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

Product

Within the markets Measurement, HVAC, Building and Control, and Home Appliances/White Goods, humidity modules are required which are capable 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
- Precise humidity measurement
- Drift stable thanks to wide sensor area
- With temperature sensor PT1000
- Smallest dimensions
- Mechanical robust and easy to integrate
- Calibrated humidity and temperatures signal on one single bus.
- RoHs conform

Technical data

Sensor Type:	P14 SMD
Measurement principle:	Capacitive humidity sensor
Mechanical dimensions:	W=10 x L=47 x T=2.8mm
Humidity measurement range:	0 ... 100 % RH
	(max. dew point = 85 deg C)
Operating temperature range:	- 25 ... +85 deg C
Supply voltage:	5 Volts DC
Current consumption:	< 3 mA
Output signal:	0x0...0x7FFF (0...100% RH), 0x0…0x7FFF (-40….+125 deg C)
Temperature sensor:	PT1000
Storage temperature:	-40...+100 deg C / at max. 95% RH non condensing
Accuracy:	< ±3 %RH (15 ... 85 % RH @ 23 deg C)
	< ±0.5 deg C (-25…+85 deg C)
Response time T$_{63}$:	< 5 sec
Output terminals:	Soldering pads for VCC, clock and data (I^{2}C), GND

IST
INNOVATIVE SENSOR TECHNOLOGY

IST AG, Industriestrasse 2, CH-9630 Wattwil, Switzerland, Phone (+)41 71 987 73 73, Fax (+)41 71 987 73 77
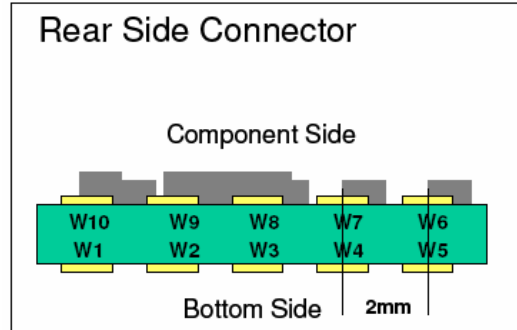e-mail info@ist-ag.com, www.ist-ag.com

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Terminal Pinout

W1	Reserved
W2	Reserved
W3	Clock SCL (I²C)
W4	Data SDA (I²C)
W5	Reserved
W6	Reserved
W7	Signal GND
W8	GND
W9	Reserved
W10	Vcc +

Description I²C

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 exist of 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).
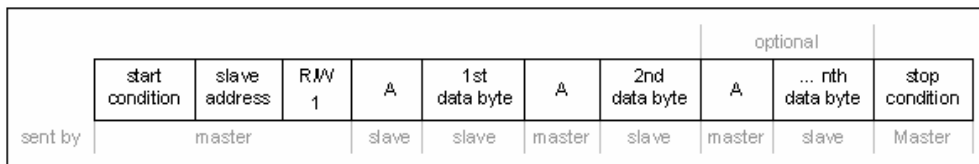
Start Condition:
SDA changes from high to low during SCL is in high condition.

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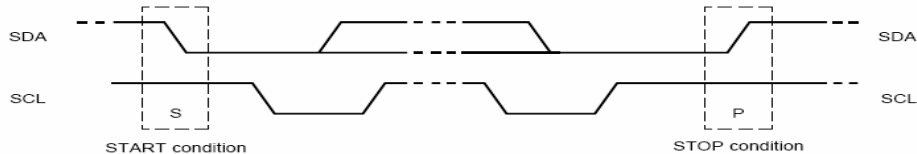
Start- und Stop Condition

Typical read operation timing sequence

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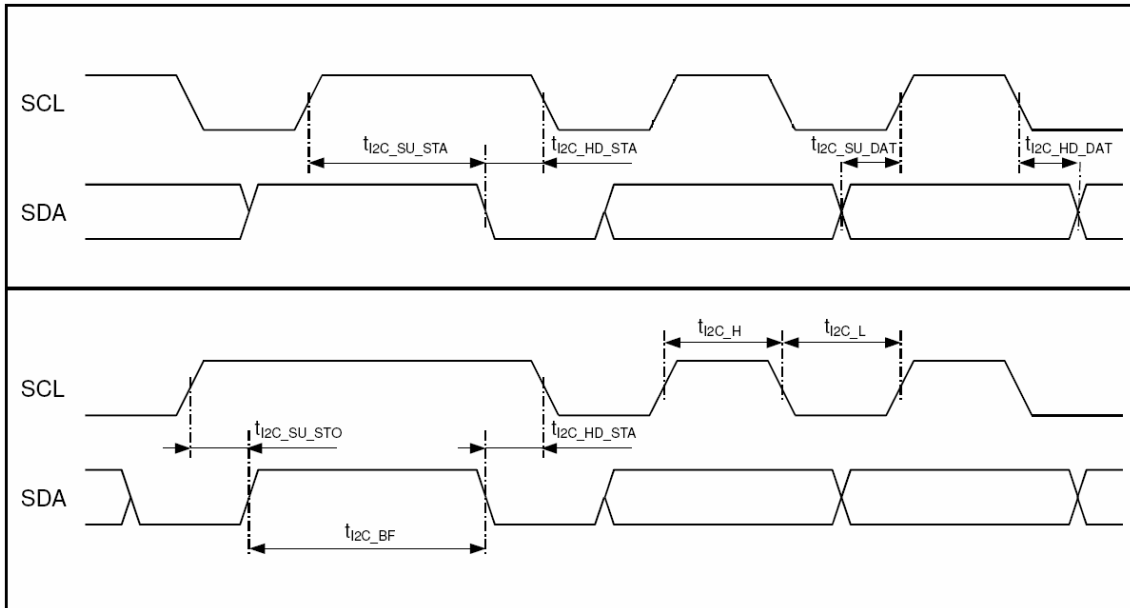e-mail info@ist-ag.com, www.ist-ag.com

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Slave-address:	0x78 or factory definable customer specific address
SCL clock-frequency:	Max. 400kHz
Bus free time between start- and stop condition t_{I2C_BF}:	Min. 1.3µs
Hold delay start condition t_{I2C_HD-STA}:	Min. 0.6µs
Setup time start condition $t_{I2C\_SU\_STA}$:	Min. 0.6µs
Setup time stop condition $t_{I2C\_SU\_STO}$:	Min. 0.6µs
Data hold time (trigger=data) $t_{I2C\_HD\_DAT}$:	0µs
Data setup time $t_{I2C\_SU\_DAT}$:	Min. 0.1µs
Low period SDA/SCL t_{I2C_L}:	Min. 1.3µs
High period SDA/SCL t_{I2C_H}:	Min. 0.6µs
Input-high-level:	2.4...3V
Input-low-level:	0.0...0.6V
External pull- up resistor:	Min. 2kΩ
Maximum load capacitance:	Max. 2nF

General timing diagram

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