Approval　　　No. :　_____

Product　　　　　:　HUNIDITY SENSOR　　　　

UNIX Tech's Part No.　: HR601　　　　　　　

Customer's　Part No.　:　_____

Specifications　　　:　R$_{25}$　　$\pm$　2 % RH　　　　

　　　　　　　　　　　　　_____

Date　　　　　　　:　2017/05/28　　　　　　

## 1　Description

　　　　　　　　　　　　　　　　this product specification is applied to the Humidity Sensor Type HR601. The terminal electrode material uses Lead free solder (Sn/Ag/Cu ). This product is conformity with RoHS directive which means that lead, cadmium, mercury, hexavalent chromium and specific bromine-based flame retardants have not been used.

## 2　Applications

The applications of the component are used in relative humidity measurement, control and display. There are many end products can be used. For example air conditioner, humidifier, dehumidifier, hygrometer, recorder, transmitter,wine cabinet…etc.
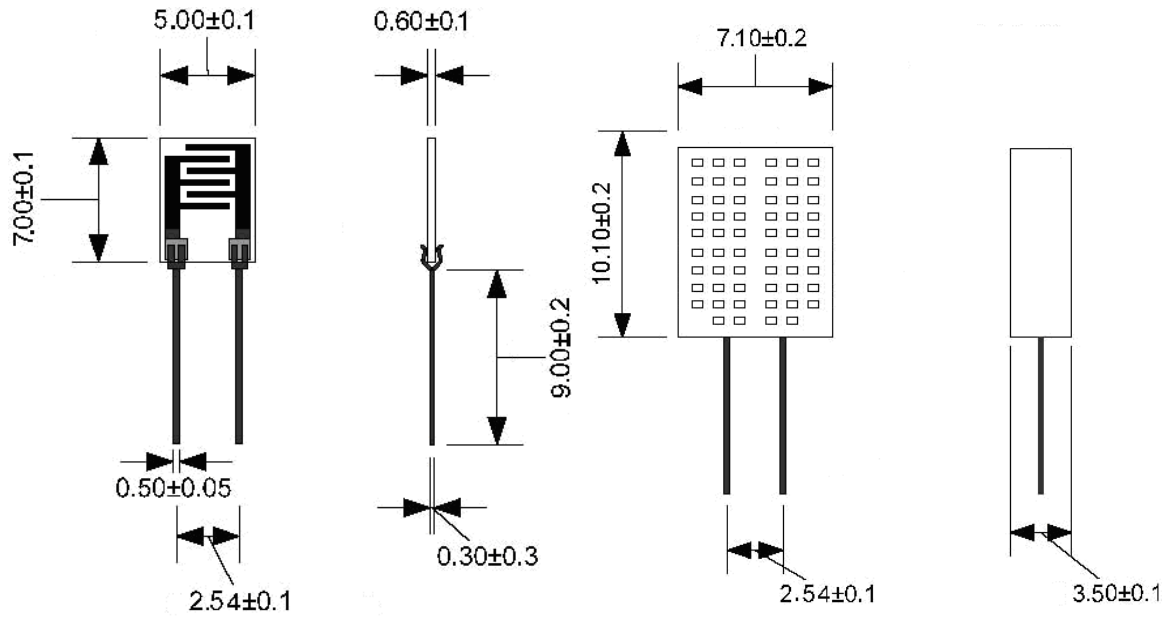
## 3　Model no.

HR　-　601

Polymer　resistive　humidity　sensor,

Product type
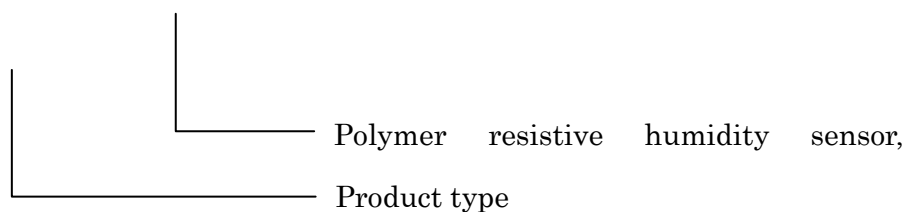
# 4　Configuration & main parts

### 4.1 Configuration



Units:mm

### 4.2　Main parts :

| No. | Parts | Reference |
|-----|-------|-----------|
| 1 | Sensor case | ABS |
| 2 | Substrate | Ceramic thick-film |
| 3 | Sensing material | Polymer |
| 4 | Electrode | Ag/Carbon |
| 5 | Lead frame | Phosphor bronze |

### 4.3　Electrical characteristics :

| | Units | Min. | Typ. | Max. |
|---|-------|------|------|------|
| Rated voltage | Vrms | - | - | 1 |
| Rated power | mA | - | - | 0.2 |
| Operating frequency range | kHz | 20 | 1 | 2000 |
| Operating temperature range | ℃ | 0 | - | 60 |
| Operating humidity range | %RH | 25 | - | 90 |
| Impedance range at 60%RH and 25℃** | kΩ | 27 | - | 33 |
| Humidity accuracy | %RH | -2 | - | +2 |
| Hysteresis (40%RH~80%RH) | %RH | - | - | 1 |
| Temperature dependence(reference) | %RH/℃ | - | 0.2 | - |

** Measurement by LCR meter at 1KHz, 1 Vrms (sine wave)

4.4    Relative humidity - Impedance – 25℃, 1kHz, 1 Vrms (sine wave)

| %RH | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
|---|---|---|---|---|---|---|---|---|
| Normal value (kΩ) | 1201 | 509 | 175.7 | 53.4 | 16 | 6.9 | 2.5 | 1.25 |

4.5    Relative humidity - Impedance curve is shown in page 5
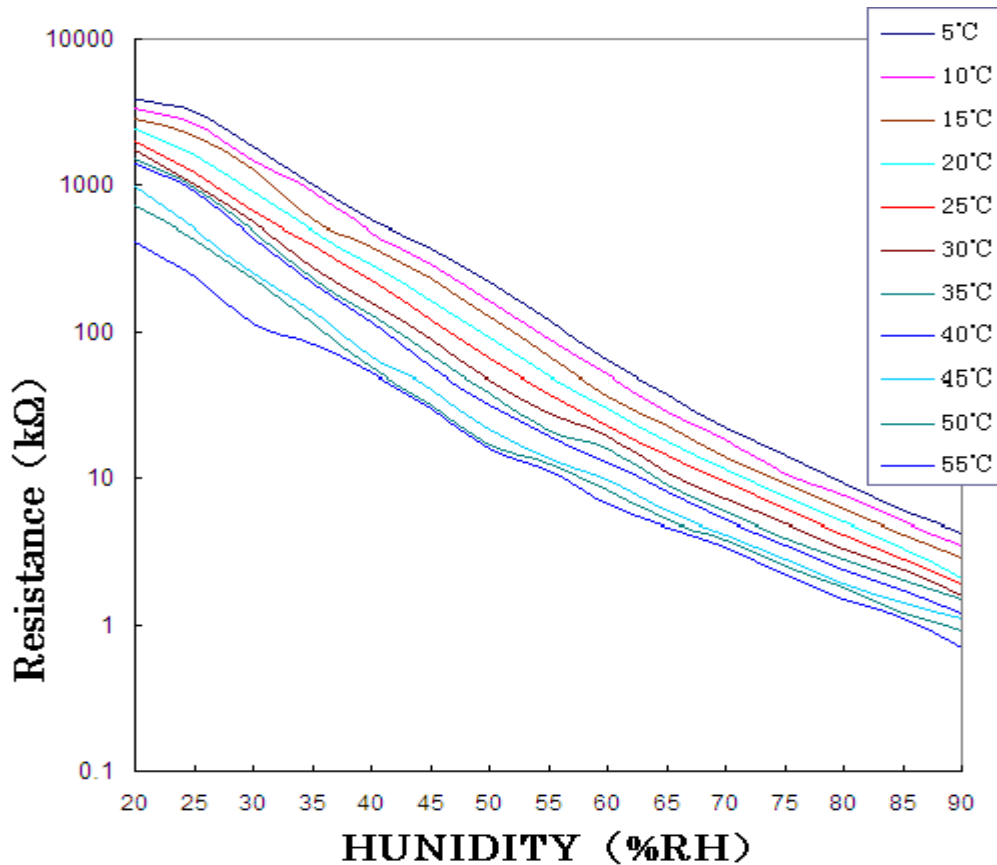


## 5   Mechanical characteristics :

| No. | Item | Description | Criteria* |
|---|---|---|---|
| 5.1 | Shock resistance | Drop down 3 times@80cm | No abnormal appearance & electrical properties |
| 5.2 | Vibration resistance | 2 hours each in the directions of X-Y-Z, at the frequency of 10-55Hz, and amplitude of 1.5mm | No abnormal appearance & electrical properties |
| 5.3 | Resistance to soldering heat | The lead terminal shall be Immersed by 3 mm from the substrate for 3 seconds in solder bath of 280±5℃ | No abnormal appearance & electrical properties |
| 5.4 | Strength of terminations | 500g@10 seconds in the axial direction of lead terminal | Secured |

## 6   Reliability Tests :

| No. | Test Item | Test Condition | Criteria |
|---|---|---|---|
| 1 | Drop Test | Drop the test piece naturally 3 times from the height of 1 m onto the lauan material of 30 mm thickness. | The sample shall not have any abnormality in the appearance and the humidity detection output shall be in the electric characteristics of item 5. |
| 2 | Lead Traction Intensity | The weight of 1 Kg is applied to the lead wire in the direction parallel to the sensor for 10 seconds. | |
| 3 | Lead Bending Intensity | The sensor is held vertically, and the weight of 250 g is hung from the lead wire end.    The sensor is bend in right angle, and returned to the original shape, and next bend in the same way to the reverse direction, and returned to original shape. | |
| 4 | Solder Heat Resistance | Do soldering of 5 +/-2 seconds long on the lead terminal 1.6 to 3.6 mm away from the case side with soldering iron tip temperature 280 +/-10 deg.C. | It should be without cominig-off of the terminal and within the electric characteristics of item 5. |
| 5 | Heat Shock | The samples are subjected to 10 cycles of 60 minutes' exposures of each of -25 degree and +70 degree.   (Do not let it have dewdrops.) | The variation of the humidity detection output shall be within +/-5 % against the initial value. |
| 6 | Exposure to High Temperature | The samples are exposed to a temp. of +70 degree for 1000 hrs. | |
| 7 | Exposure to High Humidity | The samples are exposed to a temp. of +40 degree with 95 %RH for 1000 hrs. | |
| 8 | Exposure to Low Temperature | The samples are exposed to a temp. of -25 degree for 1000 hrs. | |
| 9 | Exposure to Low Humidity | The samples are exposed to a temp. of +25 degree with 20 %RH for 1000 hrs. | |
| 10 | Load Life | The samples are subjected to consecutive electric load of AC 5V(1 kHz) at normal temperature and humidity for 1000 hrs. | |

* Note 1） The measurement of the humidity detection output is done after 15 minutes havepassed with the advantage way type precision humidity producing device after thetemperature humidity setting.

  Note 2） The measurement of the reliability test parts is done after they are left for more

than 2 hours in the normal temperature and the normal humidity.

## 7  Peripheral circuit :
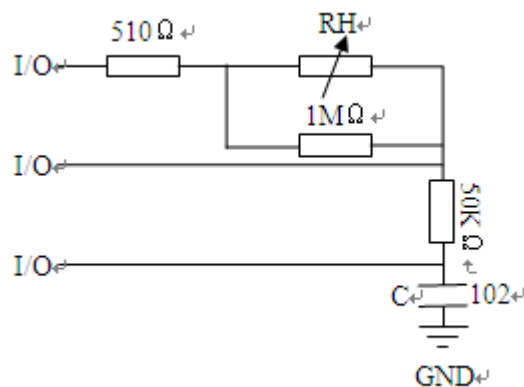


## 8  Packaging :

8.1   50 pieces were layed in tray, and 20 trays envelope in The carton.

8.2   10,000 pieces packed in a shipping carton box (430*360*390mm).

8.3   In case of fractional package, the above tray and carton box may not be used.

## 9  Caution remarks on operation :

9.1   To avoid direct application of DC voltage on humidity sensor.

9.2   To protect sensor from dewfall and drenching.

9.3   To avoid any operation of humidity sensors in the following environmental ambient.
Salt
Inorganic gas – Sulfide dioxide, Chlorine, Ammonia etc.
Organic gas – Alcoholic, Glycols, Aldehydes etc.

9.4    Recommended storage condition
Temperature range        10~40℃
Humidity range          90%RH or less

9.5    Do not store humidity sensors long period of time in an over 60%RH
ambient due to some occasion of degradation on sensor housing case.

## 10   Impedance -- %RH VS. Temperature

10.1   attach