.50	
Static pressure effect on offset	–	–	<0.05	±%F.S.S./100 bar
Static pressure effect on output span	–	–	<0.1	

1) Measured from 25°C to 85°C · 2) End point straight line setting
3) Pressure applied onto the front side of the die

Maximum Rating

Type	Over Pressure (100kPa)		Burst Pressure (100kPa)	
	FS min.	RS min.	FS min.	RS min.
K10-HS20B-03k0-D05	3	1.5	>3	>1.5
K10-HS20VB-06k0-DXX	4	2	>4	>2
K10-HS20VB-10k0-DXX	6	3	>6	>3
K10-HS20LB-35k0-DXX	10	5	>10	>5
K10-HS20LB-100k-DXX	20	10	>20	>10
K10-HS20MB-250k-DXX	40	20	>40	>20
K10-HS20MB-500k-DXX	50	25	>50	>25
K10-HS20MB-01M0-DXX	60	30	>60	>30

FS: Frontside; RS: Rearside

Parameter	Limit Values			Unit
	min.	typ.	max.	RS min.
Operating temperature range	-40	–	+125	°C
Storage temperature range	-50	–	+130	
Supply voltage	–	5	12	V

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Silicon Temperature Sensor

(at T_A = 25°C and I_B = 1mA, unless otherwise specified)

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Sensor resistance at T_A=25°C	R_{th}	1.85	2.00	2.15	
Spread of temperature factor		–	–	–	
T_A=-25°C		0.655	0.66	0.675	
T_A=0°C		0.812	0.82	0.826	
T_A=25°C	k_T	–	1	–	kΩ
T_A=50°C		1.195	1.20	1.215	
T_A=75°C		1.42	1.43	1.45	
T_A=100°C		1.66	1.68	1.70	
T_A=125°C		1.92	1.95	1.98	

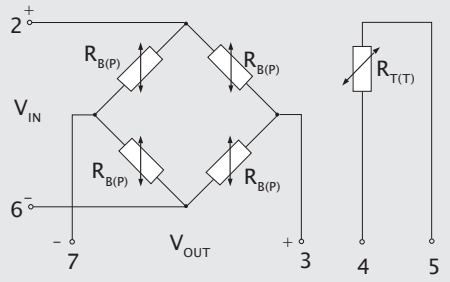
$$R_{th} = R_{25} \cdot (1 + \alpha \cdot \Delta T_A + \beta \cdot \Delta^2 T_A)[\Omega] = f(T_A)$$

$$\alpha = 7.68 \cdot 10^{-3}\,[k^{-1}],\ \beta = 1.88 \cdot 10^{-5}\,[K^{-2}]$$

$$k_T = \frac{R^{th}}{R_{25}} = 1 + \alpha \cdot \Delta T_A + \beta \cdot \Delta^2 T_A = f(T_A)$$

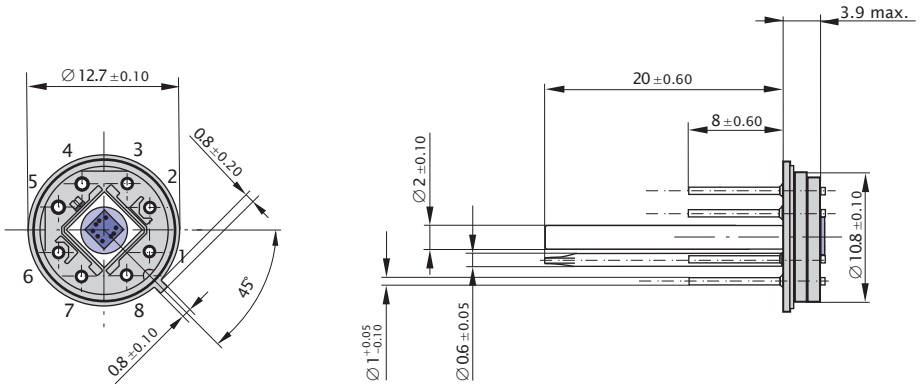
$$T = 25 + \frac{\sqrt{\alpha^2 - 4\beta + 4\beta \cdot k_T} - \alpha}{2\beta}\ [°C]$$

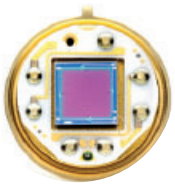
Pin configuration



Bondpad No.	Connection
1	Capillary tube
2	$+V_{IN}$
3	$+V_{OUT}$
4	Temperature sensor
5	Temperature sensor
6	$-V_{IN}$
7	$-V_{OUT}$
8	Not connected

Package outlines – Basic component





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