

SENSYLINK Microelectronics

(CHT8315)

Digital Humidity & Temperature Sensor

CHT8315 is a Low Voltage Digital Humidity and Temperature Sensor with $\pm 3.0\%RH$ Accuracy for humidity and $\pm 0.5^{\circ}C$ Accuracy for temperature. It is compatible with SMBus, I²C and 2-wire Interface. It is ideally used in HVAC, environment monitor etc.

Low Voltage Digital Humidity and Temperature Sensor

Description

CHT8315 is a low voltage digital humidity and temperature sensor with $\pm 3.0\%RH$ (Max.) accuracy for humidity and $\pm 0.5^{\circ}C$ (Max.) accuracy for temperature. Humidity and Temperature data can be read out directly via digital interface by MCU, Bluetooth Chip or SoC chip.

The digital interface is compatible with SMBus, I²C and 2-wire protocol. Also it supports communication with fast speed (up to 400 kHz) and high speed (up to 3.4MHz) for I²C protocol.

Each chip is specially calibrated for temperature and humidity accuracy in factory before shipment to customers. There is no need for re-calibration anymore.

It includes a high precision band-gap circuit, an analog to digital converter, a calibration unit with non-volatile memory, and a digital interface block.

It has ALERT logic output pin with open drain structure, which is active low or high. The measured frequency will become fastest when alert is triggered.

The chip supports up to 4 devices in one I²C bus by setting different slave address via AD0 pin.

Available Package: DFN3x3-6 package

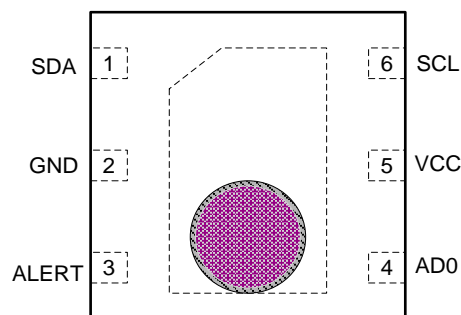
Features

- Operation Voltage: 1.75V to 5.5V
- Average Operating Current: 2.5uA (Typ.) @ 3.3V, 1Con/s for temperature and humidity
- Standby Current: 0.05uA (Typ.), 0.3uA (Max.)
- Temperature Accuracy without calibration: Maximum: $\pm 0.5^{\circ}C$ from $0^{\circ}C$ to $50^{\circ}C$
- Humidity Accuracy without calibration: Maximum: $\pm 3.0\%RH$ at 50%RH
- Compatible with SMBus, 2-wire and I²C
- Programmable Alert output
- Generate 4 different slave address by setting AD0 pin
- Supports One shot or continuous measurement
- Automatically switched to fastest measurement mode once alert is triggered
- Support SMBus timeout feature
- Packet Error Checking feature to improve communication reliability and robustness
- Temperature Range: $-40^{\circ}C$ to $125^{\circ}C$
- Humidity Range: 0%RH to 100%RH

Applications

- Smart HVAC System
- Environment Monitor
- Portable/Wearable Weather Monitor

PIN Configurations (Top View)



DFN3x3-6 (Package Code DN)

Typical Application

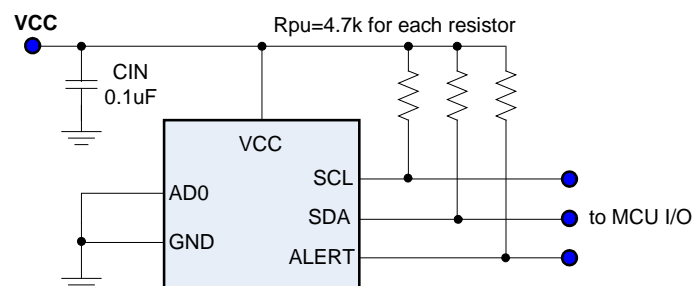


Figure 1. Typical Application of CHT8315

Pin Description

PIN No.	PIN Name	Description
1	SDA	Digital interface data input or output pin, need a pull-up resistor to VCC.
2	GND	Ground pin.
3	ALERT	To Indicate alert status of over Humidity and/or Temperature limitation programmed by setting temperature and/or high/low-limit register. Need a pull-up resistor to VCC in application. it is open drain output with active low or high by setting POL bit.
4	AD0	Slave Address selection pins, the chip can be defined total 4 different slave addresses by connecting this pin to GND, VCC, SCL or SDA pin respectively. If leave this pin open, address is 0x80. See Slave Address for detail.
5	VCC	Power supply input pin, using 0.1uF low ESR ceramic capacitor to ground
6	SCL	Digital interface clock input pin, need a pull-up resistor to VCC.

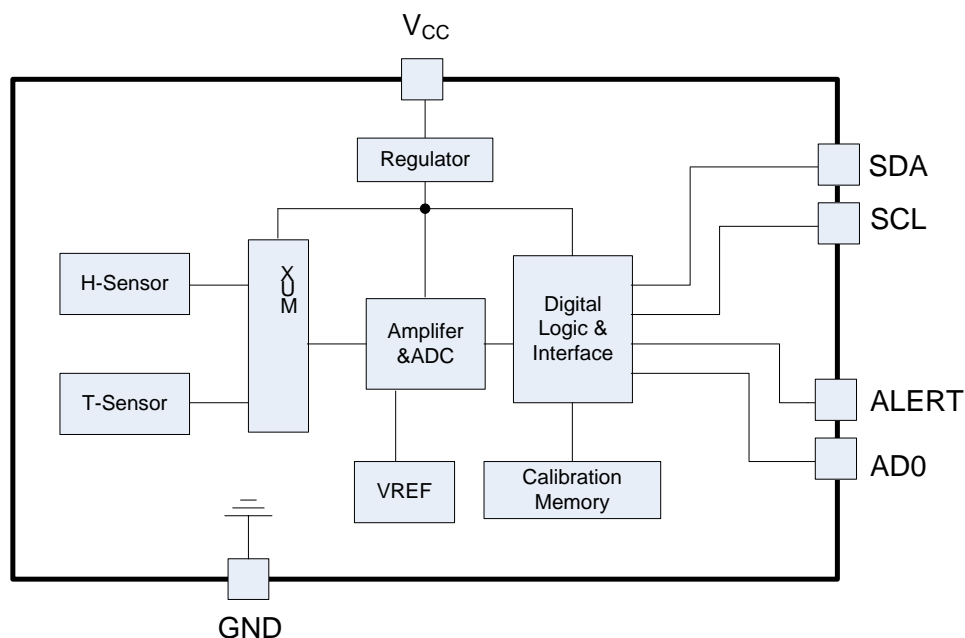
Function Block


Figure 2. CHT8315 function block

Low Voltage Digital Humidity and Temperature Sensor
Ordering Information
CHT8315 X X - X
Package Type
 DN : DFN3x3-6

Packing
 R: Tape & Reel

Protection
 C : with Cover
 Blank : without Cover

Order PN	Accuracy	Green ¹	Package	Marking ID ²	Packing	MPQ	Operation Temperature	Protection Cover
CHT8315DNR	±0.5°C ±3%RH	Halogen free	DFN3x3-6	8315 YWWAXX	Tape & Reel	3,000	-40°C~+125°C	No
CHT8315DNR-C	±0.5°C ±3%RH	Halogen free	DFN3x3-6	8315 YWWAXX	Tape & Reel	3,000	-40°C~+125°C	Yes

Notes

1. Based on ROHS Y2012 spec, Halogen free covers lead free. So most package types Sensylink offers only states halogen free, instead of lead free.

2. Marking ID includes 2 rows of characters. In general, the 1st row of characters are part number, and the 2nd row of characters are date code plus production information.

- 1) Generally, date code is represented by 3 numbers. The number stands for year and work week information. e.g. 501 stands for the first work week of year 2015; 621 stands for the 21st work week of year 2016.
- 2) Right after the date code information, the next 2-3 numbers or letters are specified to stands for supplier or production location information.
- 3) For very small outline package, there's 4 digits to stands for product information and date code, first 2 digits represent product code, and the other 2 digits stands for work week

Low Voltage Digital Humidity and Temperature Sensor

Absolute Maximum Ratings (Note3)

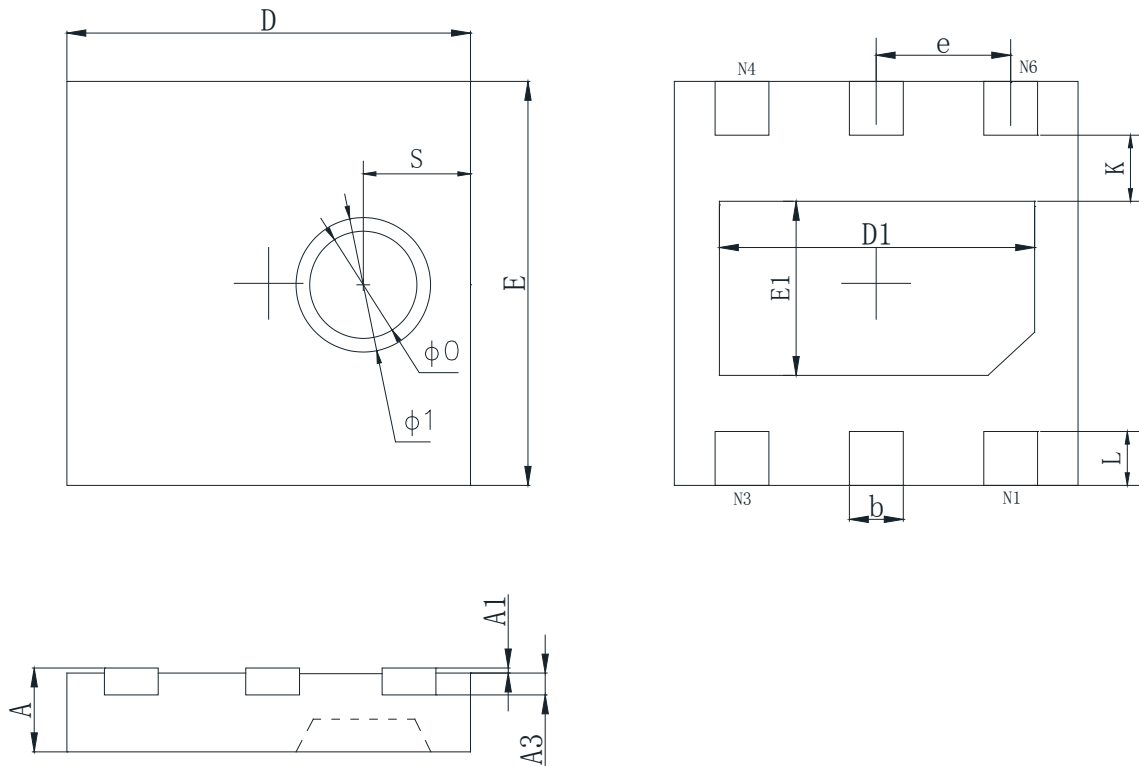
Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC} to GND	-0.3 to 5.5	V
SDA, SCL, AD0 Voltage	$V_{SDA}/V_{SCL}/V_{AD0}$ to GND	-0.3 to 5.5	V
ALERT Voltage	V_{ALERT} to GND	-0.3 to 5.5	V
Operation junction temperature	T_J	-50 to 150	°C
Storage temperature Range	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 Seconds)	T_{LEAD}	260	°C
ESD MM	ESD_{MM}	400	V
ESD HBM	ESD_{HBM}	4000	V
ESD CDM	ESD_{CDM}	1000	V

Note3

1. *Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at the "Absolute Maximum Ratings" conditions or any other conditions beyond those indicated under "Recommended Operating Conditions" is not recommended. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.*

Recommended Operating Conditions

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	1.75 ~ 5.5	V
Ambient Operation Temperature Range	T_{AT}	-40 ~ +125	°C
Ambient Operation Temperature Range for Humidity	T_{ATH}	0 ~ +85	°C
Ambient Operation Humidity Range	T_{AH}	0 ~ 100	%RH

Package Outline Dimensions
DFN3x3-6 Unit (mm)


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.010	0.050	0.000	0.002
A3	0.203REF.		0.008REF	
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
D1	2.300	2.500	0.091	0.098
E1	1.400	1.600	0.055	0.063
k	0.350MIN.		0.014MIN	
b	0.350	0.450	0.014	0.018
e	1.000TYP.		0.040TYP	
L	0.350	0.450	0.014	0.018
S	0.740	0.840	0.029	0.033
φ0	0.800TYP		0.036TYP	
φ1	1.000TYP		0.040TYP	



SENSYLINK Microelectronics Co., Ltd

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