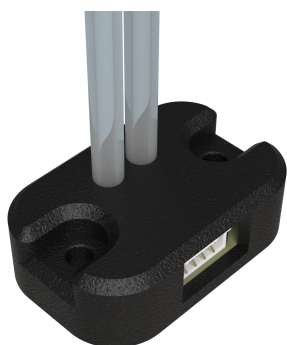

Digital Differential Pressure Sensor Module, Calibrated, Temperature compensated, ± 1500 Pa, 16 bit ADC, ± 3 %FSS Pressure Accuracy.

Datasheet - In Production



Description

The Siderion **SDP33 Airspeed** sensor is a compact, high-performance and factory-calibrated digital barometric pressure sensor (1PSI) ideal for precise altitude, pressure, and airspeed measurements.

It integrates a piezoresistive barometric sensor, a 16-bit ADC, and a DSP to cover a pressure range of ± 1500 Pa.

When used as an airspeed sensor in combination with a Pitot tube, it accurately detects differential pressure for airspeed calculations up to 180km/h at sea level in applications such as drones, aviation, and aerodynamics.

The sensor supports I²C communication interfaces, and does not need to be calibrated.

The SDP33 Airspeed sensor operates across a temperature range from -40°C to +70°C.

Features

- 5V - 10mA power supply
- ± 1500 Pa Pressure range
- Max 180 km/h at sea level
- I²C(up to 1MHz) interfaces

Applications

- UAVs and Drones
- RC aircrafts
- Pneumatic controls
- Medical Instruments

Table 1. Device summary

Order ref code	Temperature [°C]	Product size [mm]	Weight [g]
SID-SENS-SDP33	-40 to +70	26.0 x 17.0 x 8.0	4

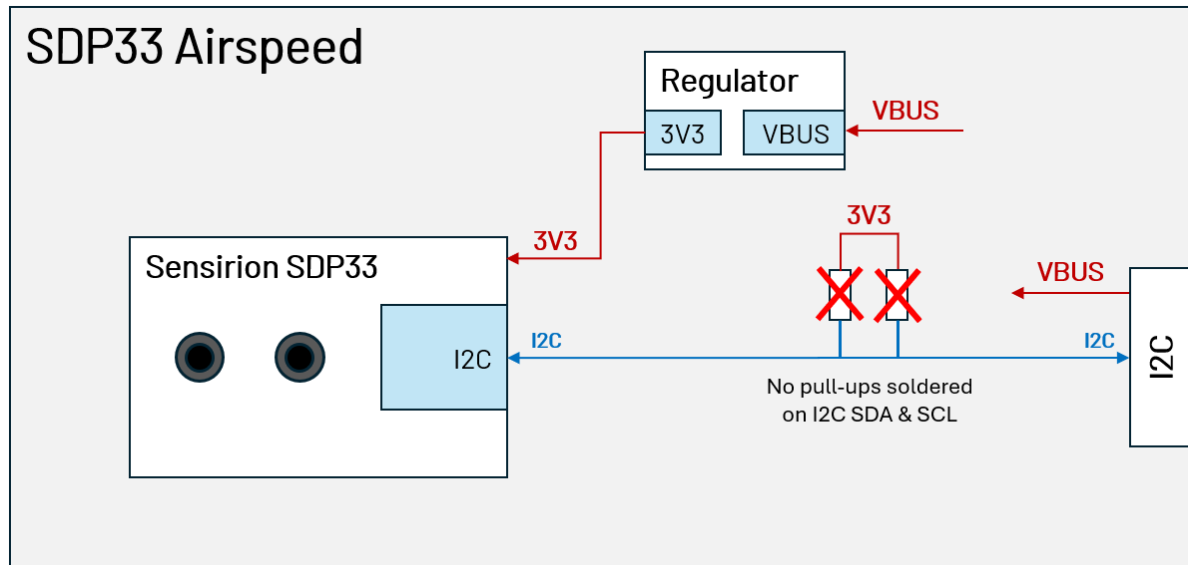
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1. Block diagram and pin description

1.1 Block diagram

Figure 1. SDP33 Airspeed sensor block diagram & connectivity (top view)



1.2 Pin description

Figure 2. SDP33 Airspeed sensor pinout (top & side views)



Table 2. Pinout configuration

	Pin	Name	Type	Function
I2C	A1	5V IN	P	5V input
	A2	I2C SCL	I	I2C Serial Clock
	A3	I2C SDA	I/O	I2C Serial Data
	A4	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. SDP33 Airspeed sensor absolute maximum ratings

Symbol	Parameter	Maximum value	Units
Vcc	Internal supply voltage	-0.5 to +5.5	V
Vdd	I/O pins supply voltage	-0.5 to 3.3+0.1	V
Icc	RF output current	10	mA
Sair_max	Maximum airspeed	180	Km/h
W	Product weight	4	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 Sensirion SDP33 specifications

Table 4. SDP33 mechanical and electrical specifications

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Units
Vcc	5V input			5.0		V
Vdd	Supply voltage for I/O			3.3		V
Idd	Current consumption	Measuring Idle state		3.8 0.05	5.5 0.7	mA mA
Idd_sm	Current consumption	Sleep Mode (25°C)		0.3	1	µA
Prange	Pressure range		-1500		1500	Pa
Pacc	Pressure accuracy	-500 to +500 Pa -1500 to +1500 Pa			3 6	%FSS %FSS
Pres	Pressure resolution	16bit ADC			0.045	Pa
Tacc	Temperature accuracy	-10°C to +60°C -40°C to + 70°C			±2.0 ±3.0	°C
Tres	Temperature resolution				0.1	°C
Sair	Measurable airspeed	@ sea level			50	m/s
Ctime	Conversion time	Continuous Mode Triggered Mode	0.45 40	0.5 45	0.55 50	ms 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%Vd d	V
Voh	IO pin high level output voltage	Ioh = 0.6mA	80%V dd		Vdd	V
Top	Operating temperature		-40		+70	°C
I2Cadd	7bit I²C address	0b0100001 (0x21)				

4. Applications

4.1 Pitot tube configuration

Figure 3. SDP33 Airspeed sensor

4.2 Airspeed computation (Bernouilli's equation)

For UAV and aeronautical use, the **SDP33** 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 SDP33 enables accurate and real-time airspeed computation, even at low airspeeds (± 1500 Pa range), critical for small UAVs and fixed-wing drones.

5. Communication interfaces

The sensor offers an I2C communication interface. 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 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 4. I2C chronogram specifications

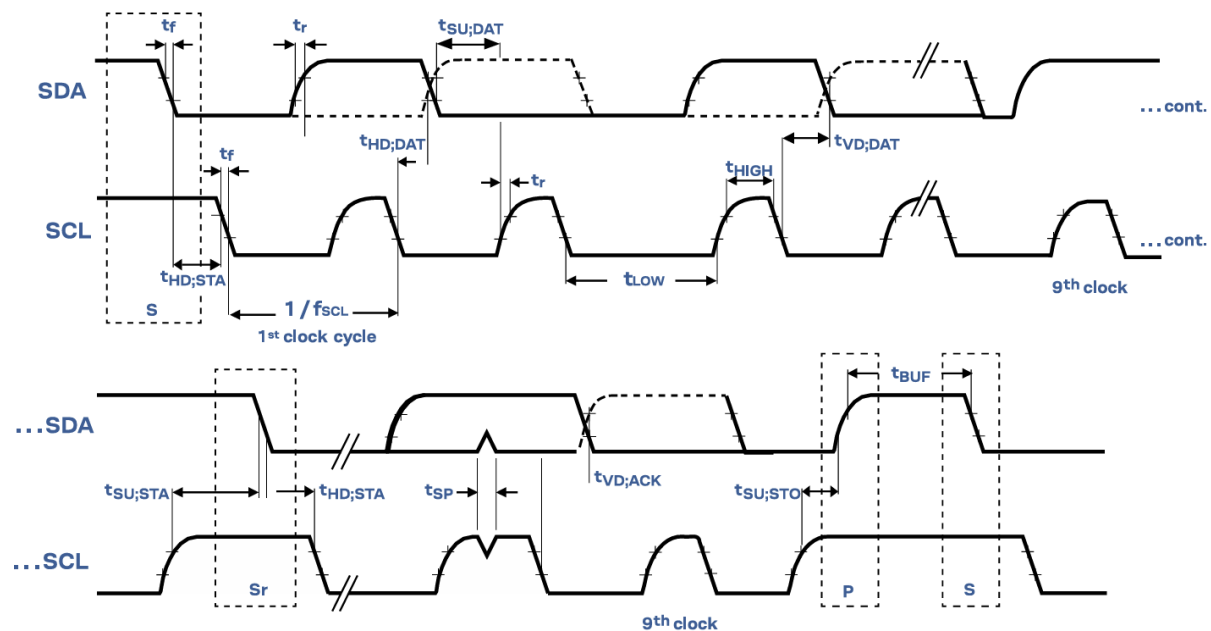
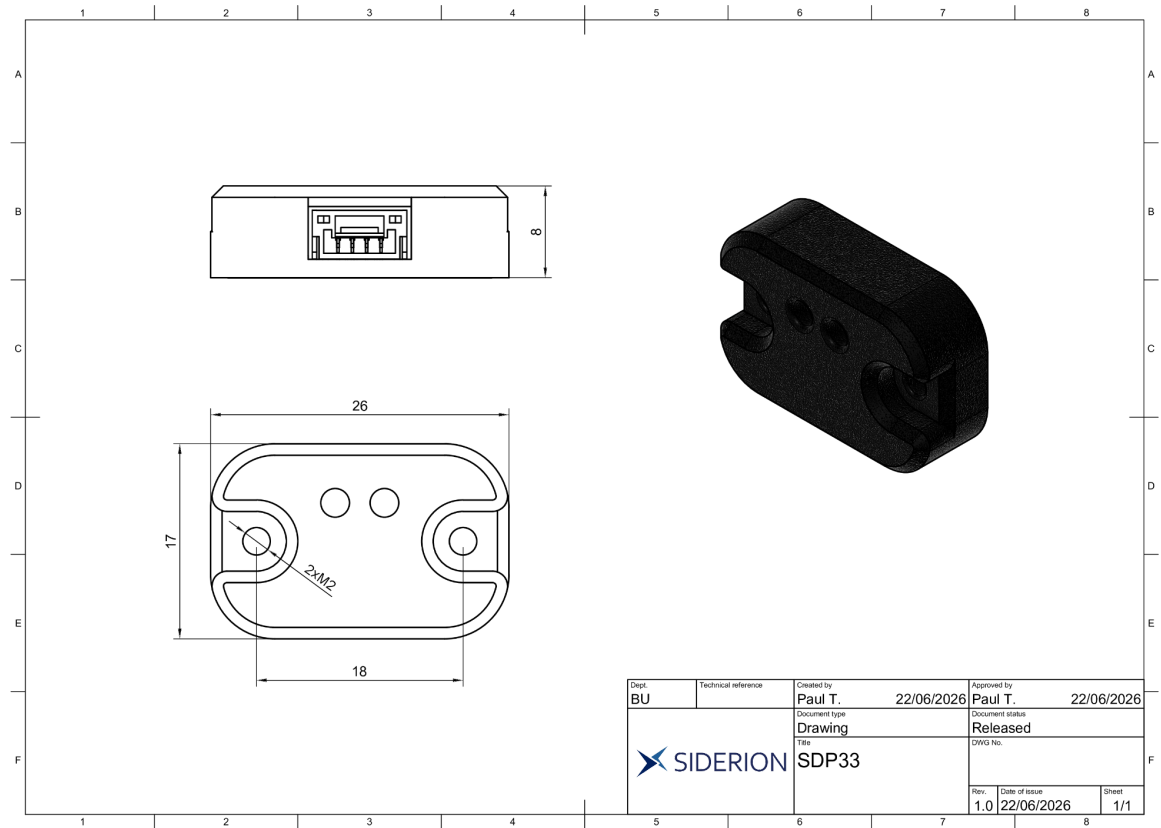


Table 5. SDP33 Airspeed sensor I2C timing specifications

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	1	MHz

6. Mechanical drawings

Figure 5. SDP33 Airspeed sensor v1.0 mechanical drawings



7. Revision history

Table 6. Document revision history

Date	Revision	Changes
23-June-2026	1.0	SiderionDoc_SDP33 / Initial release

8. Appendix

Sensirion SDP33 datasheet: [DP_DS_SDP33_D1.pdf](#)

Siderion user's guide:

Siderion tutorials:

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