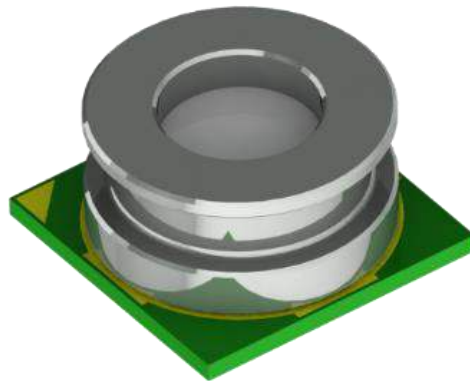


SPL17-002

Digital differential pressure sensor



1. Introduction

The SPL17-002 is a miniaturized Digital Gauge Pressure Sensor with a high accuracy and a low current consumption. The SPL17-002 is both a pressure and a temperature sensor. The pressure sensor element guarantees a high precision during temperature changes. The small package makes the SPL17-002 ideal for any devices. The SPL17-002's internal signal processor converts the output from the pressure and temperature sensor elements to 24-bit results. Each pressure sensor has been calibrated individually and contains calibration coefficients. The coefficients are used in the application to convert the measurement results to true pressure and temperature values.

Key features

- Gauge Pressure range: 0 ... 40KPa
- Temperature Range: 0...+70°C
- Supply voltage: 1.7 ... 3.6V (VDD), 1.2 ... 3.6V (VDDIO)
- Absolute accuracy: typ. ± 0.1 KPa (0~40KPa),
- Temperature accuracy: $\pm 2^\circ\text{C}$ (0~70°C)
- Pressure temperature sensitivity: typ. < 1 Pa/K
- Measurement time: typ. 4 ms
- Average current consumption: $< 3 \mu\text{A}$, Standby current: $< 100\text{nA}$
- I2C interface, Embedded 24-bit ADC
- Pb-free, halogen-free and RoHS compliant

Typical applications

- Blood pressure monitoring

Specific notes

Particles can influence the performance of the pressure sensor, we strongly recommend you to introduce special measures to avoid deposition of particles on the MEMS membrane or screen particles after assembly as the assembly process is considered to be the main root cause for particle generation.

2. Test condition

Table 1: Test condition

Standard Conditions	Temperature	Humidity	Pressure
Environment conditions	-40°C...+85°C	25%RH...75%RH	0kPa...40kPa
Basic test conditions	+25°C	60%RH...70%RH	0kPa...40kPa

3. Absolute maximum ratings

Table 2: Absolute maximum ratings

Parameter	Condition	Min	Max	Units
Storage temperature		-40	+125	°C
Supply Voltage	All pins	-0.3	+3.63	V
Voltage at all IO Pins	All pins	-0.3	+3.63	V
ESD rating	JESD22-A114	-2	+2	kV
Overpressure		0	80	kPa

4. Electrical characteristics

VDD = 1.8V, VDDIO=1.8V, T=25°C, unless otherwise noted. If not stated otherwise, the given values are ± 3 -Sigma values over temperature/voltage range in the given operation mode.

Table 3: Operating conditions, output signal and mechanical characteristics

Parameter	Symbol	Condition	Min	Typ. ⁽¹⁾	Max	Units
Operating temperature	TA	Operational	-40	25	85	°C
		Full accuracy	0	25	70	°C
Operating Pressure	P		0		40	kPa
Supply voltage	VDD		1.7		3.6	V
Interface supply voltage	VDDIO		1.2		3.6	V
Supply current	I _{dd}	1 Hz (with 1 measurement per second.)		2.8	3	uA
Peak current	I _{peak}	During conversion		0.9	1.15	mA
Standby current	I _{dds} bm			5	100	nA

Absolute accuracy pressure	P_A	0~40kPa 0...+70°C after OPC ⁽²⁾		±0.1		kPa
Noise in pressure	P_Noise			3		PaRMS
Offset temperature coefficient	TCO	0 kPa +25...+40°C		±1		Pa/K
Absolute accuracy temperature		0~+70°C		±2		°C
Pressure/Temperature measurement rate	f		0.25		128	Hz
Pressure measurement time	t			4		ms
Serial data clock	f _{I2C}	For I2C			3.4	MHz
Long term stability		12month(without OPC)		2		kPa

Note: (1) Typical specifications are not guaranteed; (2) OPC: One point calibration.

5. Pin configuration

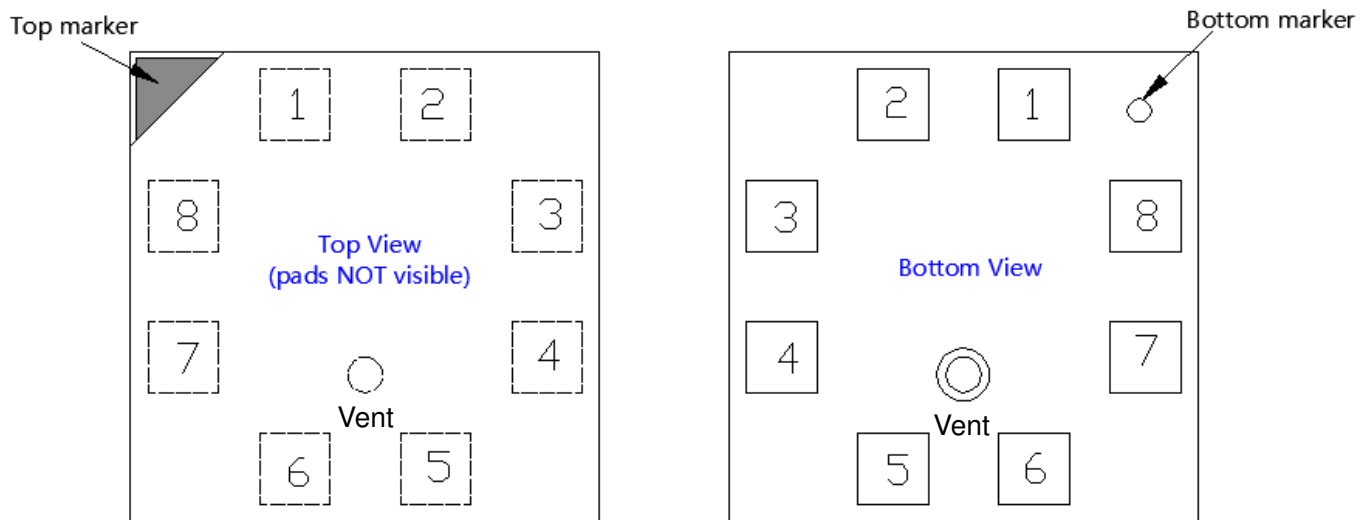


Figure 7: Layout pin configuration SPL17-002 (top view and bottom view)

Table 13: Pin configuration of SPL17-002

Pin	Name	I2C
1	SCL	Serial Clock

2	SDA	Serial data in/out
3	SDO	Serial Data Output / Interrupt
4	NC	Not Connect
5	VDD	Supply voltage for analog blocks
6	VDDIO	Digital supply voltage for digital blocks and I/O interface
7	GND	Ground
8	GND	Ground

6. Outline dimensions

The sensor is an 8-pin metal housing LGA 4 × 4 × 2 mm³ package. Its dimensions are depicted in Figure 8. General tolerances are ±0.05mm.

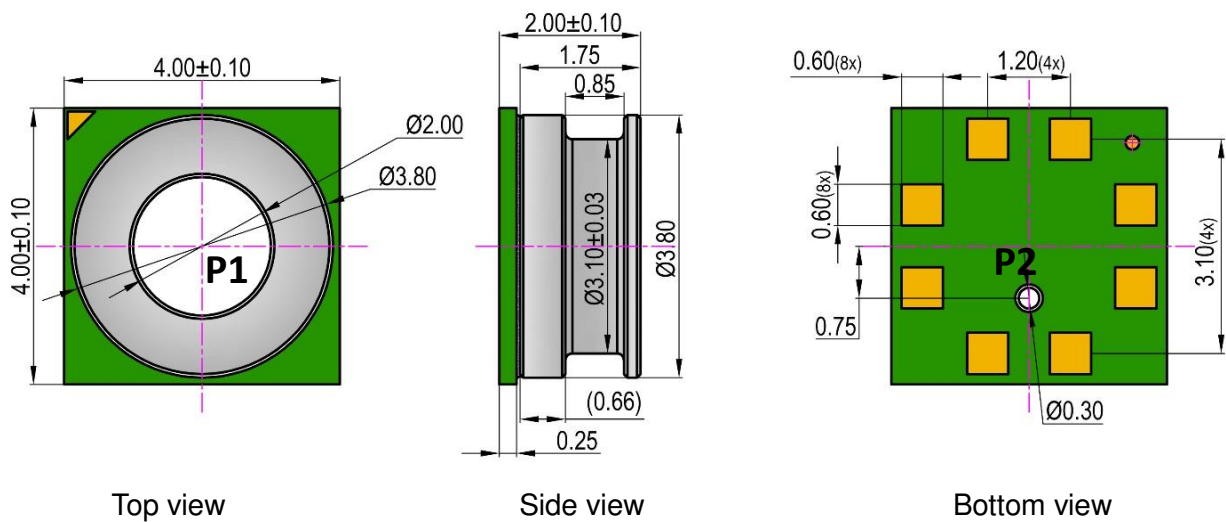


Figure 8: SPL17-002 outline and mechanical data

Note: When P1>P2, the sensor output >0.

7. Storage and transportation

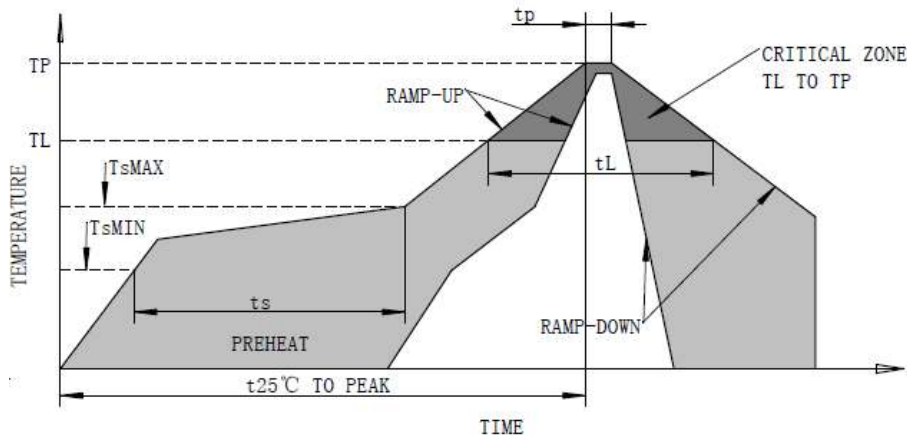
- Keep in warehouse with less than 75% humidity and without sudden temperature change, acid air, any other harmful air or strong magnetic field.
- The MEMS pressure sensor with normal pack can be transported by ordinary conveyances. Please

protect products against moist, shock, sunburn and pressure during transportation.

- Storage Temperature Range: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Operating Temperature Range: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- Moisture Sensitivity Level:3

8. Soldering recommendation

Recommended solder reflow for flex board:



Profile Feature	Pb-Free Assembly
Average ramp-up rate(TsMAX to TP)	2°C /seconds max
Preheat	
-Temperature Min.(TsMIN)	130°C
-Temperature Max.(TsMAX)	200°C
-Time(TsMIN to TsMAX)(Ts)	90~110 seconds
Time maintained above:	
-Temperature(TL)	217°C
-Time(tL)	50~60 seconds
Ramp time of Ts to TL	15-25 seconds
Time 25°C to peak temperature	300 seconds max
Peak temperature(TP)	235-240 °C
Ramp-down rate (peak to 217°C)	2~4°C /seconds

9. Package specifications

Carrier Tape Information [Unit: mm]

Quantity per reel: 3.0 kpcs.

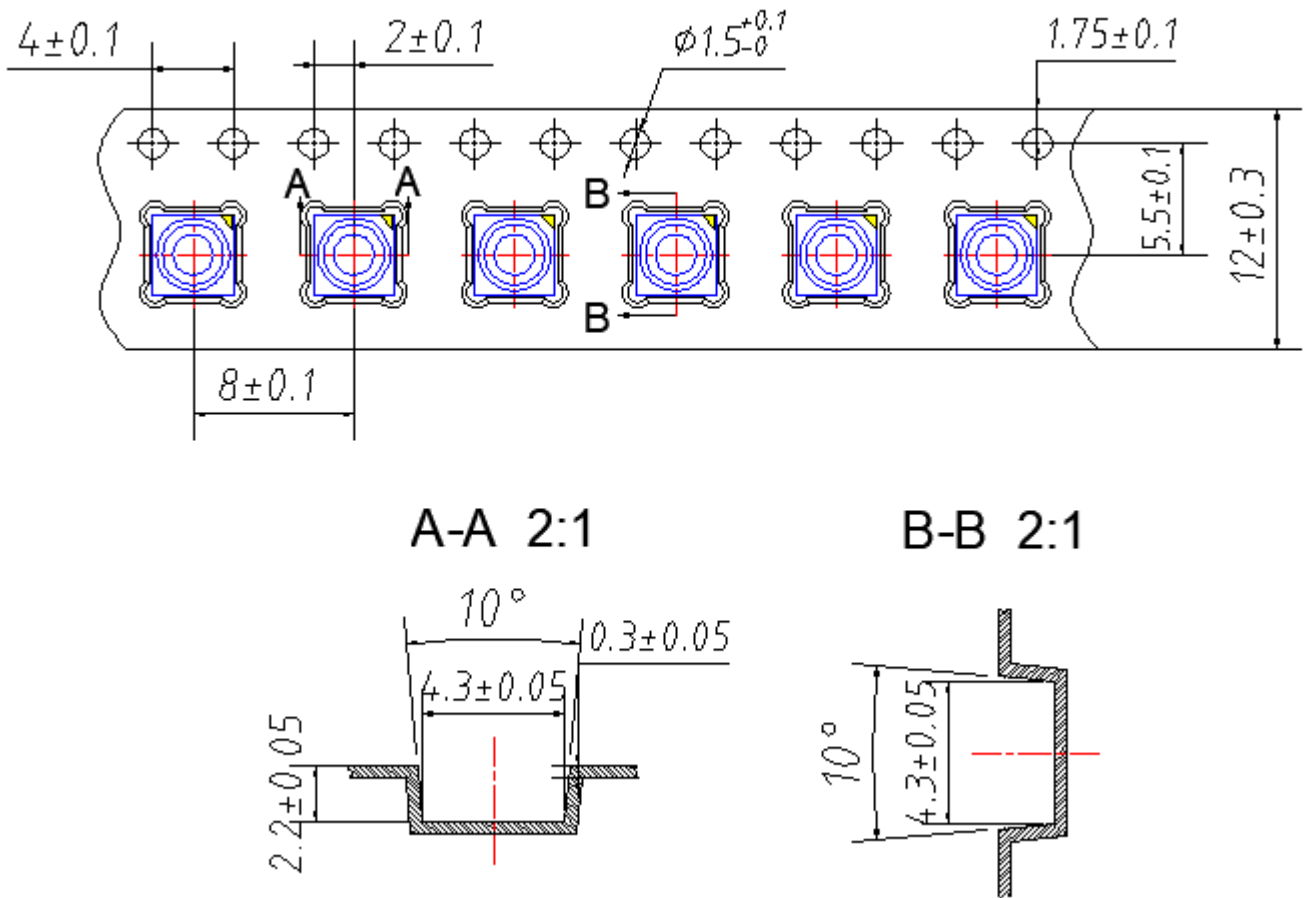


Figure 9: Carrier Tape (1)

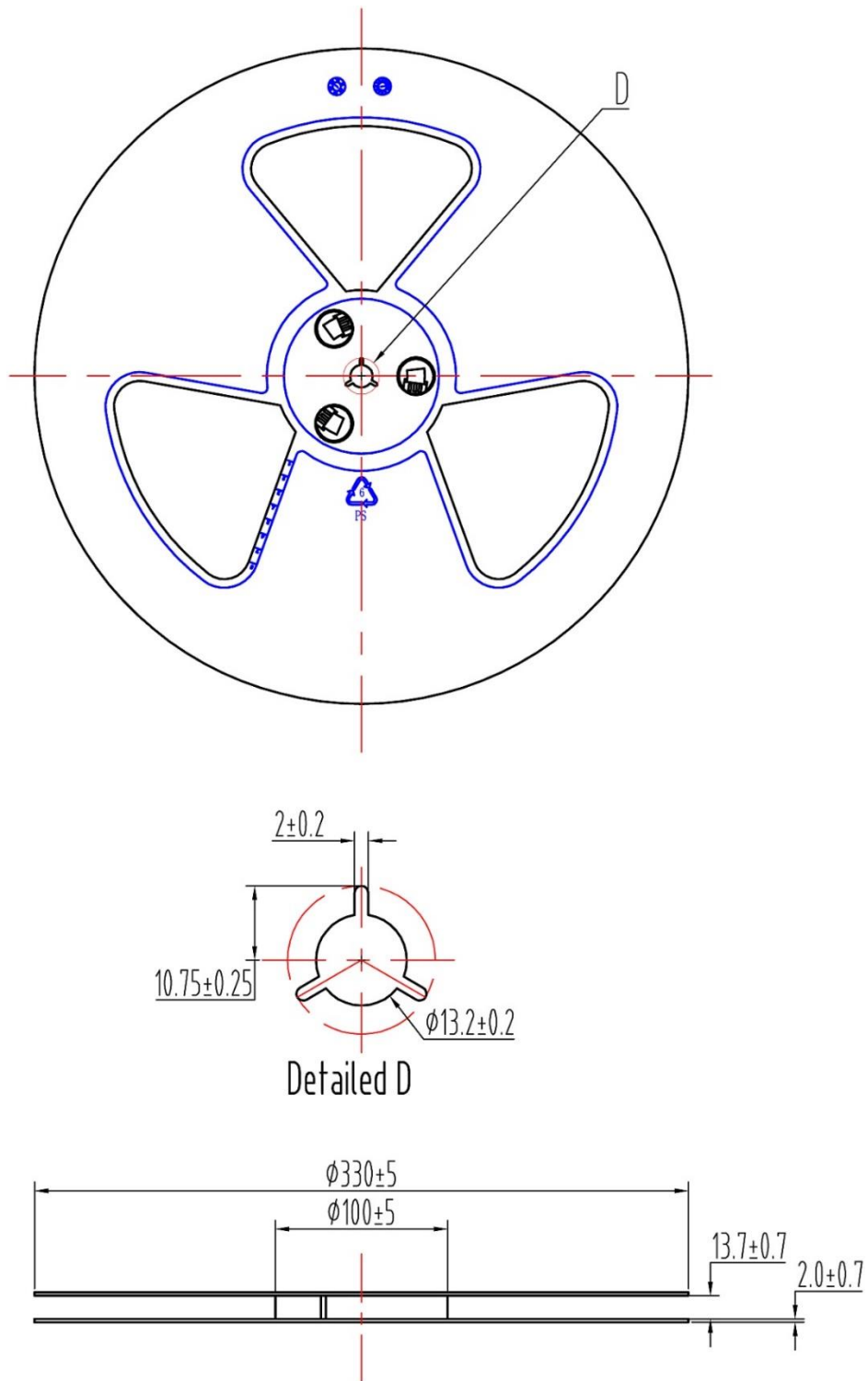


Figure 10: Carrier Tape (2)