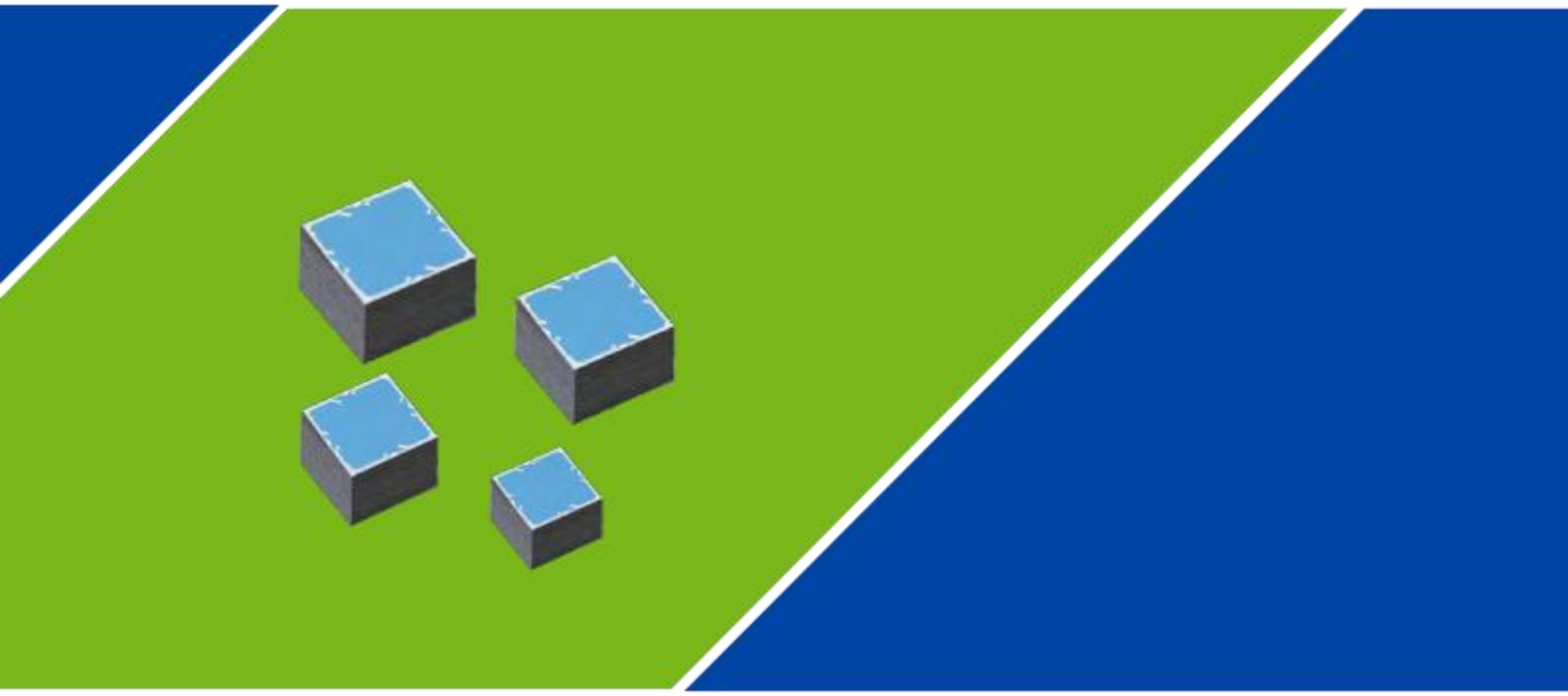
北微传感
BEWIS SENSING



BW-MD series

Highly stable monocrystalline silicon pressure/differential pressure sensor chips

Technical Manual

V.0

BW-MD series highly stable monocrystalline silicon pressure/differential pressure sensor chips

Bewis BW-MD series of highly stable monocrystalline silicon sensor chip, which has a number of excellence performance, and has been batch cast to the international market. It has been widely used in petrochemical, metallurgical power, industrial automation, aerospace, Internet of things and other fields in Europe, Asia.

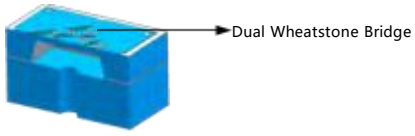
- High-purity monocrystalline silicon
- Double-beam suspended MEMS structure
- Ultra-high overpressure performance
- 1kPa standard range

Product Characteristics

- High purity monocrystalline silicon material

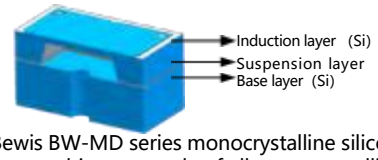
The Bewis BW-MD series of monocrystalline silicon chips are made of ultra-high purity monocrystalline silicon, which is superior to the composite and diffusion silicon materials commonly used in the market. Bewis has also broken the monopoly of this material by only a few top sensor companies in the world.

- ' Double Beam ' MEMS Design



Bewis BW-MD series monocrystalline silicon sensor chip adopts the classic Wheatstone bridge principle, but in the bridge design innovation using a double Wheatstone bridge, the bridge to achieve 'double beam'. The double-beam bridge circuit, with complementary bridge resistance temperature characteristics, achieves self-compensation when the bridge circuit undergoes self-heating changes or noise interference, which significantly improves the chip's anti-interference capability and long-term stability.

- ' Suspended ' MEMS structure



Bewis BW-MD series monocrystalline silicon sensor chips are made of all monocrystalline silicon, with the sensing layer bonded to the base layer with silicon-silicon bonding, which improves the hydrostatic characteristics of the chip (much better than the traditional silicon-glass bonding), and a suspension layer of inert material with μm thickness is added between the sensing layer and the base layer, which greatly reduces the effect of stress and improves the insulating characteristics.

- 1kPa ... 40MPa standard range

1kPa, 6kPa, 40kPa, 100kPa, 400kPa, 4MPa, 40MPa Seven standard ranges cover the full range of gauge, differential and absolute pressures for process control. smaller standard range, 1kPa, ensures optimum performance in the differential pressure range.

- Better overvoltage performance

This excellent overpressure performance enables most microdifferential pressure applications to be constructed without a protective diaphragm, improving overall accuracy and static pressure characteristics while simplifying sensor construction and reducing costs.

- ' Plum Mirror' MEMS Layout

MEMS silicon sensor chips require a metallisation process that takes the internal leads out of the bridge resistor and creates an area of metal bonding. This metal wire and metal binding area will also have a stress effect on the silicon sensing film surface. The Bewis BW-MD series chip adopts a fully symmetrical 'mi rror image' metallisation layout, with the metallisation located at the very edge of the chip, and with the metallisation located at the very edge of the chip, the Bewis BW-MD series chip adopts a fully symmetrical 'mirror image' metallisation layout. The Bewis BW-MD series chip adopts a fully symmetrical 'pl um mirror' metallisation layout, and the metallisation is placed at the very edge of the chip, so that the metallisation changes uniformly and symmetrically when the temperature and pressure change, thus minimising its effect.

Comparison of Bewis BW-MD chip with peer chips (same range)

- Bridge circuit resistance: 10kΩ (a global original)

The larger bridge circuit resistance can effectively control the temperature effect, ensure high signal-to-noise ratio of the output signal, and reduce power consumption.

- Monocrystalline silicon layer thickness up to 2.5mm

In MEMS sensor silicon chip technology, the size of the silicon wafer and the thickness of the silicon layer also play a key role in the cost and performance of the sensor chip, and consistent sensor chip material is conducive to achieving the best temperature and hydrostatic characteristics. Bewis BW-MD series chips are made of all mono-crystalline silicon, with the industry's largest size and thickness, and are designed to improve quality without sacrificing cost.。

Comparison of Bewis BW-MD chip with peer chips (same range)

Thick Silicon

- more stable

Product Specification

Range and Overvoltage

Model	Range	Overvoltage (back)	Overvoltage (positive)
MD1	1kPa	1MPa	1.5MPa
MD2	6kPa	2MPa	2.5MPa
MD3	40kPa	5MPa	6MPa
MD4	100kPa	7MPa	10MPa
MD6	400kPa	7MPa	10MPa
MD7	4MPa	10MPa	12MPa
MD8	40MPa	-	60MPa

Characteristics

(Measured at I=0.3mA, T=23℃)

Parameters		min	typ	max	Unit
Bridge Resistance		9.5	10	10.5	kΩ
Offset Voltage		-3	0	+3	mV/V
Supply Voltage		-	3	10	V
Supply Current		-	0.3	1	mA
Temperature Coefficient of Bridge Resistance		+0.05	+0.08	+0.12	%FS/K
Temperature Coefficient of Zero Point		-0.05	±0.03	+0.05	%FS/K
Temperature Coefficient of Full Scale		-0.05	-0.08	-0.15	
Temperature Bias (42h, 30℃ to 135℃ to 30℃)		0.02	1	2	uV/V
Static Pressure Characteristics		-	0.03	-	±%FS/10MPa
Long-term Stability (1000h, 135℃		-	≤ 3	±5	uV/V
Nonlinearity		-	≤ 0.3	-	±%FS
Sensitivity	MD1-MD2	6	8	10	mV/V
	MD3-MD8	15	20	25	mV/V

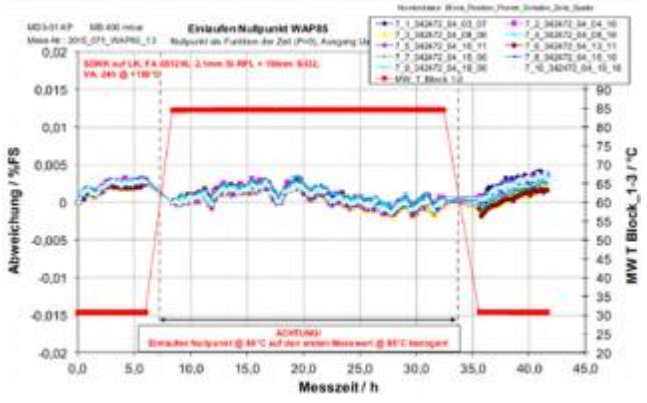
Power supply method

constant voltage supply: 3~20V
recommended voltage: 4.5~5.5V

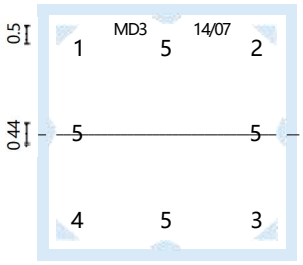
Stability

(Heating from 23℃ to 85℃ for 30 hours,returning to 23℃. Measuring zero drift over 42 hours)

Model	Range	Bias
MD1	1kPa	< 0.050 %FS
MD2	6kPa	< 0.007 %FS
MD3~MD8	40kPa~40MPa	< 0 005 %FS

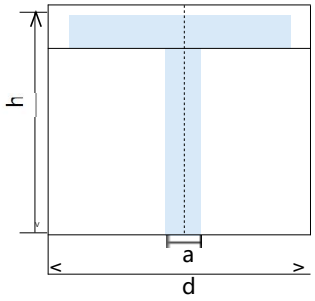


Lead Definition



Number	Electrical connection
1	V+ power positive
2	S+ signal output negative
3	V- power negative
4	S- signal output positive
5	V+ power positive

Dimension Drawing



	MD1	MD2	MD3	MD4	MD6	MD7	MD8
d(mm)	5.00	4.40	3.40	2.50	2.50	2.10	2.10
h(mm)	2.45	2.45	2.45	2.45	2.45	2.45	2.45
a(mm)	0.50	0.50	0.50	0.50	0.50	0.50	0.50

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