HTU21D(F) Sensor

Digital Relative Humidity sensor with Temperature output

- DFN type package
- Relative Humidity and Temperature Digital Output, I²C interface
- Fully calibrated
- Lead free sensor, reflow solderable
- Low power consumption
- Fast response time

DESCRIPTION

The HTU21D(F) is a new digital humidity sensor with temperature output by MEAS. Setting new standards in terms of size and intelligence, it is embedded in a reflow solderable Dual Flat No leads (DFN) package with a small 3 x 3 x 0.9 mm footprint. This sensor provides calibrated, linearized signals in digital, I²C format.

HTU21D(F) digital humidity sensors are dedicated humidity and temperature plug and play transducers for OEM applications where reliable and accurate measurements are needed. Direct interface with a micro-controller is made possible with the module for humidity and temperature digital outputs. These low power sensors are designed for high volume and cost sensitive applications with tight space constraints.

Every sensor is individually calibrated and tested. Lot identification is printed on the sensor and an electronic identification code is stored on the chip – which can be read out by command. Low battery can be detected and a checksum improves communication reliability. The resolution of these digital humidity sensors can be changed by command (8/12bit up to 12/14bit for RH/T).

With MEAS' improvements and miniaturization of this sensor, the performance-to-price ratio has been improved – and eventually, any device should benefit from its cutting edge energy saving operation mode.

Optional PTFE filter/membrane (F) protects HTU21D digital humidity sensors against dust and water immersion, as well as against contamination by particles. PTFE filter/membranes preserve a high response time. The white PTFE filter/membrane is directly stuck on the sensor housing.

FEATURES

- Full interchangeability with no calibration required in standard conditions
- Instantaneous desaturation after long periods in saturation phase
- Compatible with automatized assembly processes, including Pb free and reflow processes
- Individual marking for compliance to stringent traceability requirements

APPLICATIONS

- Automotive: defogging, HVAC
- Home Appliance
- Medical
- Printers
- Humidifier

ELECTRICAL AND GENERAL ITEMS

(@T = 25°C, @Vdd = 3V)

Characteristics		Symbol	Min	Typ	Max	Unit
Voltage Supply		VDD	1.5	3.0	3.6	V
Current consumption [1]	Sleep mode	idd		0.02	0.14	µA
	Measuring		300	450	500	µA
Power Dissipation	Sleep mode			0.06	0.5	µW
	Average 8bit [2]			2.7		µW
Communication		digital 2-wire interface, I²C protocol				
Heater	VDD=3V	5.5mW/ΔT=+0.5-1.5°C				
Storage		-40°C/125°C				

[1] Conditions: V_{dd} = 3V, SCK= 400kHz at 25°C
[2] Conditions: V_{dd} = 3V, SCK= 400kHz, Temp<60°C, duty cycle <10%

SENSOR PERFORMANCE

RELATIVE HUMIDITY

(@T = 25°C, @Vdd = 3V)

Characteristics		Symbol	Min	Typ	Max	Unit
Resolution	12 bits			0.04		%RH
	8 bits			0.7		%RH
Humidity Operating Range		RH	0		100	%RH
Relative Humidity Accuracy	typ			±2		%RH
@25°C (20%RH to 80%RH)	max		See graph 1			%RH
Replacement		fully interchangeable				
Temperature coefficient (from 0°C to 80°C)		T_{cc}			-0.15	%RH/°C
Humidity Hysteresis				±1		%RH
Measuring Time [1]	12 bits			14	16	ms
	11 bits			7	8	ms
	10 bits			4	5	ms
	8 bits			2	3	ms
PSRR					±10	LSB
Recovery time after 150 hours of condensation		t		10		s
Long term drift				0.5		%RH/yr
Response Time (at 63% of signal) from 33 to 75%RH [2]		τ_{RH}		5	10	s

[1] Typical values are recommended for calculating energy consumption while maximum values shall be applied for calculating waiting times in communication.
[2] At 1m/s air flow

CLEAR BOTH SIDES OF SJ1
TO DISABLE I2C PULLUP RESISTORS

3.3V

SJ1

R2 4.7K

R1 4.7K

SDA

SCL

U1

VDD DATA SCK
GND
GND

HTU21D

3.3V

C1
0.1uF

GND

GND

7-bit I2C Address is 0x40
I2C write is 0x80
I2C read is 0x81

VCC RANGE: 1.5V TO 3.6V

3.3V

GND
SDA
SCL

1
2
3
4

JP1

SFE
SFE

REV:

TITLE: HTU21D Breakout

Design by: N. Seidle

Date: 10/16/2013 9:08:58 AM   Sheet: 1/1

open hardware