HCH-1000 Series
Capacitive Humidity Sensors

DESCRIPTION
The HCH-1000 series humidity sensor is a capacitive polymer sensor designed for relative humidity measurement. The sensor converts humidity value into capacitance, which can be measured electronically.

Polyimide is used as a humidity sensing material because of its inherent IC (Integrated Circuit) processing compatibility, reduced temperature dependence and enhanced resistance against contamination. The HCH-1000-Series is manufactured using semiconductor technology.

FEATURES AND BENEFITS
- Polymer sensing offers enhanced resistance against contamination
- Reduced temperature dependence
- Semiconductor fabrication technology
- Uses glass wafer as substrate
- Enhanced sensitivity and accuracy provides fast response
- Low hysteresis and long-term stability

The sensor consists of a grid top electrode, a polyimide layer, and a bottom electrode. The grid top electrode on the bottom electrode provides enhanced sensitivity when compared to that of a standard structure.

A cased version, for dust protection, and an uncased version are available.

POTENTIAL APPLICATIONS

Industrial
- Air compressors
- Battery-powered systems
- Drying equipment
- HVAC (includes air conditioning, air movement, thermostats, humidifiers, de-humidifiers, humidistats, enthalpy sensing)
- OEM assemblies
- Office automation equipment
- Process equipment
- Refrigeration (includes bulk and transport systems)
- Telecommunications cabinets
- Weather stations and meteorology equipment

Medical
- Hospital air compressors
- Infant incubators
- Microenvironments
- Sleep apnea equipment
- Treadmill stress monitoring equipment
HCH-1000 Series

Table 1. Specifications (T<sub>A</sub> = 25 °C [77 °F], Input Voltage = 1 V<sub>RMS</sub>, Frequency = 20 kHz)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Condition</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal capacitance</td>
<td>at 55 %RH</td>
<td>310</td>
<td>330</td>
<td>350</td>
<td>pF</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>10 %RH to 95 %RH</td>
<td>0.55</td>
<td>±2</td>
<td>0.65</td>
<td>%RH</td>
</tr>
<tr>
<td>Humidity hysteresis</td>
<td>–</td>
<td>–</td>
<td>±2</td>
<td>–</td>
<td>%RH</td>
</tr>
<tr>
<td>Linearity</td>
<td>–</td>
<td>–</td>
<td>±2</td>
<td>–</td>
<td>%RH</td>
</tr>
<tr>
<td>Response time</td>
<td>30 %RH to 90 %RH</td>
<td>–</td>
<td>15</td>
<td>–</td>
<td>sec</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>5 °C to 70 °C [41 °F to 158 °F]</td>
<td>0.15</td>
<td>0.16</td>
<td>0.17</td>
<td>pF/°C</td>
</tr>
<tr>
<td>Long-term stability (drift)</td>
<td>–</td>
<td>–</td>
<td>0.2</td>
<td>–</td>
<td>%RH/year</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>–</td>
<td>–</td>
<td>-40 [-40]</td>
<td>120 [248]</td>
<td>°C [°F]</td>
</tr>
<tr>
<td>Operating humidity range</td>
<td>–</td>
<td>–</td>
<td>0%</td>
<td>–</td>
<td>RH</td>
</tr>
<tr>
<td>Operating frequency range</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>–</td>
<td>kHz</td>
</tr>
</tbody>
</table>

Figure 1: Frequency Characteristics

![Figure 1: Frequency Characteristics](image1)

Figure 2: Typical Humidity Response (Sensitivity = 0.6 pF/%RH.)

![Figure 2: Typical Humidity Response](image2)

Figure 3: Temperature Characteristics (At 1 V<sub>RMS</sub> and 20 kHz.)

![Figure 3: Temperature Characteristics](image3)
Capacitive Humidity Sensors

Figure 4: Mounting Dimensions (For reference only: mm [in].)

**ENVIRONMENTAL TEST SYSTEM**
Figure 5 depicts environmental testing. The devices are characterized at 25 °C [77 °F] between 20 %RH and 95 %RH. The meter is set to measure capacitance at 1 V and 20 kHz. For a precise measurement, a hygrometer is compared with the humidity of the temperature-humidity chamber. The data output indicates the effect of sensor characterization before/after environmental tests.

**Figure 5: Environmental Test System Diagram**
Order Guide

<table>
<thead>
<tr>
<th>Catalog Listing</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCH-1000-001</td>
<td>HCH Series capacitive polymer humidity sensor, 2,54 mm [0.100 in] lead pitch SIP</td>
</tr>
<tr>
<td>HCH-1000-002</td>
<td>HCH Series capacitive polymer humidity sensor, 2,54 mm [0.100 in] lead pitch SIP, cased version</td>
</tr>
</tbody>
</table>

⚠️ WARNING
PERSONAL INJURY
DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.
Failure to comply with these instructions could result in death or serious injury.

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Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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