

HTW2700 Series - Air Flow, Humidity, Temperature Three-in-One Sensor



- Integrated, convenient for users to use, based on microelectromechanical system technology
- Convenient integrated connection pipe
- within +/-5 SCCM, +/-3%RH and +/-0.25°C full interchangeability
- Digital I2C output, high resolution for gas flow, humidity and temperature

description

The HTW2700 series, featuring microelectromechanical system (MEMS) humidity and gas flow sensor elements, is a professional, fully-calibrated plug-and-play module integrating gas flow, humidity, and temperature measurement. Specifically designed for OEM applications requiring reliability and precise measurements in medical and HVAC fields, it employs a universal digital I2C communication protocol for direct connection to master MCUs. Its simplified four-pin connector delivers an optimal cost-performance ratio.

characteristic

apply

- | | |
|---|--|
| <ul style="list-style-type: none"> • This product is lead free, Cr (6+), Cd and Hg. accord with RoHS • Precise bidirectional airflow, humidity and temperature measurements • High reliability and long-term stability | <ul style="list-style-type: none"> • health care industry • domestic appliance • HVAC |
|---|--|

performance parameter

maximum rating

parameter	symbol	price	unit
storage temperature	T _{stg}	- 40 to +85	°C
Power supply voltage (maximum)	V _{cc}	20	V _{dc}
pressure limit	P	50 to 115	kPa
Humidity range	RH	0 to 100	%RH
temperature range	T _a	-30 to +85	°C
Maximum input current	I _{avg}	50	mA
maximum power dissipation	P _d	150	mW

Peak condition : less than 10% of working time.

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HTW2700 Series - Three-in-One Sensor for Air Flow, Humidity and Temperature

Test conditions (@V_{cc}=3.3V_{dc}, T=23°C, R_L>1MΩ unless otherwise stated)

characteristic	symbol	least value	representative value	crest value	unit
Air flow measurement range	AF	-300		+300	sccm
Air flow accuracy (-100 to +100 sccm)			+/-5		%FS
Air flow resolution			+/-0.1		sccm
Humidity measurement range	RH	0		100	%RH
Relative humidity accuracy (10% to 95%RH)			+/-3	+/-5	%RH
Relative humidity resolution			+/-0.1		%RH
Temperature measurement range	T _a	-30		85	°C
Temperature accuracy (-10 to +40 °C)			+/-0.1	+/-0.3	°C
temperature resolution			+/-0.1		°C
preheating time	t _w		350		ms
Data sampling period			5		ms
Airflow time constant (at 63% of signal). typ ⁽¹⁾	τ		50		ms
Humidity time constant (at 63% of signal) typ. ⁽¹⁾	τ		100		ms
Temperature time constant (at 63% of signal) typ. ⁽¹⁾	τ		100		ms

(1) For air flow, %RH, T (steps TBD)

electrical character

characteristic	symbol	least value	representative value	crest value	unit
service voltage	V _{dd}	2.7	3.3	5.0	V _{dc}
supply current	I _{avg}		100		mA
SCL frequency	F			100	kHz

transmission signal

The HTW sensor is a slave module compatible with the I2C bus standard. The data format can be modified according to customer requirements

• HTW driven address

Each device is assigned a unique address.

The form of the 7-bit address: **0x41**(read channel) and **0x40**(write channel)

• protocol

order	code
deposit	0x0.
Airflow reading	0x2A
Temperature readings	
Humidity read	0x47
Status read	0x53
Status write	0x61

0x34

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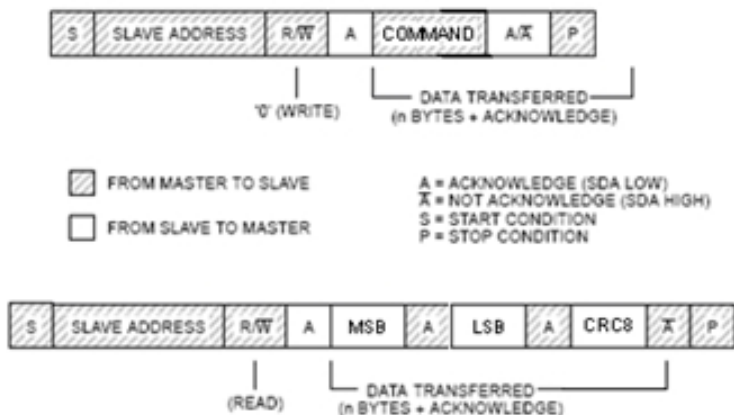
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$$CRC8 = (dataMSB \text{ XOR } dataLSB) - 1$$

data transmission

air flow rate	least value	representative value	crest value
Limits (DATA)	-300.0		+300.0
Limits (DATA)	0xF48		0x0BB8
Resolution (scm)		0.1	
Resolution (DATA)		1	
Update cycle (ms)		10	20
temperature	least value	representative value	crest value
the limit (°C)	-30.0		+85.0
Limits (DATA)	0xFED4		0x0352
resolution ratio (°C)		0.1	
Resolution (DATA)		1	
Update cycle (ms)		100	
humidity	least value	representative value	crest value
the limit (%RH)	0.0		+100.0
Limits (DATA)	0x0000		0x03E8
Resolution (%RH)		0.1	
Resolution (DATA)		1	
Update cycle (ms)		100	

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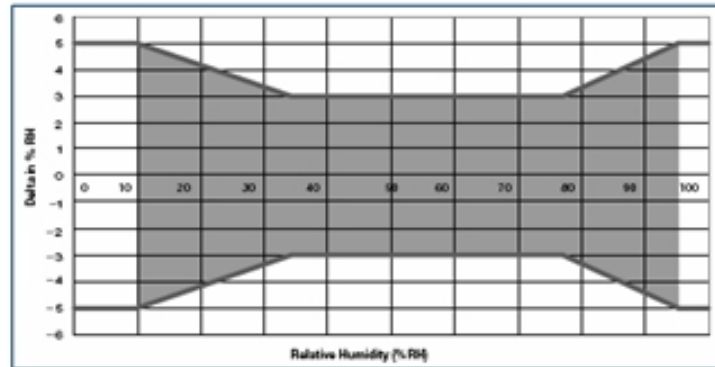
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HTW2700 series - three in one sensor for air flow, humidity and temperature

Humidity error budget(@23°C)

The HTW2700 series modules are designed for maximum accuracy measurements in the range of 10 to 95%RH.

Exceeding this range (<10% or> 95% RH, including condensation) will not affect the reliability of the HTW2700 series.

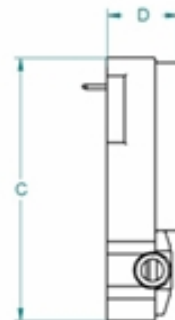
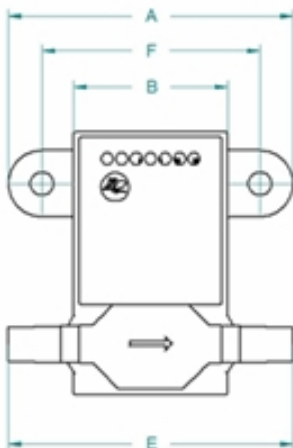
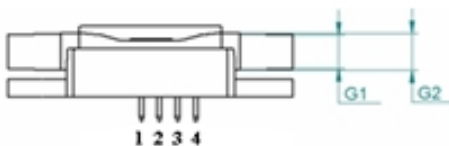


package

pin assignment

number	function
1	VDD - powering voltage
2	GND - the earth
3	SDA - Serial data
4	SCL - Serial clock

HTW2700 Series Dimensions



Dim	Typ (mm)
A	40
B	21.6
C	37
D	10
E	40
F	30.6
G1	4.7
G2	5.2

- (1) For board to board assembly, it is recommended to use soldering or ferrochrome welding
- (2) Pin position: to be determined
- (3) Lead spacing: 2.54 mm

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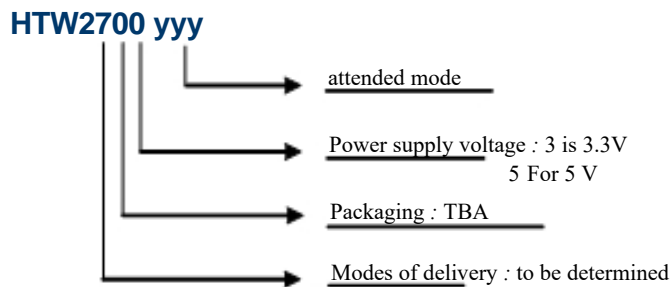


procedure qualification

Resist the effects of nature and chemicals

- The HTW2700 series contains anti-static protection circuit, up to $\pm 15kV$, air discharge.
- HTW2700 series anti-EMC interference.
- The HTW2700 series has input polarity protection
Additional tests: The sensor maintains normal operation under harsh chemical conditions, including salt spray, SO_2 (0.5%), H_2S (0.5%), O_3 , NO_x , NO , CO , CO_2 , softeners, soap, toluene, acids(H_2SO_4 , HNO_3 , HCl), HMDS, pesticides, cigarette smoke, and other substances not fully listed.
- The HTW2700 series is not sensitive to light

Order information



e.g. HTW2703

Revision	Comments	Who	Date
0	Creation document	D. LE GALL	December 07
A	Mechanical dimensions updated, product picture changed	D. LE GALL	January 08
B	Standardized datasheet format, Electrical characteristics updated, 3D schematic and Mechanical dimensions updated, Pinout assignment updated and Connector pitch added	D. LE GALL	May 08
C	Transmission Signals paragraph updated and HPP number added	D. LE GALL	October 08

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