HIH-4602-L Series
Humidity Sensors

DESCRIPTION
HIH-4602-L Series Relative Humidity (RH) sensors are designed to deliver RH sensing in a rugged, low-cost slotted TO-5 can.

The laser-trimmed, thermoset polymer capacitive sensing elements have on-chip integrated signal conditioning, helping to reduce product development times.

FEATURES
- Near linear voltage output vs %RH
- Laser-trimmed interchangeability
- Enhanced accuracy, fast response
- Chemically resistant
- Stable, low drift performance
- Built-in static protection
- TO-5 can

A typical current draw of only 200 µA allows use in battery-powered systems.

HIH-4602-L-CP sensors include a calibration and data printout to allow individually matched downstream electronics and ±3.5 %RH total accuracy.

POTENTIAL APPLICATIONS
- Refrigeration
- Drying
- Meteorology
- Battery-powered systems
- OEM (Original Equipment Manufacturer) assemblies
## HIH-4602-L Series

### Table 1. Performance Specifications (At 5 Vdc supply and 25 °C [77 °F] unless otherwise noted.)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Unit</th>
<th>Specific Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interchangeability (first order curve)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>0% RH to 59% RH</td>
<td>-5</td>
<td>–</td>
<td>5</td>
<td>% RH</td>
<td>–</td>
</tr>
<tr>
<td>60% RH to 100% RH</td>
<td>-8</td>
<td>–</td>
<td>8</td>
<td>% RH</td>
<td>–</td>
</tr>
<tr>
<td>Accuracy (best fit straight line)</td>
<td>-3.5</td>
<td>–</td>
<td>+3.5</td>
<td>% RH</td>
<td>1</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>–</td>
<td>3</td>
<td>–</td>
<td>% RH</td>
<td>–</td>
</tr>
<tr>
<td>Repeatability</td>
<td>–</td>
<td>±0.5</td>
<td>–</td>
<td>% RH</td>
<td>–</td>
</tr>
<tr>
<td>Settling time</td>
<td>–</td>
<td>–</td>
<td>70</td>
<td>ms</td>
<td>–</td>
</tr>
<tr>
<td>Response time (1/e in slow moving air)</td>
<td>–</td>
<td>30</td>
<td>–</td>
<td>s</td>
<td>–</td>
</tr>
<tr>
<td>Stability (at 50% RH in one year)</td>
<td>–</td>
<td>1.2</td>
<td>–</td>
<td>% RH</td>
<td>–</td>
</tr>
<tr>
<td>Voltage supply</td>
<td>4</td>
<td>–</td>
<td>5.8</td>
<td>Vdc</td>
<td>–</td>
</tr>
<tr>
<td>Current supply</td>
<td>–</td>
<td>200</td>
<td>500</td>
<td>µA</td>
<td>–</td>
</tr>
<tr>
<td>Output voltage temp. coefficient at 50% RH, 5 V</td>
<td>–</td>
<td>-4</td>
<td>–</td>
<td>mV/°C</td>
<td>–</td>
</tr>
<tr>
<td>Voltage output (1st order curve fit)</td>
<td>( V_{\text{out}} = (V_{\text{supply}})(0.0062(\text{sensor RH}) + 0.16) ), typical at 25 °C</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>True RH = (sensor RH)/(1.0546-0.00216T), T in °C</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40[-40]</td>
<td>See Figure 1.</td>
<td>85[185]</td>
<td>°C[°F]</td>
<td>–</td>
</tr>
<tr>
<td>Operating humidity</td>
<td>0</td>
<td>See Figure 1.</td>
<td>100</td>
<td>% RH</td>
<td>3</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40[-40]</td>
<td>See Figure 2.</td>
<td>125[257]</td>
<td>°C[°F]</td>
<td>–</td>
</tr>
<tr>
<td>Storage humidity</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>% RH</td>
<td>3</td>
</tr>
</tbody>
</table>

**Specific Notes:**
1. Applies to HIH-4602-L-CP only.
2. Device is calibrated at 5 Vdc and 25 °C.
3. Non-condensing environment.

**General Notes:**
- Sensor is ratiometric to supply voltage.
- Extended exposure to ≥90% RH causes a reversible shift of 3% RH.
- Sensor is light sensitive. For best performance, shield sensor from bright light.

### Factory Calibration Data
HIH-4602-L-CP Sensors include a calibration and data printout. See Table 2.

### Table 2. Example Data Printout

<table>
<thead>
<tr>
<th>Model</th>
<th>HIH-4602-L-CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel</td>
<td>92</td>
</tr>
<tr>
<td>Wafer</td>
<td>030996M</td>
</tr>
<tr>
<td>MRP</td>
<td>337313</td>
</tr>
<tr>
<td>Calculated values at 5 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( V_{\text{out}} ) at 0% RH</td>
</tr>
<tr>
<td></td>
<td>( V_{\text{out}} ) at 75.3% RH</td>
</tr>
<tr>
<td>Linear output for 3.5% RH accuracy at 25 °C</td>
<td></td>
</tr>
<tr>
<td>Zero offset</td>
<td>0.958 V</td>
</tr>
<tr>
<td>Slope</td>
<td>30.680 mV/%RH</td>
</tr>
<tr>
<td>RH</td>
<td>( (V_{\text{out}} - \text{zero offset})/\text{slope} )</td>
</tr>
<tr>
<td>Ratiometric response for 0% RH to 100% RH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( V_{\text{out}} )</td>
</tr>
</tbody>
</table>
Humidity Sensors

Figure 1. Operating Environment (Non-condensing environment.)

- Recommended operating zone
- Operating zone limited to <50 hours
- No specification zone

Figure 2. Storage Environment (Non-condensing environment.)

- Recommended storage zone
HIH-4602-L Series

Figure 3. Typical Output Voltage vs Relative Humidity (At 5 V and 25 °C.)

![Graph](image1)

Figure 4. Typical Output Voltage (BFSL) vs Relative Humidity (At 0 °C, 70 °C and 5 V.)

![Graph](image2)
Figure 5. Mounting Dimensions (For reference only. mm/[in])

1. Case ground
2. Vdc out
3. (-) Power or ground
4. (+) Vdc supply
5. No connection
6. No connection

Figure 6. RH Sensor Construction
Sensor construction consists of a planar capacitor with a second polymer layer to protect against most dirt/dust particles, oils and other hazards.

Figure 7. Typical Application Circuit

HIH-4602

+Ve Supply Voltage (5 V)

- Ve Voltage Out

OUT

Minimum Load

80 kOhm

0 V
Order Guide

<table>
<thead>
<tr>
<th>Catalog Listing</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIH-4602-L</td>
<td>Relative humidity sensor in TO-5 can</td>
</tr>
<tr>
<td>HIH-4602-LP</td>
<td>Relative humidity sensor in TO-5 can with calibration and data printout</td>
</tr>
</tbody>
</table>

ADDITIONAL HUMIDITY SENSOR INFORMATION
See the following associated literature at [www.honeywell.com/sensing](http://www.honeywell.com/sensing):
- Product installation instructions
- Application sheets:
  - Humidity Sensor Performance Characteristics
  - Humidity Sensor Theory and Behavior
  - Humidity Sensor Moisture and Psychrometrics
  - Thermoset Polymer-based Capacitive Sensors

**WARNING**
MISUSE OF DOCUMENTATION
- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.
Failure to comply with these instructions could result in death or serious injury.

**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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