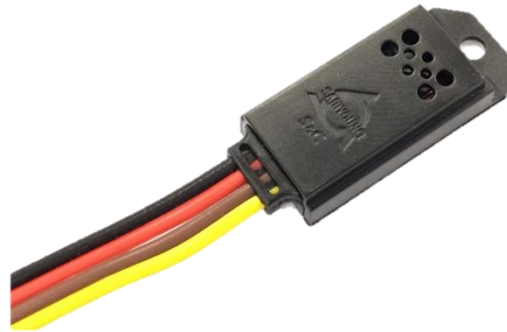


HCPV-301H-10

HumiChipII® Voltage Output Humidity & Temperature Sensor

Features

- ◆ Linear & Calibrated %RH Voltage Output
- ◆ SMD NTC with inner electrodes
- ◆ Rigid & Strong Molded Package
 - for Durability and Easy Installation
- ◆ Customized Accuracy

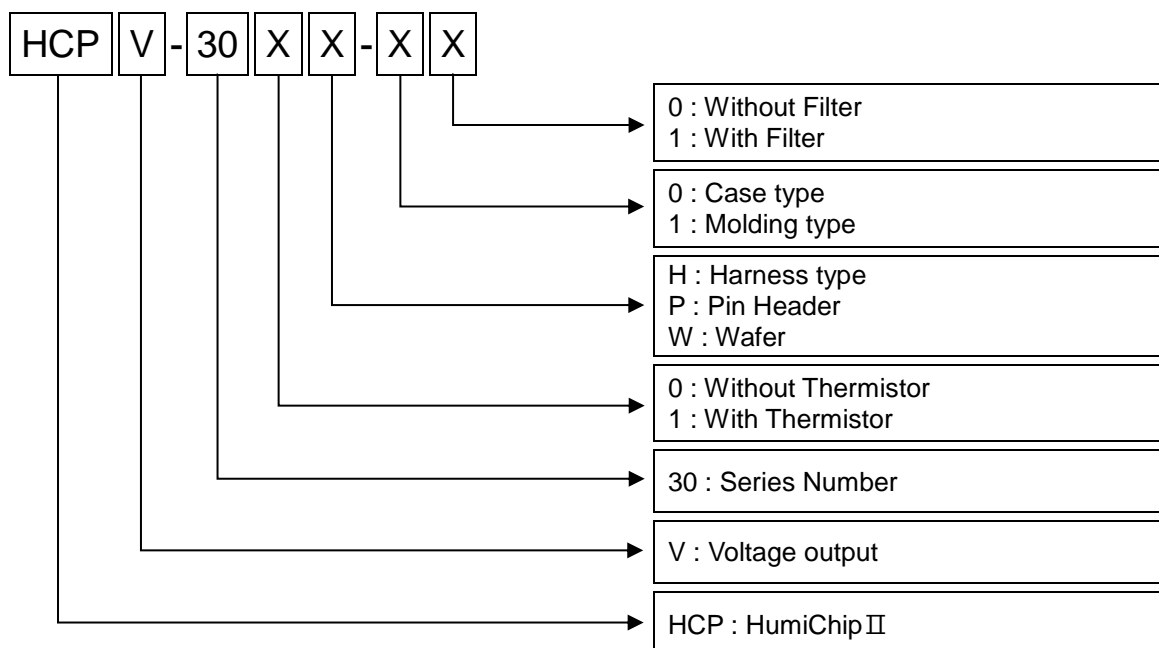


Product Summary

HCPV-301H-10 is an accurate and reliable humidity measuring sensor module based on [HumiChipII®](#).

The humidity output of the sensor is temperature compensated and is in linear voltage which can be directly interfaced with a microcomputer with an ADC input. The molded package and reinforced connection between the sensor and the harness ensures durability and reliability even in harsh environment.

Part Number



Electrical Specification

Parameter	Symbol	Value	Unit
Supply Voltage	V_{cc}	5.0	V
Current Consumption	I_{cc}	1.5	mA

Environmental

Parameter	Symbol	Value	Unit
Operating Temperature Range	T_s	-40 ~ 85	°C
Storage Temperature Range	T_{stg}	-55 ~ 125	°C
Operating Humidity Range	RH	0 ~ 100	%RH

Sensor performance

Relative Humidity (RH%)

Humidity Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V_{cc}	4.75	5.00	5.25	V
Nominal Output @50%RH	H_{VOUT}	2.232	2.350	2.468	V
Humidity Measuring Range	RH	0		100	%RH
Relative Humidity Accuracy		-5		+5	%RH
Humidity Hysteresis		-2		+2	%RH
Humidity Average Sensitivity			26.23		mV/%RH
Temperature Coefficient	T_{cc}		-0.05		%RH/°C
Response Time ($\tau_{63\%}$)			7.0		sec

Temperature (°C)

Temperature Characteristics		Symbol	Min.	Typ.	Max.	Unit
Temperature Measuring Range		T _a	-40		85	°C
Nominal Resistance @25°C		R	4.950	5.000	5.050	kΩ
Beat Value : B25/85		B	3938	3977	4016	K
Normal Resistance Tolerance @°C		T		1		%
B Value Tolerance		B		1		%
Response Time (τ63%)	Thermistor unit ¹⁾				5	sec
	Module Assy's unit ²⁾				115	sec

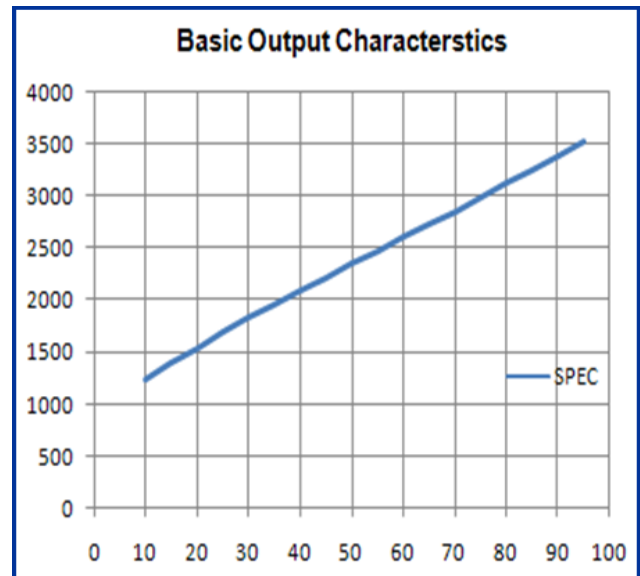
1) evaluates reaching time at 56.6°C which is 63.2% of 25°C → 75°C (Resistance Value of 56.6°C : 1.436kΩ(Ref.))

2) evaluates reaching time at 72.4°C which is 63.2% of 25°C → 75°C (Resistance Value of 72.4°C : 818Ω(Ref.))

Humidity Look-up Table (@25°C)

Reference Output Values (Vcc=5V)

%RH	Vout(mV)	%RH	Vout(mV)
10	1235	55	2480
15	1390	60	2605
20	1540	65	2730
25	1685	70	2860
30	1825	75	2990
35	1960	80	3125
40	2090	85	3260
45	2220	90	3400
50	2350	95	3530



Polynomial Equations :

$$H_V_{out} [mV] = 8.439 \times 10^{-4} \times RH^3 - 0.1485 \times RH^2 + 34.16 \times RH + 908.5$$

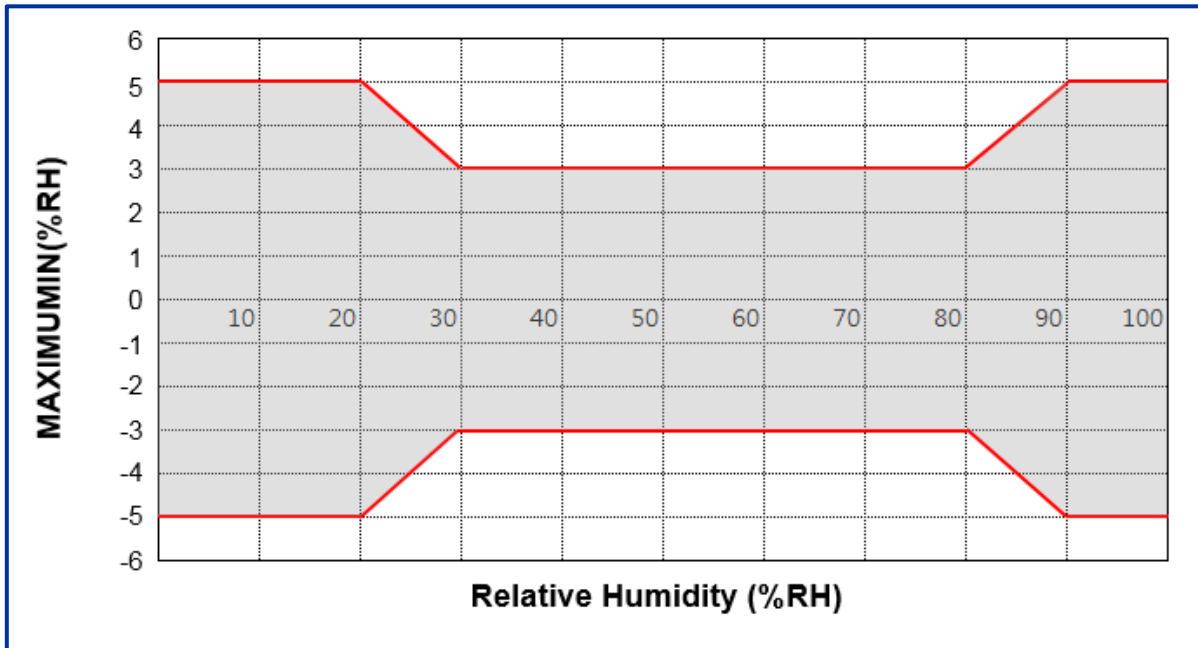
$$RH [%] = -1.56 \times 10^{-9} \times V_{out}^3 + 1.205 \times 10^{-5} \times V_{out}^2 + 8.22 \times 10^{-3} \times V_{out} - 15.6$$

Linear Equations :

$$H_V_{out} [mV] = 26.23 \times RH + 1032$$

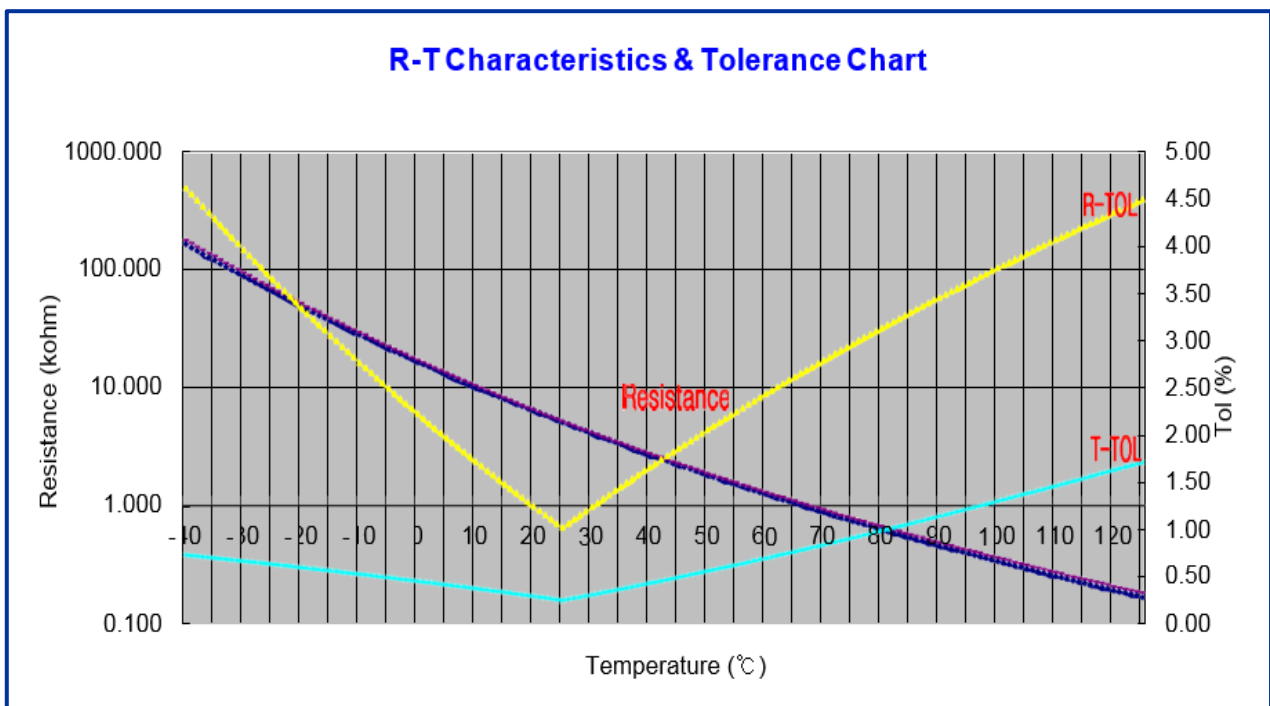
$$RH [%] = 0.03812 \times V_{out} - 39.36$$

Relative Humidity Accuracy



HCPV series sensor module is able to measure accuracy humidity optimized within 10 to 95%RH. This sensor accuracy is the range $\pm 3\%RH$ in 30%~80%RH, and the range $\pm 5\%RH$ in less than 30%RH and over 80%RH.

Temperature Look-up Table



TEMP. (°C)	RESISTANCE (kΩ)			RESIST.-TOL. (%)		TEMP.-TOL. (°C)	
	MIN.	CENTER	MAX.	MAX.	MIN.	MAX.	MIN.
-40	159.726	167.101	174.800	4.41	4.61	0.68	0.71
-39	149.821	156.637	163.748	4.35	4.54	0.67	0.70
-38	140.578	146.880	153.448	4.29	4.47	0.67	0.70
-37	131.950	137.777	143.847	4.23	4.41	0.66	0.69
-36	123.894	129.283	134.893	4.17	4.34	0.66	0.68
-35	116.370	121.355	126.541	4.11	4.27	0.65	0.68
-34	109.341	113.952	118.747	4.05	4.21	0.64	0.67
-33	102.771	107.039	111.472	3.99	4.14	0.64	0.66
-32	96.629	100.579	104.680	3.93	4.08	0.63	0.66
-31	90.886	94.542	98.336	3.87	4.01	0.63	0.65
-30	85.513	88.899	92.409	3.81	3.95	0.62	0.64
-29	80.485	83.621	86.870	3.75	3.89	0.61	0.64
-28	75.779	78.684	81.691	3.69	3.82	0.61	0.63
-27	71.373	74.064	76.848	3.63	3.76	0.60	0.62
-26	67.246	69.739	72.318	3.57	3.70	0.60	0.62
-25	63.380	65.690	68.078	3.52	3.64	0.59	0.61
-24	59.756	61.897	64.109	3.46	3.57	0.58	0.60
-23	56.358	58.344	60.393	3.40	3.51	0.58	0.60
-22	53.172	55.013	56.912	3.35	3.45	0.57	0.59
-21	50.183	51.890	53.650	3.29	3.39	0.56	0.58
-20	47.379	48.962	50.592	3.23	3.33	0.56	0.57
-19	44.746	46.214	47.726	3.18	3.27	0.55	0.57
-18	42.273	43.635	45.037	3.12	3.21	0.54	0.56
-17	39.951	41.215	42.514	3.07	3.15	0.54	0.55
-16	37.769	38.942	40.147	3.01	3.09	0.53	0.55
-15	35.718	36.806	37.924	2.96	3.04	0.53	0.54
-14	33.790	34.800	35.836	2.90	2.98	0.52	0.53
-13	31.976	32.914	33.875	2.85	2.92	0.51	0.53
-12	30.270	31.140	32.032	2.79	2.86	0.51	0.52
-11	28.664	29.472	30.299	2.74	2.81	0.50	0.51

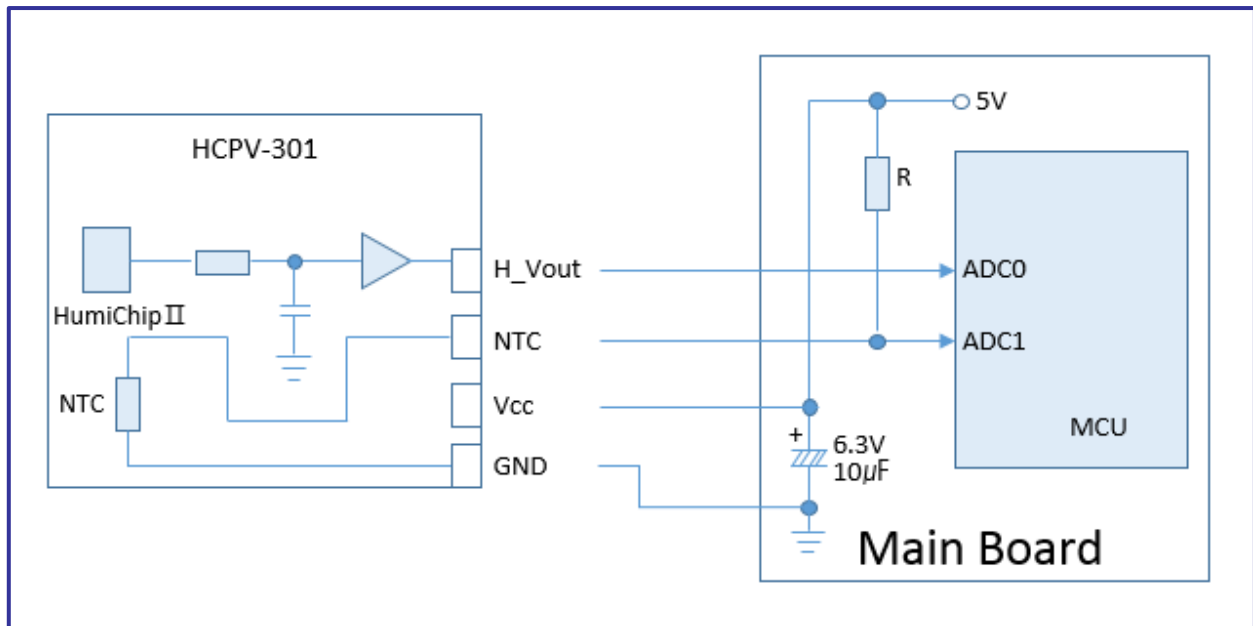
TEMP. (°C)	RESISTANCE (kΩ)			RESIST.-TOL. (%)		TEMP.-TOL. (°C)	
	MIN.	CENTER	MAX.	MAX.	MIN.	MAX.	MIN.
-10	27.152	27.902	28.670	2.69	2.75	0.49	0.50
-9	25.729	26.425	27.137	2.63	2.70	0.49	0.50
-8	24.388	25.034	25.695	2.58	2.64	0.48	0.49
-7	23.124	23.725	24.338	2.53	2.58	0.47	0.48
-6	21.933	22.491	23.060	2.48	2.53	0.46	0.47
-5	20.810	21.328	21.856	2.43	2.48	0.46	0.47
-4	19.751	20.232	20.721	2.37	2.42	0.45	0.46
-3	18.752	19.198	19.652	2.32	2.37	0.44	0.45
-2	17.809	18.223	18.645	2.27	2.31	0.44	0.45
-1	16.918	17.303	17.694	2.22	2.26	0.43	0.44
0	16.077	16.434	16.797	2.17	2.21	0.42	0.43
1	15.283	15.614	15.951	2.12	2.16	0.42	0.42
2	14.533	14.840	15.152	2.07	2.10	0.41	0.41
3	13.823	14.108	14.398	2.02	2.05	0.40	0.41
4	13.152	13.417	13.686	1.97	2.00	0.39	0.40
5	12.518	12.763	13.012	1.92	1.95	0.39	0.39
6	11.918	12.145	12.376	1.87	1.90	0.38	0.38
7	11.350	11.561	11.775	1.83	1.85	0.37	0.38
8	10.812	11.008	11.206	1.78	1.80	0.36	0.37
9	10.303	10.484	10.668	1.73	1.75	0.36	0.36
10	9.820	9.989	10.159	1.68	1.70	0.35	0.35
11	9.363	9.519	9.676	1.64	1.65	0.34	0.34
12	8.930	9.074	9.220	1.59	1.60	0.33	0.34
13	8.520	8.653	8.788	1.54	1.56	0.33	0.33
14	8.130	8.254	8.378	1.49	1.51	0.32	0.32
15	7.761	7.875	7.990	1.45	1.46	0.31	0.31
16	7.410	7.516	7.622	1.40	1.41	0.30	0.30
17	7.078	7.175	7.273	1.36	1.37	0.29	0.30
18	6.762	6.852	6.942	1.31	1.32	0.29	0.29
19	6.462	6.545	6.628	1.27	1.27	0.28	0.28
20	6.177	6.253	6.330	1.22	1.23	0.27	0.27

TEMP. (°C)	RESISTANCE (kΩ)			RESIST.-TOL. (%)		TEMP.-TOL. (°C)	
	MIN.	CENTER	MAX.	MAX.	MIN.	MAX.	MIN.
21	5.906	5.976	6.047	1.18	1.18	0.26	0.26
22	5.649	5.713	5.778	1.13	1.13	0.25	0.25
23	5.404	5.464	5.523	1.09	1.09	0.24	0.24
24	5.171	5.226	5.281	1.04	1.04	0.24	0.24
25	4.950	5.000	5.050	1.00	1.00	0.23	0.23
26	4.735	4.785	4.835	1.04	1.04	0.24	0.24
27	4.531	4.581	4.631	1.09	1.09	0.25	0.25
28	4.337	4.386	4.436	1.13	1.13	0.26	0.26
29	4.152	4.201	4.250	1.17	1.18	0.27	0.27
30	3.976	4.025	4.074	1.21	1.22	0.28	0.29
31	3.808	3.857	3.905	1.26	1.26	0.30	0.30
32	3.649	3.697	3.745	1.30	1.31	0.31	0.31
33	3.497	3.544	3.592	1.34	1.35	0.32	0.32
34	3.352	3.399	3.446	1.38	1.39	0.33	0.33
35	3.214	3.260	3.307	1.42	1.43	0.34	0.35
36	3.082	3.128	3.174	1.46	1.47	0.35	0.36
37	2.957	3.002	3.048	1.50	1.52	0.37	0.37
38	2.837	2.882	2.927	1.54	1.56	0.38	0.38
39	2.723	2.767	2.811	1.58	1.60	0.39	0.39
40	2.614	2.658	2.701	1.62	1.64	0.40	0.41
41	2.510	2.553	2.596	1.66	1.68	0.42	0.42
42	2.411	2.453	2.495	1.70	1.72	0.43	0.43
43	2.316	2.358	2.399	1.74	1.76	0.44	0.45
44	2.226	2.266	2.307	1.78	1.80	0.45	0.46
45	2.139	2.179	2.219	1.82	1.84	0.46	0.47
46	2.057	2.096	2.135	1.86	1.88	0.48	0.48
47	1.978	2.016	2.055	1.90	1.92	0.49	0.50
48	1.902	1.940	1.978	1.93	1.96	0.50	0.51
49	1.830	1.867	1.904	1.97	2.00	0.52	0.52
50	1.761	1.797	1.834	2.01	2.04	0.53	0.54

TEMP. (°C)	RESISTANCE (kΩ)			RESIST.-TOL. (%)		TEMP.-TOL. (°C)	
	MIN.	CENTER	MAX.	MAX.	MIN.	MAX.	MIN.
51	1.695	1.730	1.766	2.05	2.08	0.54	0.55
52	1.631	1.666	1.701	2.08	2.12	0.55	0.56
53	1.571	1.605	1.639	2.12	2.15	0.57	0.58
54	1.513	1.546	1.580	2.16	2.19	0.58	0.59
55	1.457	1.490	1.523	2.19	2.23	0.59	0.60
56	1.404	1.436	1.468	2.23	2.27	0.61	0.62
57	1.353	1.384	1.416	2.26	2.31	0.62	0.63
58	1.304	1.335	1.366	2.30	2.34	0.63	0.64
59	1.257	1.287	1.318	2.33	2.38	0.65	0.66
60	1.212	1.242	1.272	2.37	2.42	0.66	0.67
61	1.169	1.198	1.227	2.40	2.45	0.67	0.69
62	1.128	1.156	1.185	2.44	2.49	0.69	0.70
63	1.088	1.116	1.144	2.47	2.53	0.70	0.71
64	1.050	1.077	1.105	2.51	2.56	0.71	0.73
65	1.013	1.040	1.067	2.54	2.60	0.73	0.74
66	0.978	1.004	1.031	2.58	2.63	0.74	0.76
67	0.945	0.970	0.996	2.61	2.67	0.75	0.77
68	0.912	0.937	0.963	2.64	2.71	0.77	0.79
69	0.881	0.906	0.930	2.68	2.74	0.78	0.80
70	0.851	0.875	0.899	2.71	2.78	0.80	0.82
71	0.823	0.846	0.870	2.74	2.81	0.81	0.83
72	0.795	0.818	0.841	2.78	2.85	0.82	0.84
73	0.769	0.791	0.814	2.81	2.88	0.84	0.86
74	0.743	0.765	0.787	2.84	2.91	0.85	0.87
75	0.719	0.740	0.762	2.87	2.95	0.87	0.89
76	0.695	0.716	0.737	2.91	2.98	0.88	0.90
77	0.672	0.693	0.713	2.94	3.02	0.89	0.92
78	0.650	0.670	0.691	2.97	3.05	0.91	0.93
79	0.629	0.649	0.669	3.00	3.08	0.92	0.95
80	0.609	0.628	0.648	3.03	3.12	0.94	0.96

TEMP. (°C)	RESISTANCE (kΩ)			RESIST.-TOL. (%)		TEMP.-TOL. (°C)	
	MIN.	CENTER	MAX.	MAX.	MIN.	MAX.	MIN.
81	0.590	0.608	0.627	3.06	3.15	0.95	0.98
82	0.571	0.589	0.608	3.09	3.18	0.97	0.99
83	0.553	0.570	0.589	3.13	3.22	0.98	1.01
84	0.535	0.553	0.571	3.16	3.25	1.00	1.03
85	0.518	0.535	0.553	3.19	3.28	1.01	1.04

Basic Circuits (Application Circuit)

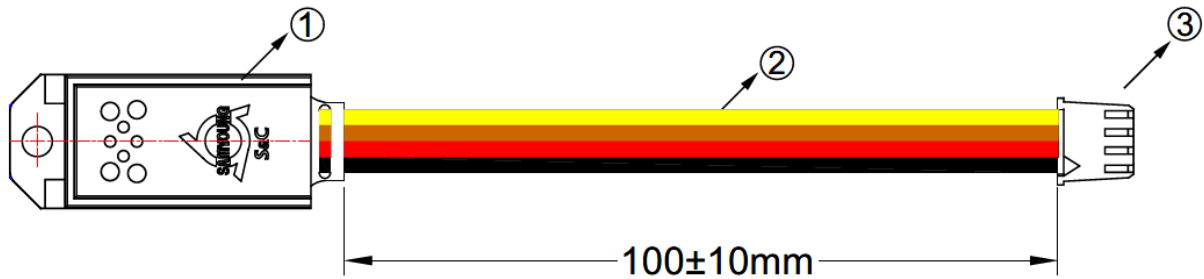


Dimensions

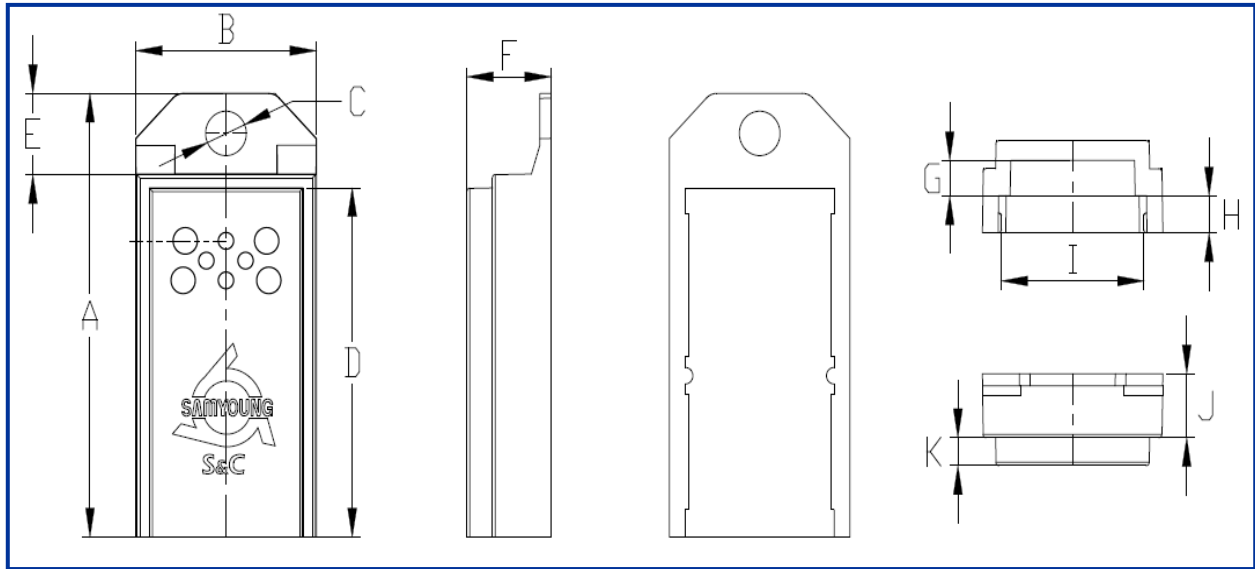
Parts Dimensions

HCPV- 301H-10

Unit : mm



No.	Component parts	Spec.	Qty.	Color	Maker	Remark
1	Case	PC (Polycarbonate)	1	BLACK		
	PCB	FR4	1			
	Sensor	HumiChipII	1		SAMYOUNG S&C	
2	Harness	UL 1007-AWG#24	1	YELLOW	SHINWHA	H-Vout
		UL 1007-AWG#24	1	BROWN	SHINWHA	NTC
		UL 1007-AWG#24	1	RED	SHINWHA	VCC
		UL 1007-AWG#24	1	BLACK	SHINWHA	GND
3	Housing	SMH250-04	1	WHITE	YEONHO	
	Terminal	YST025	4	SILVER	YEONHO	

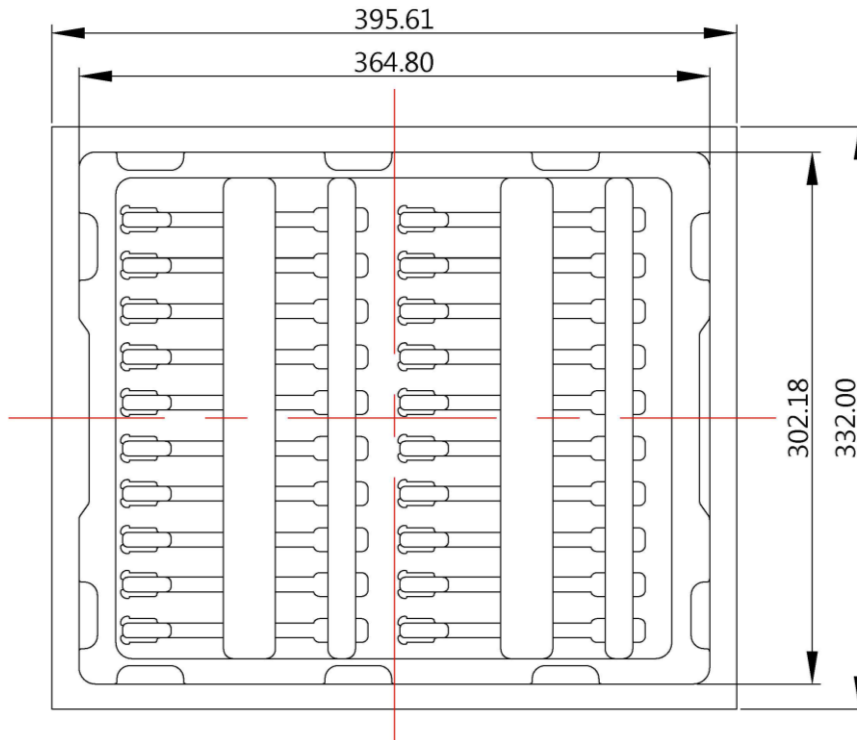


Type	Dimension(mm)
A	27.00 ± 0.35
B	12.00 ± 0.30
C	2.70Ø ± 0.25
D	21.25 ± 0.35
E	4.95 ± 0.25
F	5.60 ± 0.25
G	2.15 ± 0.25
H	2.25 ± 0.25
I	9.48 ± 0.25
J	3.90 ± 0.25
K	1.70 ± 0.25

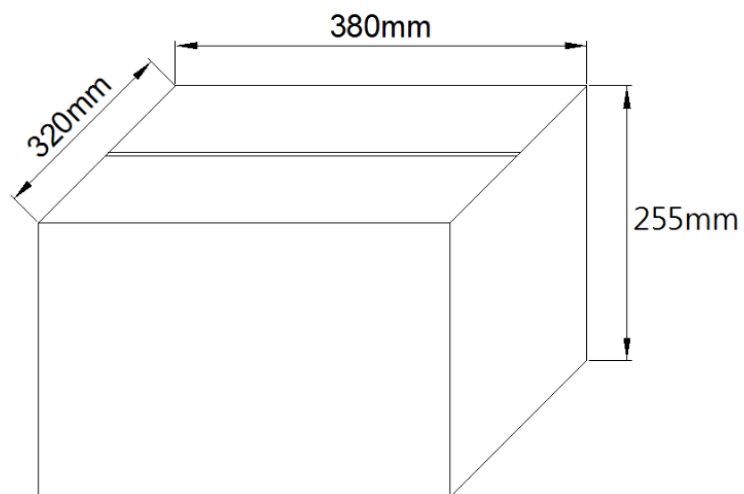
Packaging

Type	Quantity(pcs.)		Size (W × L × H mm)	
	Tray	Out box	Tray	Out box
HCPV-301H-10	20	400	364.8×302.18×17	380×320×255

Tray : 20 pcs / 1Tray (PS, 364.8×302.18×17mm)



Outlet box(380×320×255mm): 20 Trays (400pcs)



Revision History

Date	Version	Page(s)	Changes
04 Jan 2017	1.0		First Release



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