TEMPERATURE AND HUMIDITY MODULE

HTF 3130

*Based on the rugged HTS2030SMD humidity sensor, HTF3130 is a dedicated **humidity and temperature transducer** designed for OEM applications where a reliable and accurate measurement is needed. It features a very small size for easy, cost-effective mechanical mounting. Direct interface with a micro-controller is made possible with the module's linear **frequency output**.*

MAIN FEATURES

- **One of the smallest humidity / temperature modules on the market.**
- **Stable,proportional frequency output from 0 to 99% RH.**
- **Calibrated within +/- 3% RH @ 55% RH at 5.00 VDC.**
- **High quality thermistor**
- Stable characteristics with temperature.
- High reliability and long term stability.

HUMIDITY SENSOR SPECIFIC FEATURES

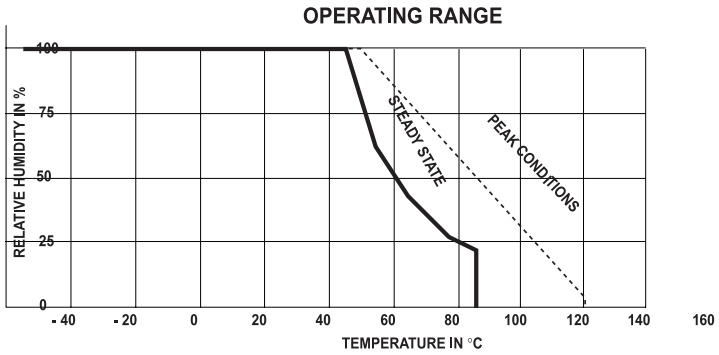
- **Instantaneous de-saturation after long periods in saturation phase.**
- **Fast response time.**
- **High resistance to chemicals.**
- Not affected by water immersion.
- Patented solid polymer structure.

TEMPERATURE SENSOR SPECIFIC FEATURES

- **10 K +/- 3% NTC temperature sensor**
- Stable
- High sensitivity

MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Storage Temperature	Tstg	-40 to 105	°C
Storage Humidity Range	RHstg	0 to 100	% RH
Supply Voltage (Peak)	Vs	16	Vdc
Humidity Operating Range	RH	0 to 99	% RH
Temperature Operating Range	Ta	-40 to 85	°C

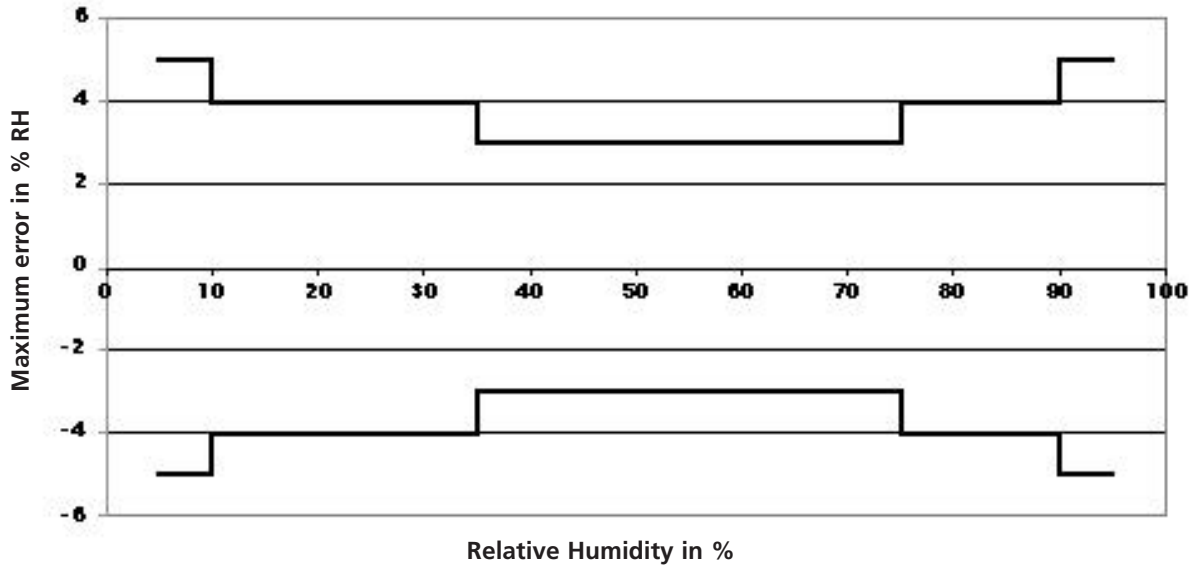


CHARACTERISTICS

Humidity sensor (Ta = 25°C, Vs = 5.00Vdc , R_L > 100 KΩ unless otherwise stated)

Characteristics	Symbol	Min.	Typ.	Max.	Unit.
Humidity metrology range	RH	10		95	% RH
Relative Humidity accuracy (10 to 95 % RH)	RH		+/- 3	+/- 5	% RH
Voltage supply	Vs	4	5.00	16	VdC
Nominal output @ RH = 55 % and 5.00VDC	Fout	6560	6600	6640	Hz
Current consumption	Ic			0.1	mA
Voltage supply influence (4 to 7 VDC)	RH		+/-1		% RH
Averaged Sensitivity from 33 % to 75 % RH	ΔFout / Δ RH	-10	- 11	-12	Hz/% RH
Sink current capability	Is		100		µA
Recovery time after 150 hours of condensation	t		10		s
Humidity Hysteresis			+/-1.5		% RH
Long term stability			0.5		% RH/yr
Time constant (33 to 76% RH, static, @63 %)	τ		1		s

Relative Humidity Accuracy of HTF 3130 @ 25°C

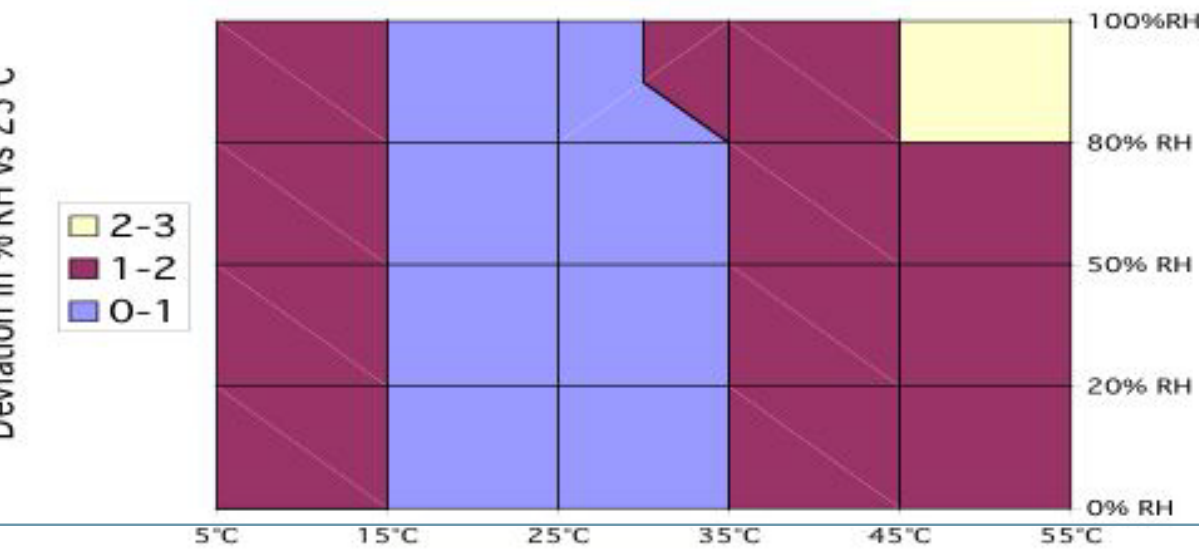


Modeled Signal output : $F_{out} = 7314 - 16.79*RH + 0.0886RH^2 - 0.000358RH^3$ with F_{out} in Hz and RH in %

Typical response look-up table (Polynomial Reference curve)

RH (%)	0	5	10	15	20	25	30	35	40	45	50
Fout (Hz)			7155	7080	7010	6945	6880	6820	6760	6705	6650
RH (%)	55	60	65	70	75	80	85	90	95	100	
Fout (Hz)	6600	6550	6500	6450	6400	6355	6305	6260	6210		

Temperature influence on HTF3130 humidity measurement



Calibration data are traceable to NIST standards through CETIAT laboratory.

CHARACTERISTICS

Temperature sensor (Ta = 25°C)

Characteristics	Symbol	Min.	Typ.	Max.	Unit.
Nominal resistance @ 25°C			**10**		**kΩ**
Beta value : B25/100	**B**	**3600**	**3730**	**3800**	
Temperature measuring range	**Ta**	**- 40**		**85**	**°C**
Nominal Resistance Tolerance at 25°C	**Rn**		**2**	**3**	**%**
B value tolerance	**B**		**3**		**%**
Response Time	τ		**10**		**s**

Typical temperature output

Depending on the needed temperature measurement range and associated accuracy, we suggest two methods to access to the NTC resistance values.

① $$R_T = R_N * e^{B\left(\frac{1}{T} - \frac{1}{T_N}\right)}$$

R_T NTC resistance in Ωat temperature T in K

R_N NTC resistance in Ωat rated temperature in K

T, T_N Temperature in K

B B value,material-specific constant of the NTC thermistor

e Base of natural logarithm (e =2.71828)

The actual characteristic of an NTC thermistor can, however, only be roughly described by the exponential relation,as the material parame ter B in reality also depends on temperature. So this approach is only suitable for describing a restricted range around the rated temperature or resistance with sufficient accuracy.

② For practical applications a more precise description of the real R/T curve may be required. Either more complicated approaches (e.g the Steinhart-Hart equation) are used or the resistance/ temperature relation as given in tabulated form. The below table has been experimentally determined with utmost accuracy for temperature increments of 1 degree.

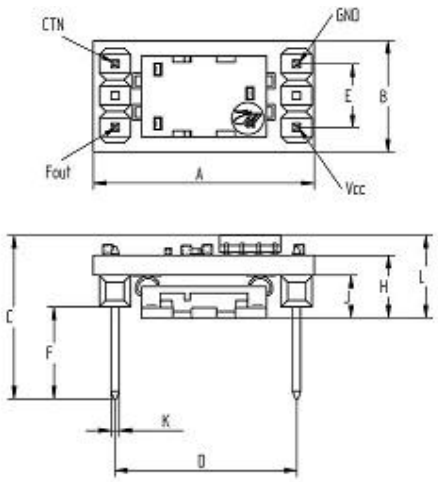
Temperature °C	Resistance (ohm)	Max. Deviation
-40	262960	35403
-38	232539	30358
-36	206064	26075
-34	182852	22416
-32	162498	19290
-30	144790	16636
-28	129054	14343
-26	115243	12383
-24	103115	10705
-22	92354	9257
-20	82923	8020
-19	78581	7463
-18	74497	6947
-17	70655	6468
-16	67039	6023
-15	63591	5606
-14	60381	5222
-13	57356	4865
-12	54503	4533
-11	51813	4225
-10	49204	3932
-9	46767	3662
-8	44467	3411
-7	42296	3177
-6	40247	2960
-5	38279	2756
-4	36455	2568
-3	34731	2393
-2	33100	2230
-1	31557	2078
0	30029	1932
1	28627	1799
2	27299	1675
3	26042	1560
4	24852	1452
5	23773	1355
6	22708	1261
7	21698	1174
8	20739	1093
9	19829	1017
10	18959	946
11	18128	879
12	17338	817
13	16588	759
14	15876	705
15	15207	654
16	14569	607
17	13962	563
18	13384	522
19	12834	484
20	12280	447
21	11777	413
22	11297	382
23	10840	353
24	10404	325
25	**10000**	**300**
26	9600	300
27	9218	300
28	8853	299
29	8506	297
30	8178	296
31	7866	294
32	7568	292
33	7283	290
34	7011	287
35	6734	284
36	6484	281
37	6244	278
38	6015	275
39	5796	271
40	5575	267
41	5373	264
42	5180	260
43	4995	257
44	4817	253
45	4636	248
46	4473	245
47	4316	241
48	4166	237
49	4021	233
50	3874	229
51	3737	225
52	3606	221
53	3481	217
54	3360	213
55	3237	208
56	3126	204
57	3019	200
58	2917	197
59	2819	193
60	2720	189
61	2629	185
62	2542	182
63	2458	178
64	2378	175
65	2304	171
66	2229	168
67	2158	165
68	2089	161
69	2022	158
70	1960	155
71	1898	152
72	1839	149
73	1782	146
74	1727	143
75	1673	140
77	1573	135
79	1480	130
81	1390	124
83	1310	119
85	1235	115

QUALIFICATION PROCESS

Resistance to physical and chemical stresses

- ***HTF3130*** has passed through qualification processes of HUMIREL including vibration, shock, storage, high temperature and humidity, ESD.
- Additional tests under harsh chemical conditions demonstrate good operation in presence of salt atmosphere, SO2 (0.5%, H2S (0.5%), 03, NOx, NO, CO, CO2, Softener , Soap, Toluene, acids (H2SO4, HNO3, HCl), HMDS, Insecticide, Cigarette smoke, a non exhaustive list.
- **HTF3130** is not light sensitive.

PACKAGE OUTLINE HTF3130



Dim	A	B	C	D	E	F	G
Min	17.5	8.5	12.7	14.37	4.88	6.9	
Max	18.5	9.5	13.7	14.77	5.28	7.9	

Dim	J	H	L	K
Min	2.4	4.0	5.4	0.5
Max	3.4	5.0	6.8	0.7

Dimensions in millimeters

Connector type : upon request, customized connectors are available
to be mated with your female connector or PCB

ORDERING INFORMATION : HPP808D007

HTF3130 : Humidity Frequency output + NTC (Temperature direct output)

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