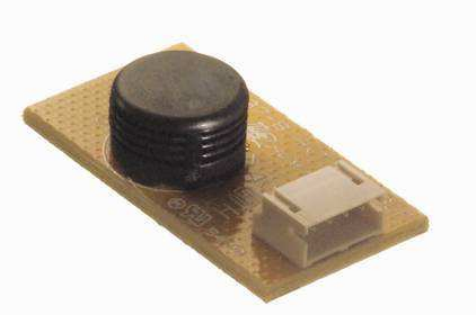
HTF3226LF – Temperature and Humidity Module



- **Full Lead free product**
- **Calibrated within +/-5% @55%RH**
- **Small size and very cost effective**
- **Miniature connector (JST)**
- **10kOhms +/-3% NTC temperature sensor (1% optional)**

DESCRIPTION

Based on the rugged HS1101LF humidity sensor, HTF3226**LF** is a dedicated **humidity and temperature transducer** designed for OEM applications where a reliable and accurate measurement is needed. It features a miniature connector for easy, cost-effective mechanical mounting. Direct interface with a micro-controller is made possible with the module's linear **frequency output**.

FEATURES

- The best combination of cost effectiveness and performance
- Stable, linear proportional frequency output from 10% to 95%RH
- Stable and reproducible 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

- High quality thermistor
- Stable
- High sensitivity

APPLICATIONS

- Printers
- Home Appliance

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PERFORMANCE SPECS

MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Storage Temperature	Tstg	-40 to 85	℃
Storage Humidity	RHstg	0 to 100	% RH
Supply Voltage (Peak)	Vs	7	Vdc
Humidity Operating Range	RH	0 to 99	% RH
Temperature Operating Range	Ta	-30 to 85	℃

Peak conditions: less than 10% of the operating time.

ELECTRICAL CHARACTERISTICS

(Ta=25℃, Vs=5Vdc +/-5%, R_L>100kΩ unless otherwise stated)

Humidity Characteristics	Symbol	Min	Typ	Max	Unit
Humidity Measuring Range	RH	1		99	%RH
Relative Humidity Accuracy (10 to 95% RH)	RH		+/-5	+/-10	%RH
Supply Voltage	Vs	4.75	5.00	5.25	Vdc
Nominal Output @55%RH (1)	Fout	8670	8750	8830	Hz
Current consumption	Ic			0.1	mA
Temperature Coefficient (0 to 60℃)	T_{cc}		-0.2		%RH/℃
Average Sensitivity from 33% to 75%RH	ΔFout/ΔRH	-13	-14	-16	Hz/%RH
Condensing conditions output (100% RH)	Fout	8000		8300	Hz
Recovery time after 150 hours of condensation	tr		10		s
Humidity Hysteresis				+/-1	%RH
Long term stability	T		+/-0.5		%RH/yr
Time Constant (at 63% of signal, static) 33% to 76%RH	τ			10	s

Temperature Characteristics	Symbol	Min	Typ	Max	Unit
Nominal Resistance @25℃	R		10		kΩ
Beta value: B25/100	β	3600	3730	3800	
Temperature Measuring Range	Ta	-30		80	℃
Nominal Resistance Tolerance @25℃	R_N		2	3	%
Beta Value Tolerance	β		3		%
Response Time	τ		10		s

TYPICAL PERFORMANCE CURVES

HUMIDITY SENSOR

- **Modeled signal output**

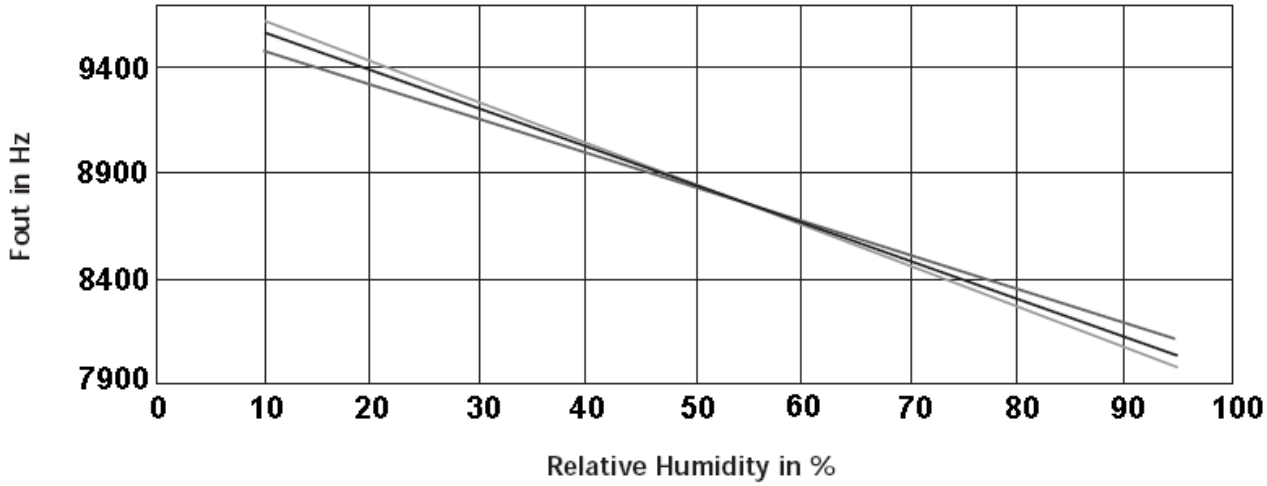
Linear Reference Curve: **Fout (Hz) = 9595 – 14.8*RH** with Fout in Hz and RH in %

Second Order Curve: **Fout (Hz) = 9659 – 18.79*RH + 0.0404*RH²** with Fout in Hz and RH in %

- **Typical response look-up table**

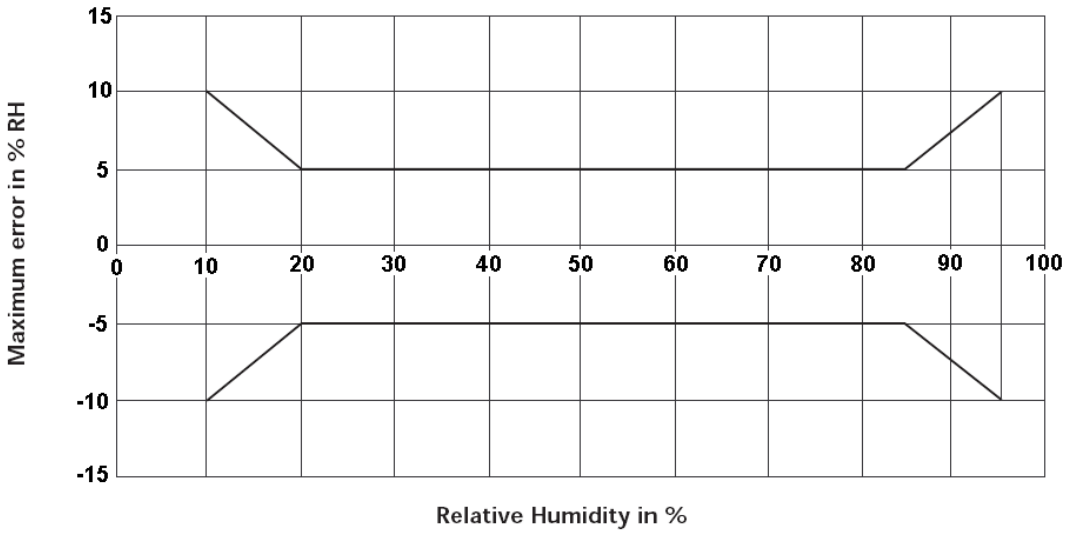
RH (%)	0	5	10	15	20	25	30	35	40	45	50
Fout (Hz)	-	-	9490	9390	9295	9205	9125	9040	8965	8890	8820
RH (%)	55	60	65	70	75	80	85	90	95	100	
Fout (Hz)	8750	8680	8615	8550	8485	8420	8355	8290	8225	-	

- **Typical, Minimum and Maximum Frequency Values for HTF3226LF**



Calibration data are traceable to NIST standards through CETIAT laboratory.

- **Relative Humidity Accuracy of HTF3226LF**



TEMPERATURE SENSOR

- **Typical temperature output**

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

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

R_T	NTC resistance in Ω at temperature T in K
R_N	NTC resistance in Ω at rated temperature T in K
T, T_N	Temperature in K
β	Beta value, material specific constant of NTC
e	Base of natural logarithm (e=2.71828)

① The exponential relation only roughly describes the actual characteristic of an NTC thermistor can, however, as the material parameter β in reality also depend on temperature. So this approach is 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 tabulation form. The below table has been experimentally determined with utmost accuracy for temperature increments of 1 degree.

Actual values may also be influenced by inherent self-heating properties of NTCs. Please refer to MEAS-France Application Note HPC106 “Low power NTC measurement”.

- **Temperature look-up table**

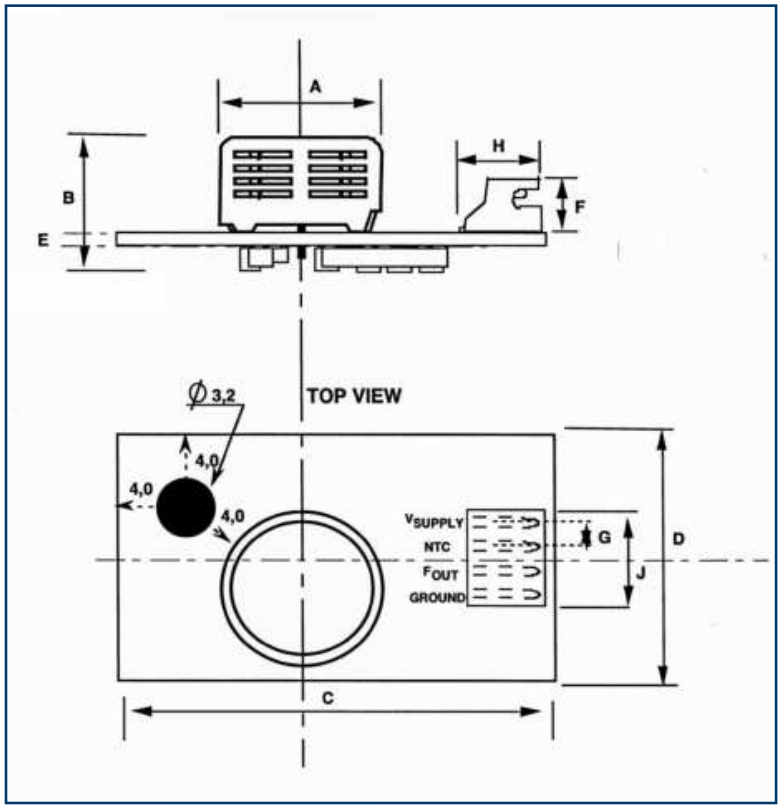
Temp (℃)	Rout (Ω)	Max Dev (Ω)	Temp (℃)	Rout (Ω)	Max Dev (Ω)	Temp (℃)	Rout (Ω)	Max Dev (Ω)	Temp (℃)	Rout (Ω)	Max Dev (Ω)
-30	144790	16636	**-2**	33100	2230	**26**	9600	300	**54**	3360	213
-29	136664	15444	**-1**	31557	2078	**27**	9218	300	**55**	3237	208
-28	129054	14343	**0**	30029	1932	**28**	8853	299	**56**	3126	204
-27	121925	13325	**1**	28627	1799	**29**	8506	297	**57**	3019	200
-26	115243	12383	**2**	27299	1675	**30**	8178	296	**58**	2917	197
-25	109030	11516	**3**	26042	1560	**31**	7866	294	**59**	2819	193
-24	103115	10705	**4**	24852	1452	**32**	7568	292	**60**	2720	189
-23	97565	9953	**5**	23773	1355	**33**	7283	290	**61**	2629	185
-22	92354	9257	**6**	22708	1261	**34**	7011	287	**62**	2542	182
-21	87460	8612	**7**	21698	1174	**35**	6734	284	**63**	2458	178
-20	82923	8020	**8**	20739	1093	**36**	6484	281	**64**	2378	175
-19	78581	7463	**9**	19829	1017	**37**	6244	278	**65**	2304	171
-18	74497	6947	**10**	18959	946	**38**	6015	275	**66**	2229	168
-17	70655	6468	**11**	18128	879	**39**	5796	271	**67**	2158	165
-16	67039	6023	**12**	17338	817	**40**	5575	267	**68**	2089	161
-15	63591	5606	**13**	16588	759	**41**	5373	264	**69**	2022	158
-14	60381	5222	**14**	15876	705	**42**	5180	260	**70**	1960	155
-13	57356	4865	**15**	15207	654	**43**	4995	257	**71**	1898	152
-12	54503	4533	**16**	14569	607	**44**	4817	253	**72**	1839	149
-11	51813	4225	**17**	13962	563	**45**	4636	248	**73**	1782	146
-10	49204	3932	**18**	13384	522	**46**	4473	245	**74**	1727	143
-9	46767	3662	**19**	12834	484	**47**	4316	241	**75**	1673	140
-8	44467	3411	**20**	12280	447	**48**	4166	237	**76**	1622	138
-7	42296	3177	**21**	11777	413	**49**	4021	233	**77**	1573	135
-6	40247	2960	**22**	11297	382	**50**	3874	229	**78**	1526	132
-5	38279	2756	**23**	10840	353	**51**	3737	225	**79**	1480	130
-4	36455	2568	**24**	10404	325	**52**	3606	221	**80**	1432	127
-3	34731	2393	**25**	10000	300	**53**	3481	217			

QUALIFICATION PROCESS

RESISTANCE TO PHYSICAL AND CHEMICAL STRESSES

- HTF3226LF has passed through qualification processes of MEAS-FRANCE 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, HCI), HMDS, Insecticide, Cigarette smoke, this is not an exhaustive list.
- HTF3226LF is not light sensitive.

PACKAGE OUTLINE



Dim	A	B	C	D	E	F	G	H	I	Ø
Min	9.7	8.5	28.0	14.5	1.5	3.5	1.45	4.8	7.3	3.0
Max	10.8	9.5	29.0	15.5	1.7	3.9	1.55	6.2	7.7	3.4

Dimensions in millimeters

Connector type: JST Model S4B-ZR
To be mated with ZHR or 04ZR type female connectors

ORDERING INFORMATION

HPP808G031 (MULTIPLE PACKAGE QUANTITY OF 50 PIECES)

HTF3226LF – HUMIDITY FREQUENCY OUTPUT + NTC (TEMPERATURE DIRECT OUTPUT)

Sample kit of HTF3226LF is available through MEASUREMENT SPECIALTIES web site:
http://www.meas-spec.com/humidity-sensors.aspx

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Revision	Comments	Who	Date
E	Standardized datasheet format	D. LE GALL	April 08
F	New MEAS template, MEAS-France contact details updated	D. LE GALL-ZIRILLI	October 12

Mouser Electronics

Authorized Distributor

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Measurement Specialties:

HTF3226LF