

## 1.1 Recommended Operating Conditions

The sensor shows best performance when operated within recommended normal temperature and humidity range of 10 – 40 °C and 20 – 80 %RH, respectively.

## 2 Electrical Specifications

### 2.1 Electrical Characteristics

Default conditions of 25 °C and 5 V supply voltage apply to values in the table below, unless otherwise stated.

Parameter	Conditions	Value	Units
Supply voltage	-	4.5 to 5.5	V
Idle current	Idle-Mode	< 8	mA
Average supply current	Measurement-Mode	60	mA
Max. supply current	First ~200 ms after start of Measurement-Mode	80	mA
Input high level voltage (V <sub>IH</sub> )	-	> 2.31	V
Input low level voltage (V <sub>IL</sub> )	-	< 0.99	V
Output high level voltage (V <sub>OH</sub> )	-	> 2.9	V
Output low level voltage (V <sub>OL</sub> )	-	< 0.4	V

**Table 2:** Electrical specifications.

### 2.2 Absolute Minimum and Maximum Ratings

Stress levels beyond those listed in Table 3 may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these conditions cannot be guaranteed. Exposure to the absolute maximum rating conditions for extended periods may affect the reliability of the device.

Parameter	Rating
Supply voltage VDD	-0.3 to 5.5 V
Interface Select SEL	-0.3 to 4.0 V
I/O pins (RX/SDA, TX/SCL)	-0.3 to 5.5 V
Max. current on any I/O pin	±16 mA
Operating temperature range	-10 to +60 °C
Storage temperature range	-40 to +70 °C
Operating humidity range	0 to 95 %RH (non-condensing)
ESD CDM (charge device model) <sup>4</sup>	±4 kV contact, ±8 kV air
Electromagnetic field immunity to high frequencies <sup>5</sup>	3 V/m (80 MHz to 1000 MHz)
High frequency electromagnetic emission <sup>6</sup>	30 dB 30 MHz to 230 MHz; 37 dB 230 MHz to 1000 MHz
Low frequency electromagnetic emission <sup>7</sup>	30-40 dB 0.15 MHz to 30 MHz

**Table 3:** Absolute minimum and maximum ratings.

<sup>4</sup> According to IEC 61000-4-2.

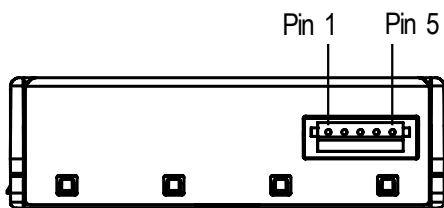
<sup>5</sup> According to IEC 61000-4-3.

<sup>6</sup> According to CISPR 14.

<sup>7</sup> According to CISPR 22.

### 3 Hardware Interface Specifications

The interface connector is located at the side of the sensor opposite to the air inlet/outlet. Corresponding female plug is ZHR-5 from JST Sales America Inc. In Figure 3 a description of the pin layout is given.



Pin	Name	Description	Comments
1	VDD	Supply voltage	5V ± 10%
2	RX	UART: Receiving pin for communication	TTL 5V and LVTTTL 3.3V compatible
	SDA	I <sup>2</sup> C: Serial data input / output	
3	TX	UART: Transmitting pin for communication	TTL 5V and LVTTTL 3.3V compatible
	SCL	I <sup>2</sup> C: Serial clock input	
4	SEL	Interface select	Leave floating to select UART
			Pull to GND to select I <sup>2</sup> C
5	GND	Ground	

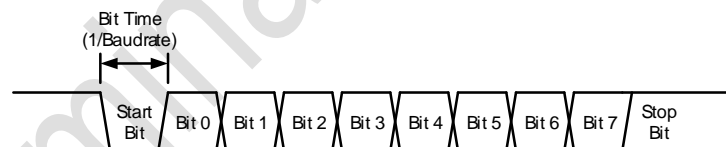
**Figure 3** The communication interface connector is located at the side of the sensor opposite to the air outlet.

**Table 4** SPS30 pin assignment.

The SPS30 offers both a UART<sup>8</sup> and an I<sup>2</sup>C interface. For connection cables longer than 20 cm we recommend using the UART interface, due to its intrinsic robustness against electromagnetic interference.

#### 3.1 Physical Layer

The SPS30 has separate RX and TX lines with unipolar logic levels. A transmitted byte looks as in Figure 4.



**Figure 4** Transmitted byte.

<sup>8</sup> Universal Asynchronous Receiver Transmitter.