HW2100LF

Relative Humidity Module

summary

HW2100LF is APOLLOSENSE's proprietary brand humidity sensor, The core components are developed using Samyoung's humidity sensitive capacitors from South Korea. It is a dedicated humidity sensor designed specifically for OEM applications, which can provide reliable and accurate measurements.

Specifications

1、Small size product
2、Product free from Lead,Cr(6+),Cd and Hg
3、Humidity calibrated within+/-3%@55%RH
4、Typical 1 to 3.6 Volt DC output for 0 to 100%RH at 5Vdc supply
5、Ratiometric to voltage supply from 4.75Vdc to 5Vdc

Features

Full interchange ability
High reliability and long term stability
Water proof design(IP67)
Very low temperature dependence
Suitable for 3 to10Vdc supply voltage

Applications

Industrial
Process control
Inverter
intelligent building
Incubator

Performance Specs

MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Storage Temperature	Tstg	-40 to 70	°C
Storage Humidity	RHstg	0 to 100	% RH
Supply Voltage (Peak)	Vs	10	Vdc
Humidity Operating Range	RH	0 to 100	% RH
Temperature Operating Range	Ta	-40 to 60	°C

Electrical Characteristics

(Ta=23°C, Vs=5Vdc +/-5%, R_L>1MΩ unless otherwise stated)

Humidity Characteristics	Symbol	Min	Typ	Max	Unit
Humidity Measuring Range	RH	0		100	%RH
Relative Humidity Accuracy (10 to 95% RH)	RH		+/-3	+/-5	%RH
Supply Voltage (regulated at 5Vdc*)	Vs		5		Vdc
Nominal Output @55%RH (at 5Vdc)	Vout	2.42	2.48	2.54	V
Current consumption	Ic		1.4	2	mA
Temperature Coefficient (10 to 50°C)	Tcc		- 0.05	-0.1	%RH/°C
Average Sensitivity from 33% to 75%RH	ΔVout/ΔRH		+26		mV/%RH
Sink Current Capability (R_L=33kΩ)	Is			150	μA
Humidity Hysteresis				+/-2	%RH
Time Constant (at 63% of signal, static) 33% to 75%RH	τ			15	s
Warm up time (electronic)	tw		150		ms
Humidity resolution			0.4		%RH
Output Impedance	Z				Ω

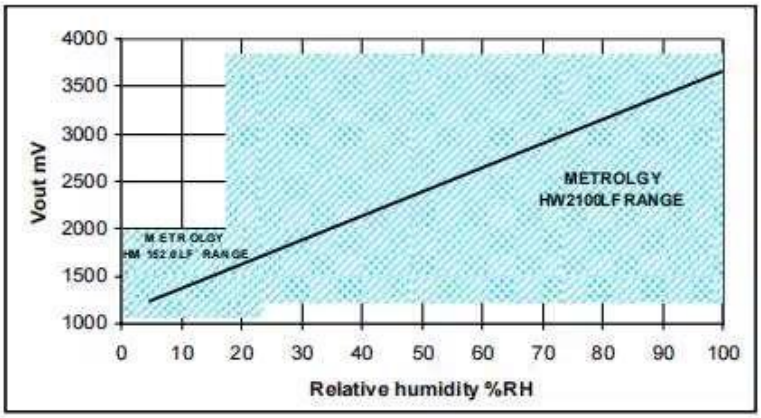
Typical Performance Curves

HUMIDITY SENSOR

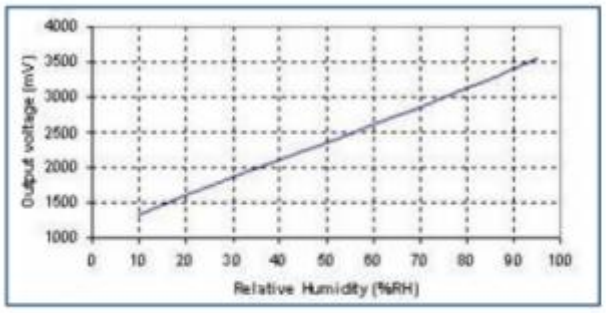
Measurement conditions

HW2100LF is specified for accurate measurements within 10 to 95% RH.

Excursion out of this range (<10% or >95% RH, including condensation) does not affect the reliability of HW2100LF characteristics.



Modeled Signal Output



RH (%)	Vout (mV)	RH (%)	Vout (mV)
10	1325	55	2480
15	1465	60	2605
20	1600	65	2730
25	1735	70	2860
30	1860	75	2990
35	1990	80	3125
40	2110	85	3260
45	2235	90	3405
50	2360	95	3555

Version1.0 / 2024

LINEAR EQUATIONS：

- $V_{out} = 25.68RH + 1079$
- $RH = 0.03892\ V_{out} - 42.017$

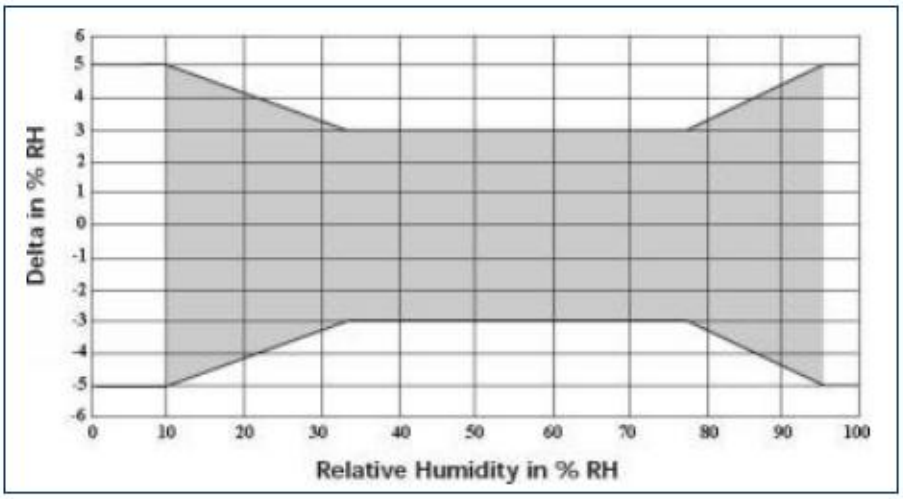
(With V_{out} in mV and RH in %)

POLYNOMIAL EQUATIONS:

- $V_{out} = 9E^{-4}\ RH^3 - 1.3E^{-1}\ RH^2 + 30.815\ RH + 1030$
- $RH = -1{,}91E^{-9}\ V_{out}^{\ 3} + 1{,}33E^{-5}\ V_{out}^{\ 2} + 9{,}56E^{-3}\ V_{out} - 2{,}16E^{+1}$

(With V_{out} in mV and RH in %)

- **Error Budget at 23°C**



TEMPERATURE COMPENSATION:

$$RH_{compensaed} = RH_{actualatT} + (T - 23) \times 0.05$$

(With T: Temperature in °C and RH: Relative Humidity in %)

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Qualification Process

Considering many requirements of the JEDEC standard, the HW2100LF sensor has undergone a complete qualification process, including:

1、Solder heat and solderability, including lead-free processes

2、Lead free wave soldering and reflow soldering process (260 ° C)+45 ° C deionized water cleaning

3、Mechanical impact JESD-22-B104-A

4、Vibration Frequency Conversion (20 to 2000Hz) JESD-22-B103-A

5、ESD electrostatic discharge air gun+-15kV (IEC 1000)

6、Salt environment JESD22-A107-A

7、Temperature cycle -40 ° C/+125 ° C

8、High temperature/humidity working life -93% RH/60 ° C, continuous for 1000 hours

9、Low humidity storage life - relative humidity<10%/23 ° C, lasting for 1000 hours

10、Resistant to immersion in water at ambient temperature and 80 ° C

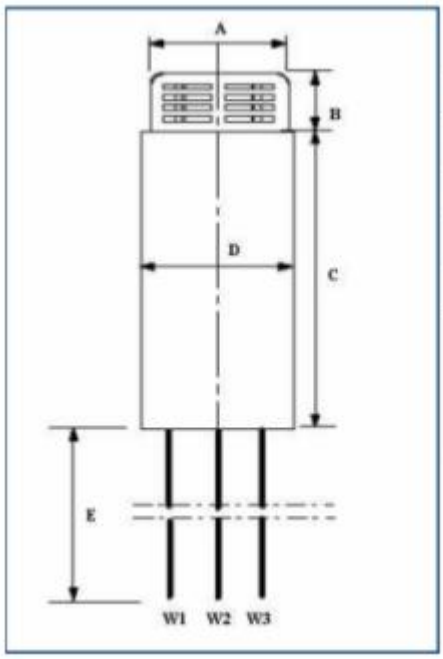
11、Storage at 140 ° C for 168 hours

12、Resistant to many chemicals related to household appliances/cars or consumer applications

SPECIFIC PRECAUTIONS

. HW2100LF is protected against reversed polarity.

. If you wish to use HW2100LF in a chemical atmosphere not listed above, consult us.



Dim	Min (mm)	Max (mm)
A	9.75	10.25
B	4.00	4.50
C	53	55
D	10.9	11.4
E*	200	250

** Specific lenght available on request*

Wire	Color	Function
W1	White	Ground
W2	Blue	Supply Voltage
W3	Yellow	Humidity Output Voltage