[SENSOR] \ MS5525 Airspeed

Digital Differential Pressure and Altimeter Sensor Module, ±1 psi, 24 bit ADC, ±0.5 %FSS Pressure Accuracy.

Datasheet - In Production

Features

- 5V - 10mA power supply
- < 2µA in stand-by mode
- ± 1 PSI Pressure range
- ±0.0025 PSI (±20 µbar) accuracy
- ±1.5°C temperature accuracy
- Max 350 km/h at sea level
- I²C(400KHz) /SPI(2MHz) interfaces

Applications

- UAVs and Drones
- RC aircrafts
- Spirometers
- Ground vehicles

Description

The Siderion **MS5525DSO Airspeed Sensor** is a compact, high-resolution and factory-calibrated digital barometric pressure sensor ideal for precise altitude, pressure, and airspeed measurements.

It integrates a piezoresistive barometric sensor, a 24-bit ADC, and a DSP to cover a pressure range of ±1 PSI, enabling altitude measurements with a resolution of ~20 cm.

When used as an airspeed sensor in combination with a Pitot tube, it accurately detects differential pressure for airspeed calculations in applications such as drones, aviation, and aerodynamics.

The sensor supports both I²C and SPI communication interfaces

The MS5525DSO Airspeed Sensor operates across a temperature range from -40°C to +70°C.

Table 1. Device summary

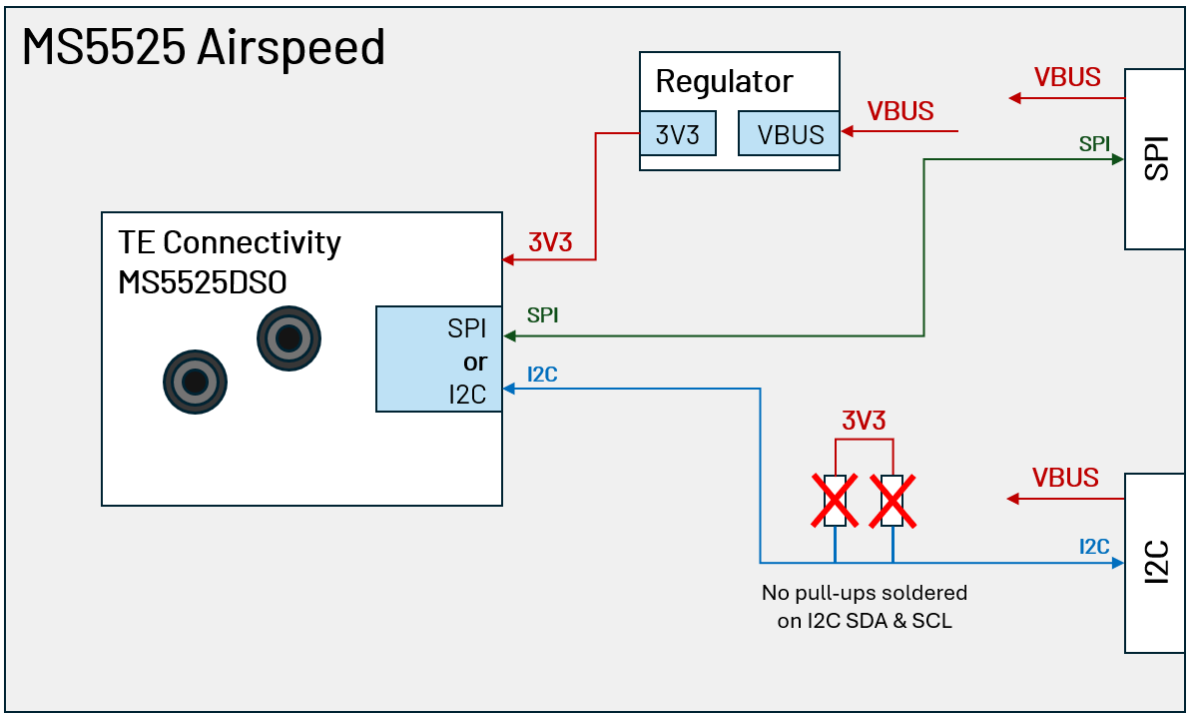
Order ref code	Temperature [°C]	Product size [mm]	Weight [g]
SID-SENS-MS5525	-40 to +70	33.0 x 26.0 x 10.0	7

Contents

1. Block diagram and pin description

1.1 Block diagram

Figure 1. MS5525 Airspeed Sensor block diagram & connectivity (top view)



1.2 Pin description

Figure 2. MS5525 Airspeed Sensor pinout (top & side views)

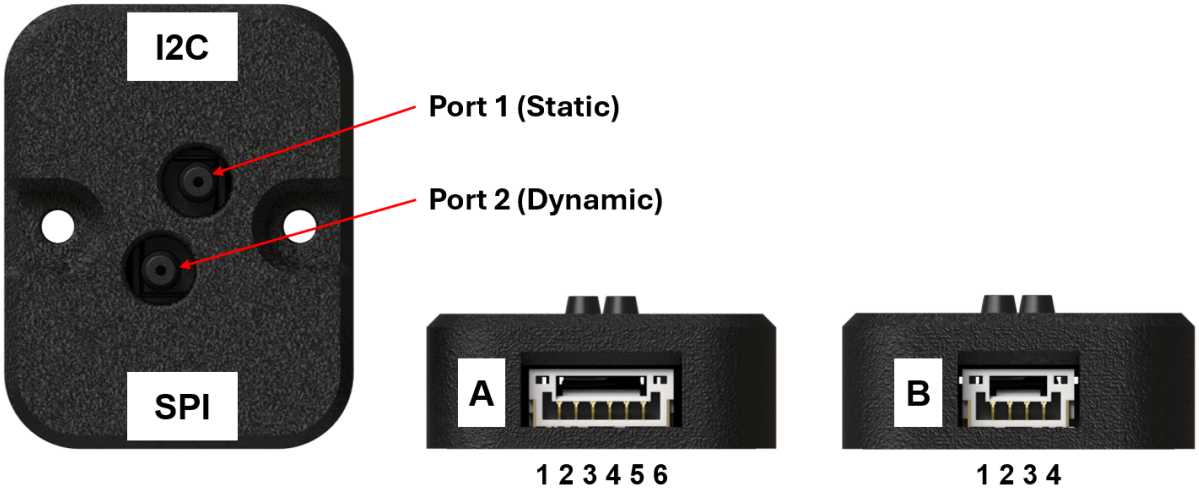


Table 2. Pinout configuration

	Pin	Name	Type	Function
SPI	A1	5V IN	P	5V input
	A2	SPI SCK	I	SPI Clock
	A3	SPI MISO	O	SPI Master Input, Slave Output
	A4	SPI MOSI	I	SPI Master Output, Slave Input
	A5	SPI CS	I	SPI Chip Select
	A6	GND	P	Ground reference
I2C	B1	5V IN	P	5V input
	B2	I2C SCL	I	I2C Serial Clock
	B3	I2C SDA	I/O	I2C Serial Data
	B4	GND	I	Ground reference

P : Power / I : Input / O : Output

2. Absolute maximum ratings

Stresses above those listed as “absolute maximum ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device under these conditions is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

Table 3. MS5525 Airspeed Sensor absolute maximum ratings

Symbol	Parameter	Maximum value	Units
Vcc	Supply voltage	-0.5 to +5.5	V
Vdd	I/O pins supply voltage	-0.5 to 3.3+0.3	V
Icc	RF output current	10	mA
Sair_max	Maximum airspeed	350	Km/h
W	Product weight	7	g
TOP	Operating temperature	-40 to +70	°C
TSTG	Storage temperature	-40 to +80	°C

This device is sensitive to electrostatic discharge (ESD), improper handling can cause permanent damage to the part.

3. Specifications

3.1 TE MS5525DSO specifications

Table 4. MS5525DSO mechanical and electrical specifications

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
Vcc	5V Inputs			5.0		V
Vdd	Supply voltage for I/O			3.3		V
Idd	Current consumption	Run (OSR=256) Run (OSR=4096)		0.9 12.5	1400 1400	µA
Idd_sb	Current consumption	Stand-By (25°C)		0.02	0.14	µA
Prange	Pressure range	@ 25°C	-1		1	PSI
Pacc	Pressure accuracy	@ 25°C	±0.25		±1	%FSS
Pres	Pressure resolution	@ 25°C	0.72		0.16	Pa
Tacc	Temperature accuracy	@ 25°C			±1.5	°C
Tres	Temperature resolution	@ 25°C			0.01	°C
Sair	Measurable airspeed	@ sea level			106	m/s
Ctime	Conversion time	OSR=4096 OSR=2048 OSR=1024 OSR=512 OSR=256	7.40 3.72 1.88 0.95 0.48	8.22 4.13 2.08 1.06 0.54	9.04 4.54 2.28 1.17 0.60	ms
Vil	IO pin low level input voltage		0		0.8	V
Vih	IO pin high level input voltage		2		Vdd+0.3	V
Vol	IO pin low level output voltage	Iol = 0.6mA	0		20%Vdd	V
Voh	IO pin high level output voltage	Ioh = 0.6mA	80%Vdd		Vdd	V
Top	Operating temperature		-40		+70	°C
I2Cadd	7bit I²C address	0b1110110 (0x76)				

4. Applications

4.1 Pitot tube configuration

Figure 3. MS5525 Airspeed Sensor

4.2 Airspeed computation (Bernouilli's equation)

For UAV and aeronautical use, the **MS5525DSO** differential sensor is typically paired with a **pitot tube** to measure dynamic pressure (**ΔP**). This ΔP is used to compute true airspeed (**TAS**) with the following relation:

$$v = \sqrt{\frac{2 \cdot \Delta P}{\rho}}$$

Equation 1. Bernouilli's equation

Where:

- **v** = airspeed (m/s)
- **ΔP** = differential pressure (Pa) measured by the sensor
- **ρ** = air density (kg/m³), varies with altitude & temperature (**1.225 Kg/m3** at sea level)

With its fast response time and high resolution, the MS5525DSO enables accurate and real-time airspeed computation, even at low airspeeds (±1 psi ≈ ±6.9 kPa range), critical for small UAVs and fixed-wing drones.

5. Communication interfaces

There are two communications interfaces including SPI and I2C. All the inputs have internal pull-up resistors in normal operation and can be left open if not used.
All the PIOs are supplied by Vdd.

5.1 SPI interface

The MS5525 Airspeed Sensor has an SPI slave interface. The SPI pins available are: SPI_MISO (TXD), SPI_MOSI (RXD), SPI_CS_N, SPI_CLK. The SPI interface is designed to allow communication to a host CPU. The interface can be operated in slave mode only.

This section provides SPI timing values for the MS5525DSO slave operation. The following tables present timing values under different capacitive loading conditions. Default SPI configuration is CPOL = 0 and CPHA = 0.

Figure 4. SPI chronogram specifications

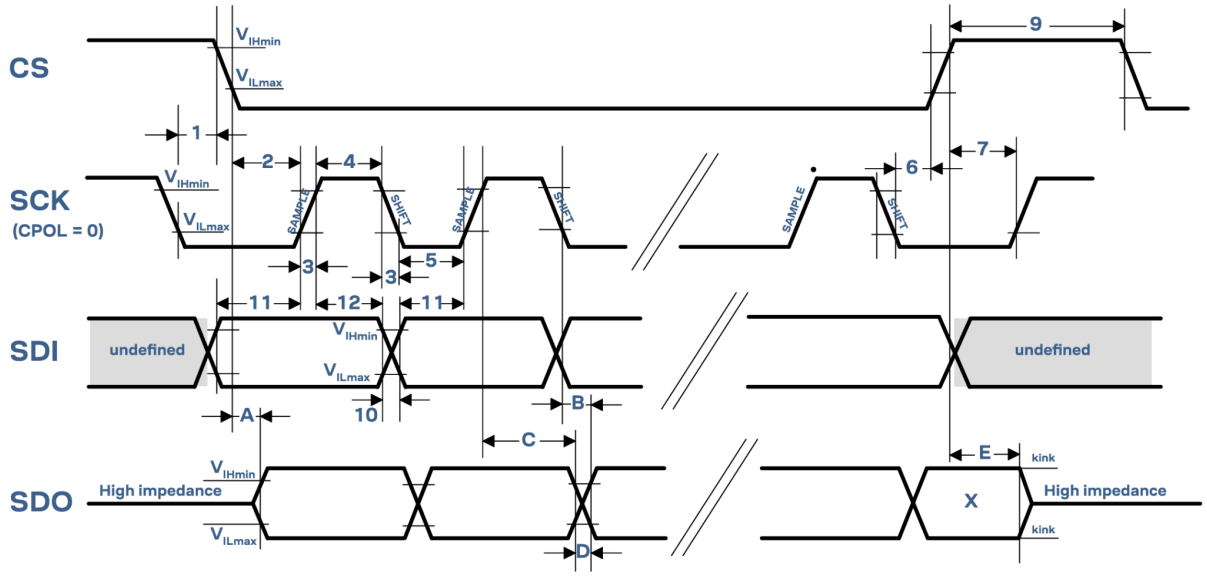


Table 5. MS5525 Airspeed Sensor SPI timing specifications

Timing value @ 6pF load	Min	Max]
Serial Data Clock (SCK)	-	2 MHz

5.2 Slave I2C interface

An I2C compliant interface is available for communication with an external host CPU. The interface can be operated in slave mode only. It is fully compatible with Fast-Mode of the I2C industry standard. Since the maximum SCL clock frequency is 400 KHz (in Fast-Mode), the maximum bit rate is 400 Kbit/s. The interface stretches the clock when slowed down while serving interrupts, therefore the real bit rates may be slightly lower.

The SDA and SCL lines do not have any internal pull-up resistors soldered in place. External pull-up resistors may be required for correct operation (typically 1 kΩ to 4.7 kΩ)

Figure 5. I2C chronogram specifications

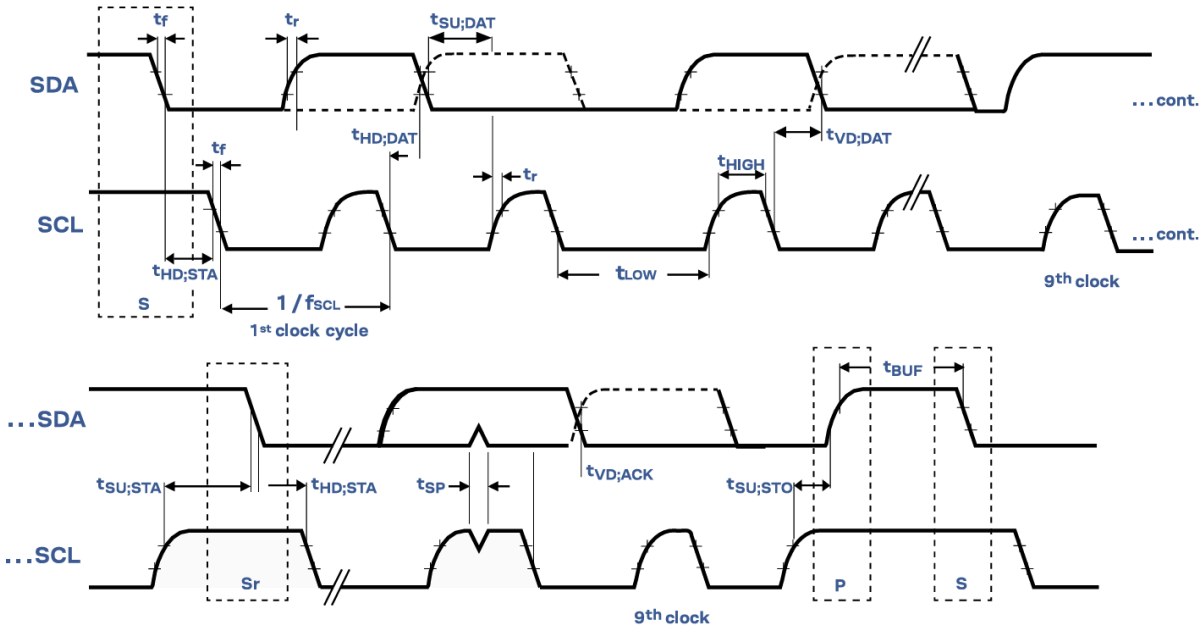
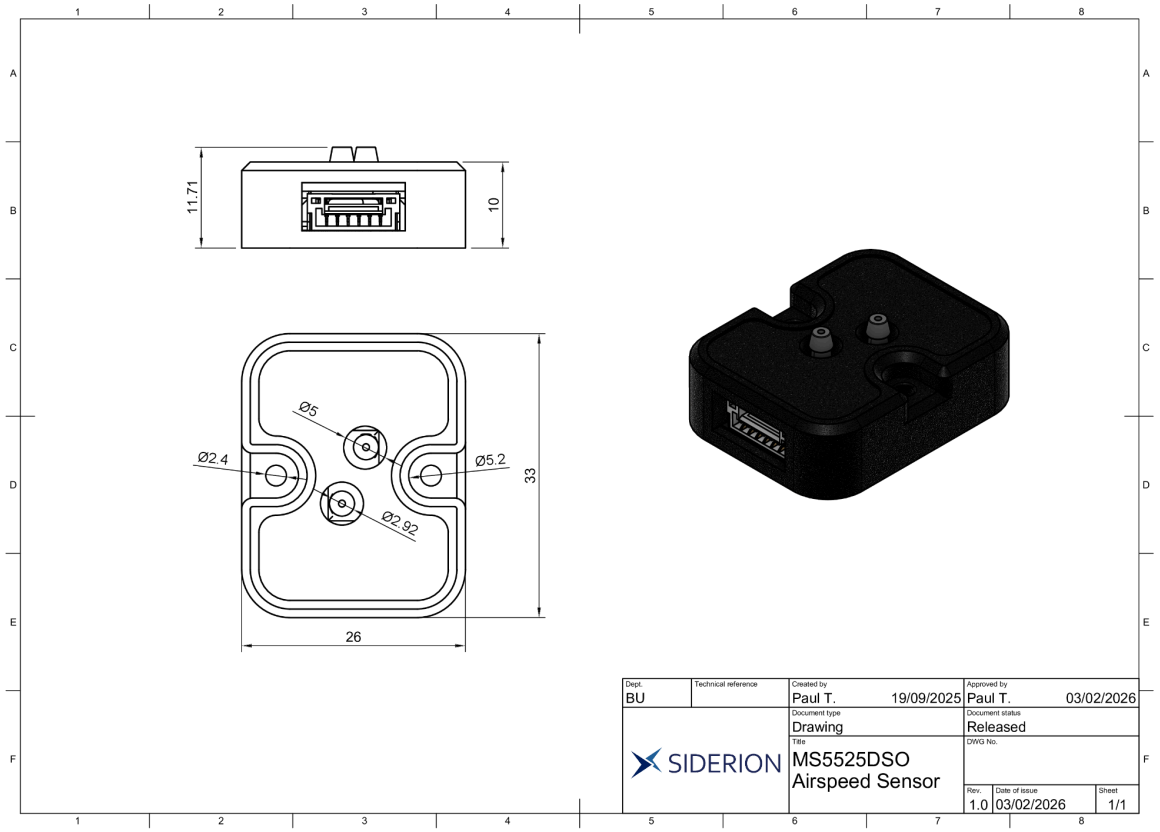


Table 6. MS5525 Airspeed Sensor I2C timing specifications

Symbol	Parameter	Min	Max	Units
Vil	LOW-LEVEL input voltage	0	0.2xVdd	V
Vih	HIGH-LEVEL input voltage	0.8xVdd	Vdd	V
Cb	Capacitive load for each bus line	6	6	pF
Fscl	SCL clock frequency	0	400	KHz

6. Mechanical drawings

Figure 6. MS5525 Airspeed Sensor v1.0 mechanical drawings



7. Revision history

Table 7. Document revision history

Date	Revision	Changes
03-Sep-2025	1.0	SiderionDoc_MS5525 / Initial release

8. Appendix

TE Connectivity MS5525DSO datasheet: MS5525DSO

Siderion user's guide:

Siderion tutorials:

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