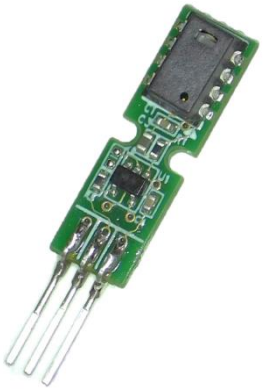
iSweek

# HCSV Series

## HumiChip SIP Voltage Output Sensor

### Features

- Relative humidity sensor with Voltage output.
- Humidity calibrated within ±3% RH
- Linearity is less than ±3% RH
- Excellent Reliability – satisfies automotive requirements.
- SIP(Single-In-line Package)



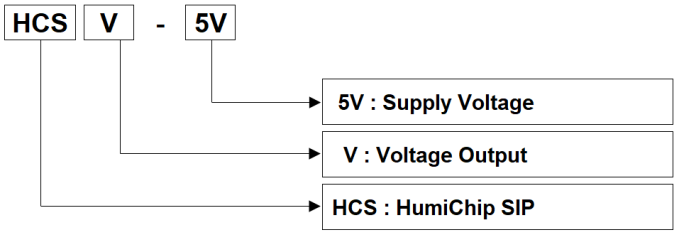
### Applications

- Smart Appliances
- HVAC control
- Industrial Process Control
- Medical
- Automotive
- Environment Monitoring

### Description

HCSV Series is an accurate and reliable RH sensor module based on HumiChip. 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.

### Part Number



## Environmental

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Storage Temperature Range | $T_{stg}$ | -55 ~ 125 | ℃ |
| Operating Temperature Range | $T_a$ | -40 ~ 85 | ℃ |
| Operating Humidity Range | RH | 0 ~ 100 | %RH |

## Electrical Specification(at 5.0V)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | 5.0 | V |
| Current Consumption | $I_{CC}$ | 1.5 | mA |

## Sensor Performance(at 5.0V)

### Relative Humidity (RH%)

| Humidity Characteristics | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Humidity Measuring Range | RH | 0 | | 100 | %RH |
| Relative Humidity Accuracy | | | ±3 | | %RH |
| Humidity Hysteresis | | | ±2 | | %RH |
| Nominal Output @50 %RH | $H\_V_{OUT}$ | 2.2 | 2.35 | 2.5 | V |
| Humidity Average Sensitivity | | | 31 | | mV/%RH |
| Temperature Coefficient | $T_{CC}$ | | -0.03 | | %RH/℃ |
| Response Time ($\tau_{63\%}$) | t | | 7.0 | | sec |

## Humidity Look-up Table (@25℃)

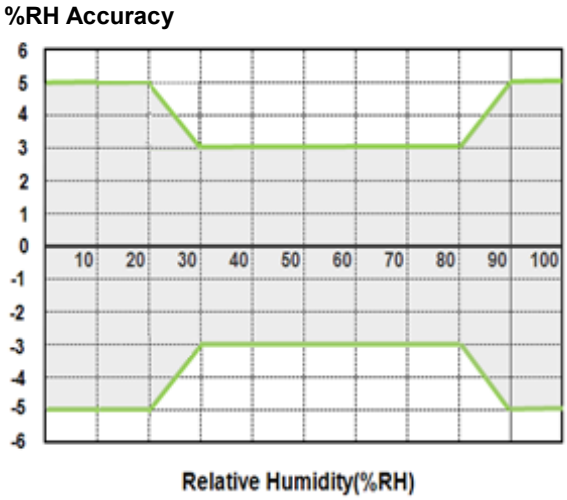
### Reference Output Values (Vcc=5V)

| %RH | Vout(mV) | %RH | Vout(mV) |
|---|---|---|---|
| 10 | 1,110 | 55 | 2,505 |
| 15 | 1,265 | 60 | 2,660 |
| 20 | 1,420 | 65 | 2,815 |
| 25 | 1,575 | 70 | 2,970 |
| 30 | 1,730 | 75 | 3,125 |
| 35 | 1,885 | 80 | 3,280 |
| 40 | 2,040 | 85 | 3,435 |
| 45 | 2,195 | 90 | 3,590 |
| 50 | 2,350 | 95 | 3,745 |

◆ **Linear Equations:**

$$H\_V_{out}[mV] = Vcc(0.0062(\text{sensor RH}) + 0.16)$$

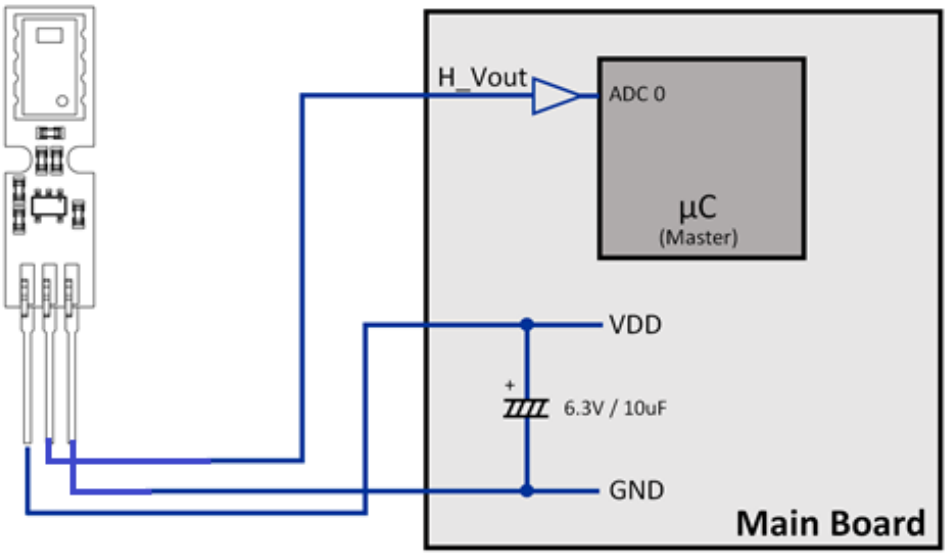
◆ **Relative Humidity Accuracy**




HCSV series is able to measure accurate humidity for optimized range of 10 to 95%RH.

The accuracy tolerance is ±3%RH for 30%~80%RH, and ±5%RH for less than 20%RH and over 90%RH.

## Application Example (Application Circuit)

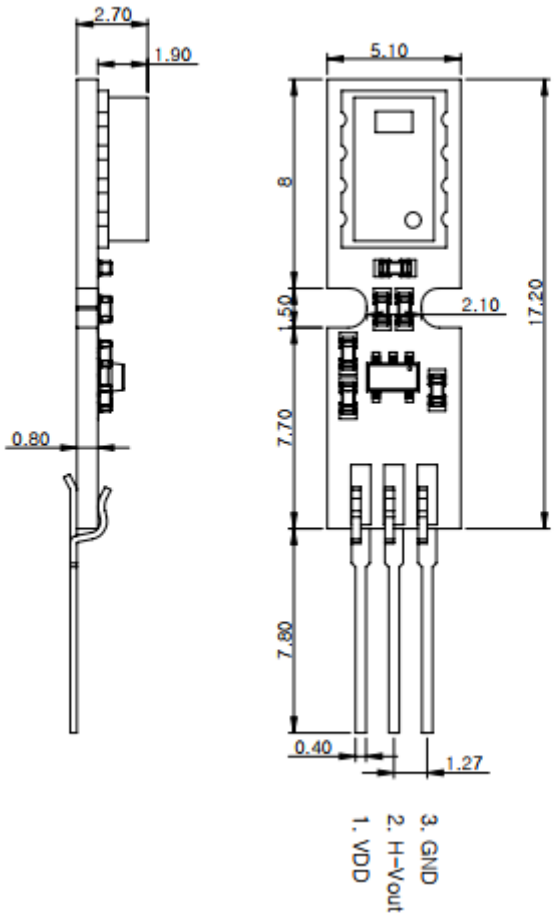



## Reliability

| No | Test Item | Test Condition | Test Criterion |
|---|---|---|---|
| 1 | Heat-Resistant | Left for 24 hours at RT 70℃, 4 hours at 60℃, and after leaving for 12 hours at the normal temperature, and confirm the operation | < ± 5%RH |
| 2 | Cold Resistance | Left for 24 hours at RT -20℃, 4 hours at 10℃, and after leaving for 12 hours at the normal temperature, and confirm the operation | < ± 5%RH |
| 3 | Humidity Resistance | Left for 48 hours at RT 40℃, RH 90～95% and after leaving for 12 hours at the normal temperature, and confirm the operation | < ± 5%RH |
| 4 | Vibration Resistance | Vibrating for 120 minutes, 1500cpm to X Y Z axial at 4mm seismic amplitude, and after leaving for 12 hours at the normal temperature, and confirm the operation | < ± 5%RH |
| 5 | Temperature Cycle | Define a cycle for 12 hours at RT -20℃, 12 hours at RT 70℃, and after leaving for 12 hours at the normal temperature, and confirm the operation | < ± 5%RH |
| 6 | THB (Temperature Humidity with bias) | After Stressing 500 hours at 85℃, 85%RH, with bias applied to the device, and after leaving for 12 hours at the normal temperature, and confirm the operation ( Interim inspection at 300 hours) | < ± 5%RH |
| 7 | Thermal Shock | A cycle is exposed to -40℃, 85℃ with 30minutes period time, undergo 300 cycles, and after leaving for 12 hours at the normal temperature, and confirm the operation | < ± 5%RH |

## Dimensions

unit : mm




## PIN Out Assignment

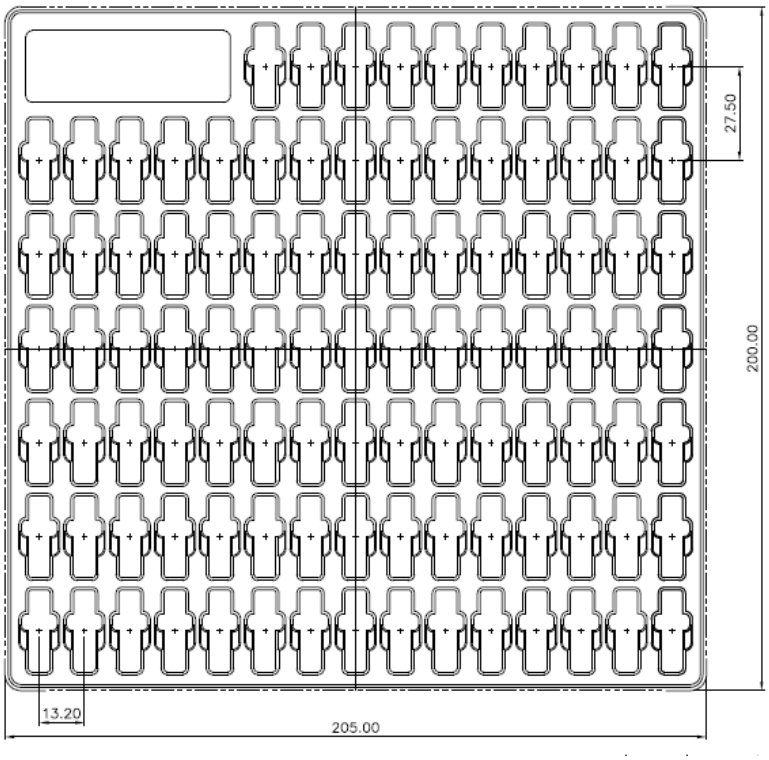
| NO. | Function |
|---|---|
| 1 | **$V_{CC}$ (DC5V)** |
| 2 | **H-Vout** |
| 3 | **GND** |

| NO. | Component parts | Material |
|---|---|---|
| 1 | PCB | FR4 |
| 2 | Lead Frame | C519R-1/2H |

## Packaging

**Packing Tray : 100ea**

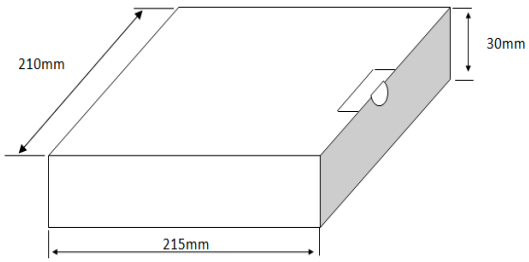
Dimension: 205 x 200 mm




**Packaging Box**

**Inbox:** **500ea** (5+1Tray X 100ea)

Dimension: 215 x 210 x 30 mm




**Outbox:** **5,000ea** (5 x Inbox 500)

Dimension: 355 x 228 x 233 mm