SENSIRION
THE SENSOR COMPANY

Comparison between Specification of SHT1x and SHT2x

Guideline for Replacement

This guideline helps to pre-arrange the change from SHT1x sensor to next generation SHT2x. It shows, where changes in design and programming are required to implement the SHT2x into an existing device using SHT1x. Actions in light red are need if SHT2x is used with Sensibus protocol. If I²C shall be implemented actions highlighted in yellow are required in addition. Care has been taken that only a minimum amount of adaptations need to be considered for replacement.

1 Sensor performance

Parameter	SHT1x	SHT2x	Action/Remark
Resolution	See datasheet	See datasheet	No change
Accuracy	See datasheet	See datasheet	

2 Sensor geometry and composition

Parameter	SHT1x	SHT2x	Action/Remark
Size	7.5 x 5 x 2.5 mm³	3 x 3 x 1.1 mm³	
Foot print	2x4 pins, see datasheet	2x3 pins plus die pad, see datasheet	Change footprint layout.
Pin size	0.8 x 1.1 mm²	0.4 x 0.4 mm²	Change pad size.
Pin pitch	1.27 mm	1 mm	Change pitch of solder pads.
Pin material	Copper coated with 5µm Ni and 0.1µm Au.	Copper coated with 5µm Ni, Pd and Au.	Update IMDS.
Housing material	LCP cap with epoxy globtop on FR4 substrate	Epoxy	Update IMDS.
Weight	100mg	25mg	

3 Application information

Parameter	SHT1x	SHT2x	Action/Remark
Soldering Instructions	See datasheet	See datasheet	No change
Storage condition	See datasheet	See datasheet	No change
Reconditioning procedure	See datasheet	See datasheet	No change
Temperature effects (incl. self-heating)	See datasheet	See datasheet	No change
Light	See datasheet	See datasheet	No change
Membrane	SF1 available from Sensirion	Currently no membrane available from Sensirion	Need of membrane for SHT2x in clarification.
Materials used for sealing/mounting	See datasheet	See datasheet	No change
Wiring considerations and signal integrity	100nF decoupling capacitor needed	100nF decoupling capacitor needed	No change required.
ESD	MIL-STD-883E, ±2kV	MIL-STD-883E, ±2kV	No change

4 Interface specifications

Parameter	SHT1x	SHT2x [1]	Action/Remark
Serial clock, f_{SCL}	max. 1MHz for VDD > 4.5V max. 5MHz for VDD < 4.5V	max. 0.4MHz	Reduce f_{SCL} if set higher than 0.4MHz for SHT1x.
Serial clock, f_{SCLH}	min. 0.1us	min. 0.6us	Increase f_{SCLH} if set shorter than 0.6us for SHT1x.
Serial clock, f_{SCLL}	min. 0.1us	min. 1.3us	Increase f_{SCLL} if set shorter than 1.3us for SHT1x.
Serial clock, t_F/t_R	min. 1ns, typ. 200ns	max. 100ns	Reduce t_R if set longer than 100ns for SHT1x.
Serial clock, pull-up resistor	None	e.g. 10kΩ	Add pull-up resistor for SHT2x when used with I²C.
Serial data, t_{SU}	min. 100ns, typ. 150ns	min. 100ns	No change required.
Serial data, t_{HO}	min. 10ns, typ. 15ns	min. 0ns, max. 900ns	No change required.
Serial data, t_F	min. 3.5ns, max. 200ns	max. 100ns	Reduce t_F if set longer than 100ns for SHT1x.
Serial data, t_R	min. 3.5ns, max. 200ns	max. 100ns	Reduce t_R if set longer than 100ns for SHT1x.
Serial data, t_V	min. 200ns, typ. 250ns	tbd	tbd
Serial data, pull-up resistor	e.g. 10kΩ	e.g. 10kΩ	No change required.

[1] Interface specifications of SHT2x comply with I²C “fast mode” standard.

5 Electrical specifications

Parameter	SHT1x	SHT2x	Action/Remark
Supply voltage:	2.4 – 5.5 V	2.1 – 3.6 V	Reduce voltage if set higher than 3.6 V for SHT1x.
Supply current:	Sleep: typ. 0.3µA Measuring: typ. 0.55mA Average: typ. 28µA	Sleep: typ. 0.15µA Measuring: typ. 0.30mA Average:	Current consumption of SHT2x is reduced almost to half of SHT1x.
Power Dissipation	Sleep: typ. 2µW Measuring: typ. 3mW Average: typ. 150µW	Sleep: typ. 0.5µW Measuring: typ. 0.9mW Average:	Power dissipation of SHT2x is significantly reduced compared to SHT1x.
Output low voltage	max. 250mV	max. 400mV	No change required.
Output high voltage	min. 90% VDD	min. 70% VDD	No change required.
Output sink current	max. 4mA	max. 4mA	No change
Input low voltage	max. 20% VDD	max. 30% VDD	No change required.
Input high voltage	min. 80% VDD	min. 70% VDD	No change required.
Input current	max. 1µA	max. ±1µA	No change required.

6 Communication with sensor

Parameter	SHT1x	SHT2x	Action/Remark
Protocol	Sensibus	I²C or Sensibus	
Start up time	11ms	15ms [1)]	Increase start up time if set shorter than 15ms for SHT1x.
Start/Stop sequence	See datasheet	See datasheet	Reprogram acc. datasheet if I²C is used.
Address	000	7-bit I²C address + 1 SDA direction bit	Adjust code acc. datasheet if I²C is used.
Command	5 bit	8 bit	Adjust code acc. datasheet if I²C is used.
Hold/No Hold Master mode	Not provided	Provided for I²C	Enables open communication with several I²C devices. Adjust code acc. datasheet if required.
Measurement time	8 bit resolution: 20ms 12 bit resolution: 80ms 14 bit resolution: 320ms	8 bit resolution: 3ms 10 bit resolution: 6ms 11 bit resolution: 11ms 12 bit resolution: 22ms 13 bit resolution: 43ms 14 bit resolution: 85ms	Measurement time of SHT2x is significantly reduced.
Soft reset	Code: 11110 Time: 11ms	Code: 1111'1110 Time: 15ms [1)]	Adjust code acc. datasheet if I²C is used. Increase reset wait time if set less than 15ms for SHT1x.
Status register, resolution	Bit 0 used to set measurement resolution.	Bit 0,7 used to set measurement resolution.	No change required.
Status register, default resolution	RH: 12 bit T: 14 bit	RH: 12 bit T: 14 bit	No change required.
Status register, OTP reload	Bit 1	Not provided	Use soft reset instead of OTP reload for SHT2x.
CRC checksum	See application note	tbd	tbd
Serial number	Not provided	See application note	No change required.

[1)] Start-up time only valid if SCL is high at start-up. In the case of SCL is low the start-up time may increase to 90ms.

7 Conversion of signal output

Parameter	SHT1x	SHT2x	Action/Remark
Coefficients for RH	See datasheet	See datasheet	Adjust conversion formula and coefficients for SHT2x.
Coefficients for T	See datasheet	See datasheet	Adjust conversion formula and coefficients for SHT2x.

8 Environmental stability

Parameter	SHT1x	SHT2x	Action/Remark
Qualification standard	Following AEC-Q100	Following AEC-Q100	No change

9 Packaging

Parameter	SHT1x	SHT2x	Action/Remark
Reel size	100, 400, 2000 pcs	400, 2000 pcs	
Tape size	12 mm width	tbd	tbd
Empty leader tape	480 mm	tbd	tbd
Empty trailer tape	300 mm	tbd	tbd
Label	See datasheet	tbd	tbd
Traceability	3-digit alphanumerical code	5-digit alphanumerical code + digital on-chip ID	

Disclaimer:
This guideline has been made with care, it may, however, not be fully complete. For proper integration of SHT2x please also consult the latest version of the datasheet (available on http://www.sensirion.com/humidity).

Revision History

Date	Revision	Changes
13 July 2009	1.0	Initial version (DHA)

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