

Description

Model SE206 is a half-bridge piezoresistive sensor die, which has a high gauge factor of 150 and is specially designed for low-level strain measurements down to a few microstrains. Its typical application is to have two SE206 bonded on a round-shape pressure diaphragm made from stainless steel or ceramics (as shown by the sketch on the right) to form a Wheatstone bridge circuit to measure pressures. And a typical way to bond this sensor die is via glass bonding process.

The SE206 sensor die has its two piezoresistive resistors laid inline with each other, similar to the GB(BL) pattern of metal foil strain gauges from BCM SENSOR. As a result, this sensor die can also be used to measure a force, e.g., by bonding it on a reverse-bending-beam to measure compression or tension forces.

Thanks to MEMS process through which this sensor die is manufactured, the SE206 features small size (1.5mm x 0.5mm) and capacity of high volume per batch in mass production.

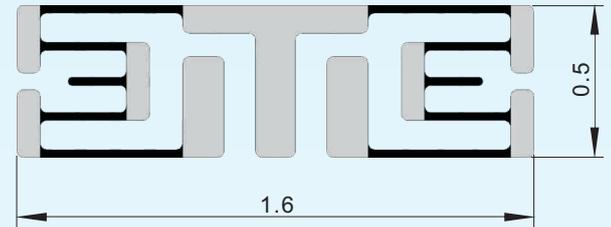
Before packing, each SE206 sensor die is individually tested and qualified to its specifications.

Three types of packaging are available as options to fit different marketing demands. The details of these three types can be found in Ordering Information.

Features

- excellent non-linearity up to: $\pm 0.5\%$ fs
- gauge factor: 150
- small foot-print, high product rate per wafer for cost-effective application

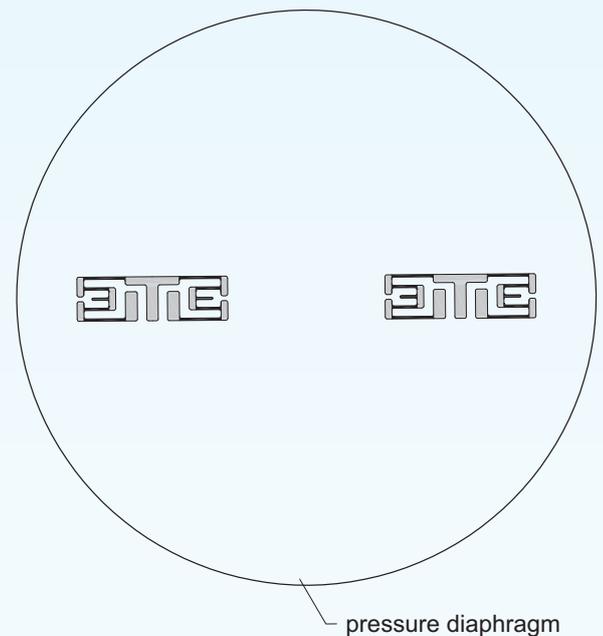
Dimensions



Notes:

- 1) Thickness is about 10 μ m.
- 2) All dimensions are in mm.

Example of Bonding Positions on Pressure Diaphragm



Applications

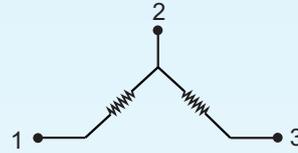
- pressure sensor application
- force sensor application

Model SE206

Half-Bridge Sensor Dies for Pressure Sensor Application



Schematic Circuit Diagram



Technical Data

Parameters		Units	Specifications	Notes
measuring strain range		$\mu\epsilon$	15~500	
maximum working strain		%fs	150	1
strain limit		%fs	200	1
gauge resistance (R)		k Ω	4 \pm 1	
difference in R between 2 sensing elements		%R	$\leq \pm 1.5$	
gauge factor (GF)			150	
excitation	voltage	Vdc	5 (typical), or any voltage in the range of 2, ..., 10Vdc	
	current	mA	1 (typical), or any current in the range of 0.5, ..., 2.5mA	
zero offset		mV/V	$\leq \pm 15$	
non-linearity (NL)		%fs	better than ± 0.5	2 & 3
hysteresis (HY)		%fs	better than ± 0.2	
repeatability (RP)		%fs	better than ± 0.2	
long-term stability		%fs/year	better than ± 0.2	
storage temperature range		$^{\circ}\text{C}$	-40 ~ +150	
operating temperature range		$^{\circ}\text{C}$	-40 ~ +150	
temp. coeff. (TC) of bridge resistance		%R/ $^{\circ}\text{C}$	≤ 0.35	4
TC of zero offset		%fso/ $^{\circ}\text{C}$	$\leq \pm 0.5$	5
TC of span		%fso/ $^{\circ}\text{C}$	$\leq -0.4 $	5
thermal HY of zero offset		%fso/ $^{\circ}\text{C}$	$\leq \pm 0.3$	
electrical interface			solder pads	
dimensions		mm	1.6 x 0.5 x 0.01	

General conditions for measurements: temperature = 25 $^{\circ}\text{C}$, humidity = 40%RH.

Notes: 1. fs refers to full scale strain.

2. Tested at strain in the range of 15~500 $\mu\epsilon$.

3. Calculated according to Terminal Base Line (the endpoint method).

4. Calculated as a rate of resistance change between -40 $^{\circ}\text{C}$ and +150 $^{\circ}\text{C}$, and normalized by the resistance at 25 $^{\circ}\text{C}$.

5. Calculated as a rate of output change between -40 $^{\circ}\text{C}$ and +150 $^{\circ}\text{C}$, and normalized by the output at 25 $^{\circ}\text{C}$, when the die is not temperature compensated.

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Half-Bridge Sensor Dies for Pressure Sensor Application



Ordering Information

position (pos.) 1: model					
SE206					
pos. 2: nominal strain					
500 = 500 $\mu\epsilon$					
pos. 3: gauge factor					
150					
pos. 4: non-linearity					
0.5%fs					
pos. 5: package					
X = The chip is individually packaged in reel for either sample- or bulk-orders. Y = The wafer of chips is partially diced before delivery, and further wet-etching process is required in order to have individual chips. Z = non-diced wafer					
pos. 6: customized specifications					
“(*)” is necessary only if any customized parameter is required, otherwise it is neglectable.					
pos.1	pos. 2	pos. 3	pos. 4	pos. 5	pos. 6

Examples of Ordering Code

- standard sensor die:
SE206-500-150-0.5%fs-X

The listed dimensions, specifications and ordering information are subject to change without prior notice.

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