DigiPicco™ Basic I2C
Capacitive Humidity Module Digital (I^2C)

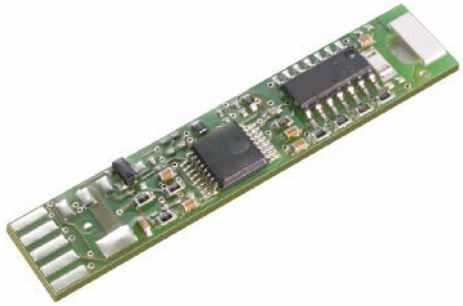
RoHS

Product

Within the markets of measurement, HVAC, building and control, and home appliances/white goods, humidity modules are required to translate the signals of the robust IST humidity sensors into commonly used standards and provide a calibrated sensor signal. Contrary to existing humidity modules or fully integrated solutions the DigiPicco series unifies advantages of both worlds, avoiding their disadvantages: The high precision measurement of humidity with discrete sensors (high stability due to wide active sensor area) combined with calibrated and linearized output signal and fully digital output of both humidity and temperature.

Advantages

- Excellent response time
- Calibration free
- Ready to use
- Very low drift due to wide sensor area
- Calibrated humidity and temperature signals on one single bus
- With extended sensor possible



Technical data

Sensor Type:	P14 SMD
Measurement principle:	Capacitive humidity sensor
Mechanical dimensions:	W=10 x L=47 x T=2.8 mm
Humidity measurement range:	0 ... 100% RH (max. dew point = 85 °C)
Operating temperature range:	- 25 ... +85 °C
Supply voltage (V_{cc}):	5 VDC
Current consumption:	< 3 mA
Output signal:	0x0 ... 0x7FFF (0 ... 100% RH), 0x0 … 0x7FFF (-40 ... +125 °C)
Temperature sensor:	Pt1000 Ω (DIN EN 60751, F0.3)
Storage temperature:	-40 ... +80 °C / at max. 95% RH non condensing
Accuracy:	< ±3 % RH (15 ... 85 % RH at 23 °C) < ±0.5 °C (-25 … +85 °C)
Response time t_{63}:	< 5 s (50% RH → 0% RH) at 23 °C
Output terminals:	Soldering pads for V_{cc}, clock and data (I^2C), GND

INNOVATIVE SENSOR TECHNOLOGY

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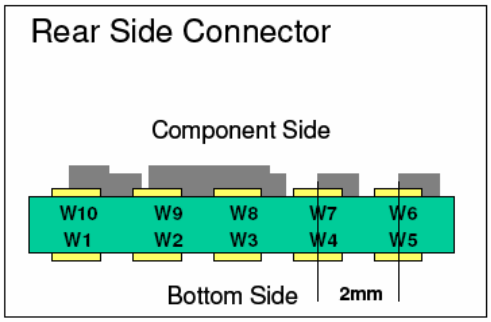
Terminal Pinout

W1	Reserved
W2	Reserved
W3	Clock SCL (I^2C)
W4	Data SDA (I^2C)
W5	Reserved
W6	Reserved
W7	Signal GND
W8	GND
W9	Reserved
W10	V_{cc}+

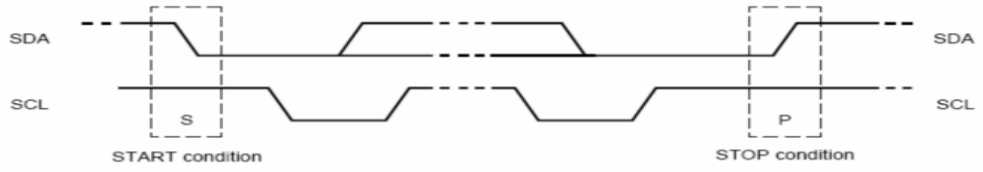


Description I^2C

First of all the external microcontroller (master) sends the start condition to the slave (DigiPicco). Then the master transmits the standard 7 Bit address (0x78) or a factory customizable address. The eight bit (LSB) determines the direction of data flow and has to be set during this operation. Following, the slave (DigiPicco) acknowledges the receipt of data with the acknowledge condition (SDA kept low during a positive clock cycle). After that, the slave (DigiPicco) outputs the data values. After each data byte the master has to acknowledge the receipt of the data values by the acknowledge condition, except before the stop condition has been sent by the master itself.

The humidity and the temperature values have two bytes each. The first two bytes are the humidity values and the second two bytes are the temperature values, 15 bit each. This sequence is repeated indefinitely until the stop condition has been sent (also refer to diagram below).

Start Condition:
SDA changes from high to low during SCL is in high condition.
Stop Condition:
SDA changes from low to high during SCL is in high condition.



Start- und Stop Condition

								optional		
	start condition	slave address	R/W 1	A	1st data byte	A	2nd data byte	A	... nth data byte	stop condition
sent by	master			slave	slave	master	slave	master	slave	Master

Typical read operation timing sequence

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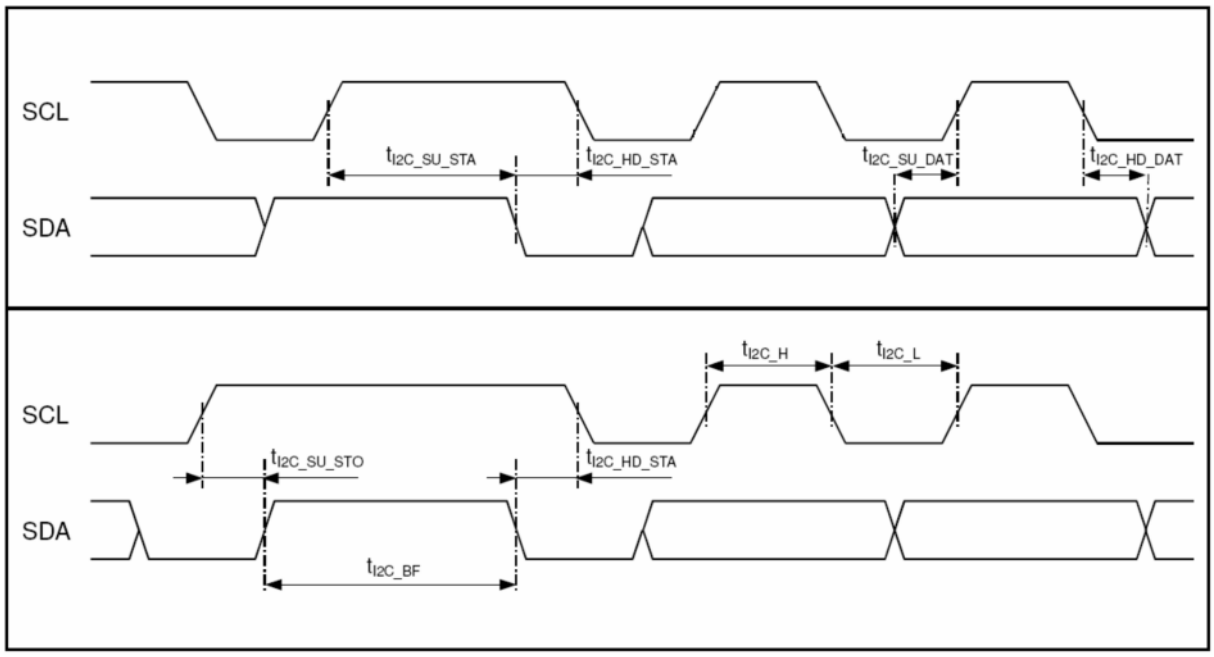
Slave-address:	0x78 or factory definable customer specific address
SCL clock-frequency:	Max. 400 kHz
Bus free time between start- and stop condition t_{I2C_BF}:	Min. 1.3 µs
Hold delay start condition $t_{I2C\_HD\text{-}STA}$:	Min. 0.6 µs
Setup time start condition $t_{I2C\_SU\_STA}$:	Min. 0.6 µs
Setup time stop condition $t_{I2C\_SU\_STO}$:	Min. 0.6 µs
Data hold time (trigger=data) $t_{I2C\_HD\_DAT}$:	0 µs
Data setup time $t_{I2C\_SU\_DAT}$:	Min. 0.1 µs
Low period SDA/SCL t_{I2C_L}:	Min. 1.3 µs
High period SDA/SCL t_{I2C_H}:	Min. 0.6 µs
Input-high-level:	2.4 ... 3 V
Input-low-level:	0.0 ... 0.6 V
External pull- up resistor:	Min. 2 kΩ
Load capacitance:	Max. 2 nF



General timing diagram

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