MPM3801
Operation Manual

V1.1

Thanks for your using products from MICROSENSOR. MPM3801 I^{2}C Digital Output Pressure Sensor is one of precise instruments. We suggest you read this manual carefully before use.

1 Introduction

The MPM3801 I^{2}C digital pressure sensor is an oil-filled OEM pressure sensitive element isolated by a stainless-steel corrugated diaphragm. The measured pressure is transmitted to the silicon pressure-sensitive chip with the precision mechanical structure of the Wheatstone bridge through the isolation diaphragm and the infused silicone oil, which realizes the accurate conversion of the measured pressure and the analog signal.

By customized integrated circuit for temperature compensation and non-linearity correction, it outputs 14-digit pressure data and 11-digit temperature data conforming to I^{2}C interface protocol or SPI interface protocol. This product is low power consumption and has high accuracy.

2 Specifications

	Min.	Typ.	Max.	Unit
Zero Pressure Output		0666		Count Hex
FS Pressure Output		399A		Count Hex
Pressure		±0.25%	±0.5%	%Span

Accuracy				
Pressure Resolution	0.01			%Span
Temperature Accuracy	-1.5		+1.5	℃
Temperature Resolution		0.1		℃
Input Voltage Range	4.9（3.2）	5（3.3）	5.1（3.4）	V
Power consumption	5（Standby）@25℃			uA
Insulation Resistance	100 MΩ,100VDC			
Overpressure			1.5x	Rated Pressure
Long Term Stability		±0.2%		Span/Year
Working Temperature	-20		80	℃
Storage Temperature	-40		125	℃
Compensation temperature	-10		50	℃
Pressure Resolution			14	Bits
Temperature Resolution			11	Bits
Activate Time			8.4	ms

3 Outline Construction (Units: mm)
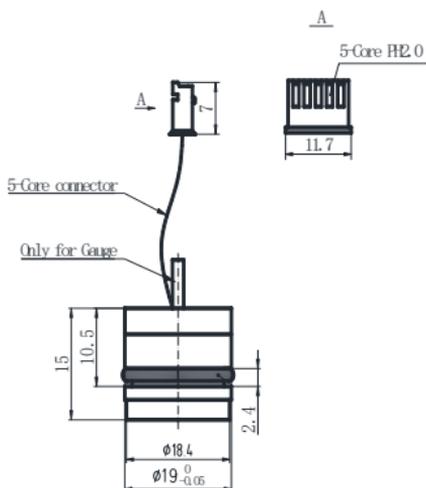
4 Electric Connection
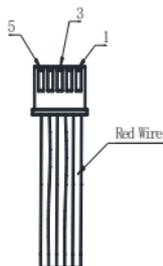
| Wire number (red-1)	Define(I²C)	Define(SPI)
1	V-	V-
2	V+	V+
3	SCL	SCLK
4	SDA	MISO
5	Null	SS

5 I2C Read Operations

For read operations, the I2C master command starts with the 7bit slave

address (default addr. 0×28H) with the 8th bit = 1 (READ).

Sensor as the slave sends an acknowledge (ACK)indicating success. Then 2-byte pressure data and 2-byte temperature data (T[10：3] and T[2：0]×××××) are returned from slave to master.
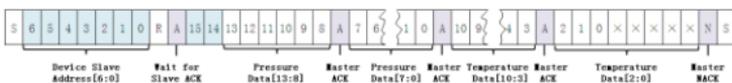
6 SPI Read Operations

The entire output packet is 4 bytes (32 bits). The high bridge data byte comes first, followed by the low bridge data byte. The first 2 bits of 1st byte S(1:0) means standby status, no need for use, may discard directly. The last 6 bits of 1st byte is the upper 6 bits of pressure data B(13:8); The 2nd byte is the lower 8 bits of pressure data B(7:0); the 3rd byte is the upper 8 bits of temperature data (10:3). The first 3 bits of 4th byte is the lower 3 bits of temperature data T(2:0). The last 5 bits of the 4th byte are undetermined and should be masked off in the application. If the user only requires the pressure data, the read can be terminated after the 2nd byte. If the temperature data is also required but only at an 8-bit resolution, the read can be terminated after the 3rd byte is read.
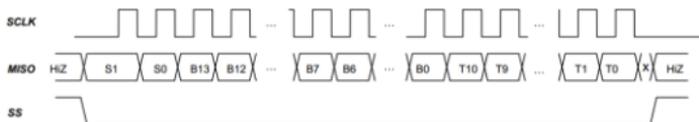
Packet：

{{ S(1:0), B(13:8)},{ B(7:0)},{ T(10:3)},{ T(2:0),XXXXX}}Where

S(1:0): Invalid data, discard

B(13:8): Upper 6 bits of pressure data.

B(7:0): Lower 8 bits of pressure data.

T(10:3): Upper 8 bits of temperature data.

T(2:0), xxxxx: Remaining 3 bits of temperature data and 5 bits invalid data

Hiz: High impedance

7 Attentions

a) Please pay attention that the measured media shall be compatible with sensor contacted parts before assembly.

b) Recommended installation dimension: diameter $\varnothing 19^{+0.05}_{+0.02}$ mm, depth ≥18mm.

c) It is recommended that the Pressure Sensor should be installed as Suspended Mode to avoid mechanical stressing effect.

d) Do not poke the diaphragm by hand, hard material or sharp things to avoid deforming the diaphragm or damaging the Pressure Sensor.

e) Do not pull the ribbon wire or press the circuit board to avoid damaging the circuit board.

f) Please pay attention to the available measured range. Do not pressurize the sensor over upper-limit pressure range. If

pressure > 1.5FS, it may damage the sensor.

g) It is recommend to take off the protection cap on the sensor very carefully during installation to avoid damaging the diaphragm.

h) Wet, conductive or corrosive media is forbidden to enter sensor electric connection parts or back pressure chamber.

i) Pleas`e keep Pressure Sensor's back breath tube connect with atmosphere well. It is strictly prohibited impurities to enter the breath tube.

8 Responsibility

Within one year from the date of shipment, for defective product caused by material and process problems, the company will replace or repair products for free; for product failures caused by some non-quality reasons during use, our company is responsible for maintenance and only charges materials cost while the fee of packaging and freight shall be borne by the customer.

Appendix

a) Pressure Calculating Formula

Output Pressure＝(FS pressure－Zero pressure)×(Pressure applied－1638) /13108＋Zero pressure

b) Temperature Calculating Formula

Output Temperature＝(Temperature applied/2047)×200－50

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