

HIH-4602-L



HIH-4602 Series monolithic IC humidity sensor with integral precision RTD in TO-39

Features

- Linear voltage output vs %RH
- Laser-trimmed interchangeability
- Chemically resistant
- Enhanced accuracy, fast response
- Stable, low drift performance
- Built-in static protection

Potential Applications

- Refrigeration equipment
- Drying
- Meteorology
- Battery-powered systems
- OEM assemblies

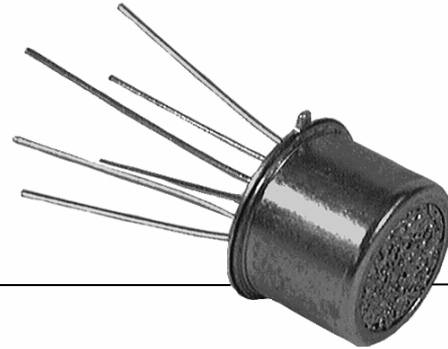
Description

The HIH-4602-L Relative Humidity (RH) sensors deliver instrumentation-quality RH sensing performance in a rugged, low cost, slotted TO-39 housing that provides a quick response while still maintaining the robustness of an enclosed component. The laser-trimmed, thermoset polymer capacitive sensing elements have on-chip integrated signal conditioning. The HIH-4602-L-CP includes calibration and data printout.

Product Specifications	
Package Type	TO-39 can
Operating Temperature Range	-40 °C to 85 °C [-40 °F to 185 °F]
Operating Humidity Range	0% RH to 100% RH
Interchangeability	0% RH to 59% RH \pm 5%, 60% RH to 100% RH \pm 8%
Accuracy (BFSL)	\pm 3.5%
Hysteresis	3% RH
Response Time	5 s 1/e in slow moving air
Repeatability	\pm 0.5% RH
Settling Time	70 ms max.
Max. Supply Voltage	5.8 Vdc
Max. Supply Current	500 μ A
Stability at 50% RH	\pm 1.2% RH
Output Signal	Analog voltage
Covered Device	Yes
Moisture/Dust Filter	No
Combined Humidity and Temperature Sensor	No
Calibration and Data Printout	No

HIH-4602-A/C Series

Humidity Sensors



DESCRIPTION

HIH-4602-A/C Series Relative Humidity (RH) sensors combine both relative humidity and temperature sensing in a TO-5 housing with a hydrophobic sintered stainless steel filter.

The laser-trimmed, thermoset polymer capacitive sensing elements have on-chip integrated signal conditioning.

The temperature sensor is thermally connected with the RH sensor making the HIH-4602-A/C often ideal for measuring dew point and other absolute moisture terms.

FEATURES

- Near linear voltage output vs %RH
- Laser-trimmed interchangeability
- Enhanced accuracy, fast response
- Chemically resistant
- Stable, low drift performance
- Built-in static protection
- Often ideal for dew point and absolute moisture measurements
- TO-5 housing

The HIH-4602-A contains an integral thermistor, while the HIH-4602-C contains an integral precision RTD.

Factory calibration data supplied with each sensor allows 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-A/C Series

TABLE 1. PERFORMANCE SPECIFICATIONS (At 5 Vdc supply and 25 °C [77 °F] unless otherwise noted.)

Parameter	Minimum	Typical	Maximum	Unit	Specific Note
Interchangeability (first order curve)	–	–	–	–	–
0% RH to 59% RH	-5	–	5	% RH	–
60% RH to 100% RH	-8	–	8	% RH	–
Accuracy (best fit straight line)	-3.5	–	+3.5	% RH	1
Hysteresis	–	3	–	% RH	–
Repeatability	–	±0.5	–	% RH	–
Settling time	–	–	70	ms	–
Response time (1/e in slow moving air)	–	50	–	s	–
Stability (at 50% RH in one year)	–	±1.2	–	% RH	–
Voltage supply	4	–	5.8	Vdc	–
Current supply	–	200	500	µA	–
Output voltage temp. coefficient at 50% RH, 5 V	–	-4	–	mV/°C	–
Voltage output (1st order curve fit)	$V_{OUT} = (V_{SUPPLY})(0.0062(\text{sensor RH}) + 0.16)$, typical at 25 °C				
Temperature compensation	True RH = (sensor RH)/(1.0546-0.00216T), T in °C				
Operating temperature	-40[-40]	See Figure 1.	85[185]	°C[°F]	–
Operating humidity	0	See Figure 1.	100	% RH	2
Storage temperature	-50[-58]	–	125[257]	°C[°F]	–
Storage humidity	See Figure 2.			% RH	2

Specific Notes:

1. Device is calibrated at 5 Vdc and 25 °C.
2. 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 Sensors are supplied with a calibration and data printout. See Table 2.

TABLE 2. EXAMPLE DATA PRINTOUT

Model	HIH-4602-C
Channel	92
Wafer	030996M
MRP	337313
Calculated values at 5 V	
V _{OUT} at 0% RH	0.826 V
V _{OUT} at 75.3% RH	3.198 V
Linear output for 3.5% RH accuracy at 25 °C	
Zero offset	0.826 V
Slope	31.483 mV/%RH
RH	(V _{OUT} - zero offset)/slope (V _{OUT} - 0.826)/0.0315
Ratiometric response for 0% RH to 100% RH	
V _{OUT}	V _{SUPPLY} (0.1652 to 0.7952)

TABLE 3. HIH-4602-A NTC THERMISTOR TEMPERATURE SPECIFICATIONS

R _b = 100 kOhm ±5% at 25 °C		
Beta = 4250, 25 °C to 85 °C		
1/T = a + b(Ln R) + c(Ln R) ^ 3, T in degrees K		
	Temp. °C	Resistance
Low	0	351000
Mid	50	33590
High	100	5569
a = 0.000828083		
b = 0.000208691		
c = 8.0812E-08		

TABLE 4. HIH-4602-C RTD TEMPERATURE SENSOR SPECIFICATIONS

Thin film platinum RTD – Class 2B (Ro: ±0.25%)
DIN EN 60571 (PER IEC 751)
TCR = 3750 ppm/°C
1000 Ohm at 0 °C [32 °F]



Humidity Sensors

FIGURE 1. OPERATING ENVIRONMENT (Non-condensing environment.)

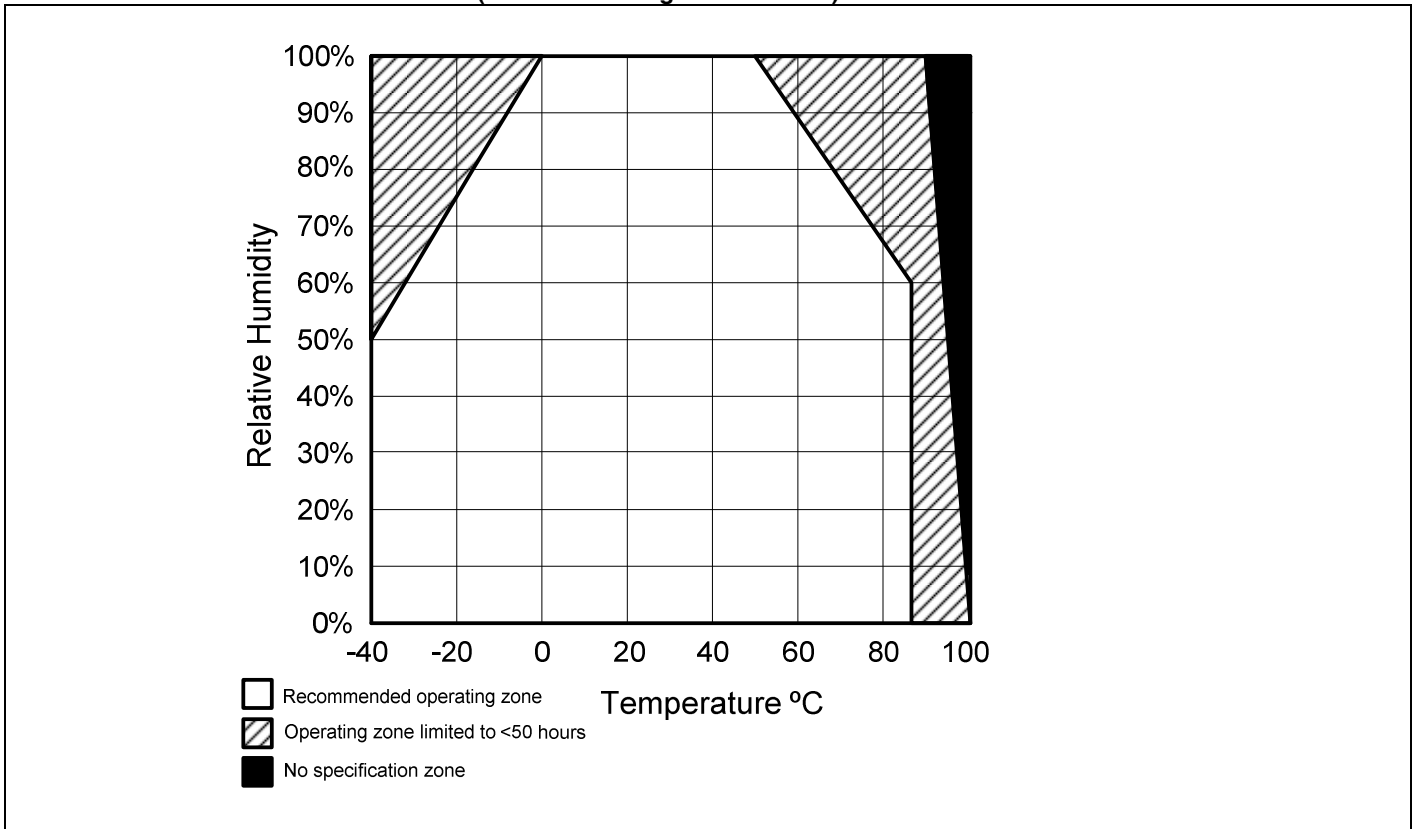
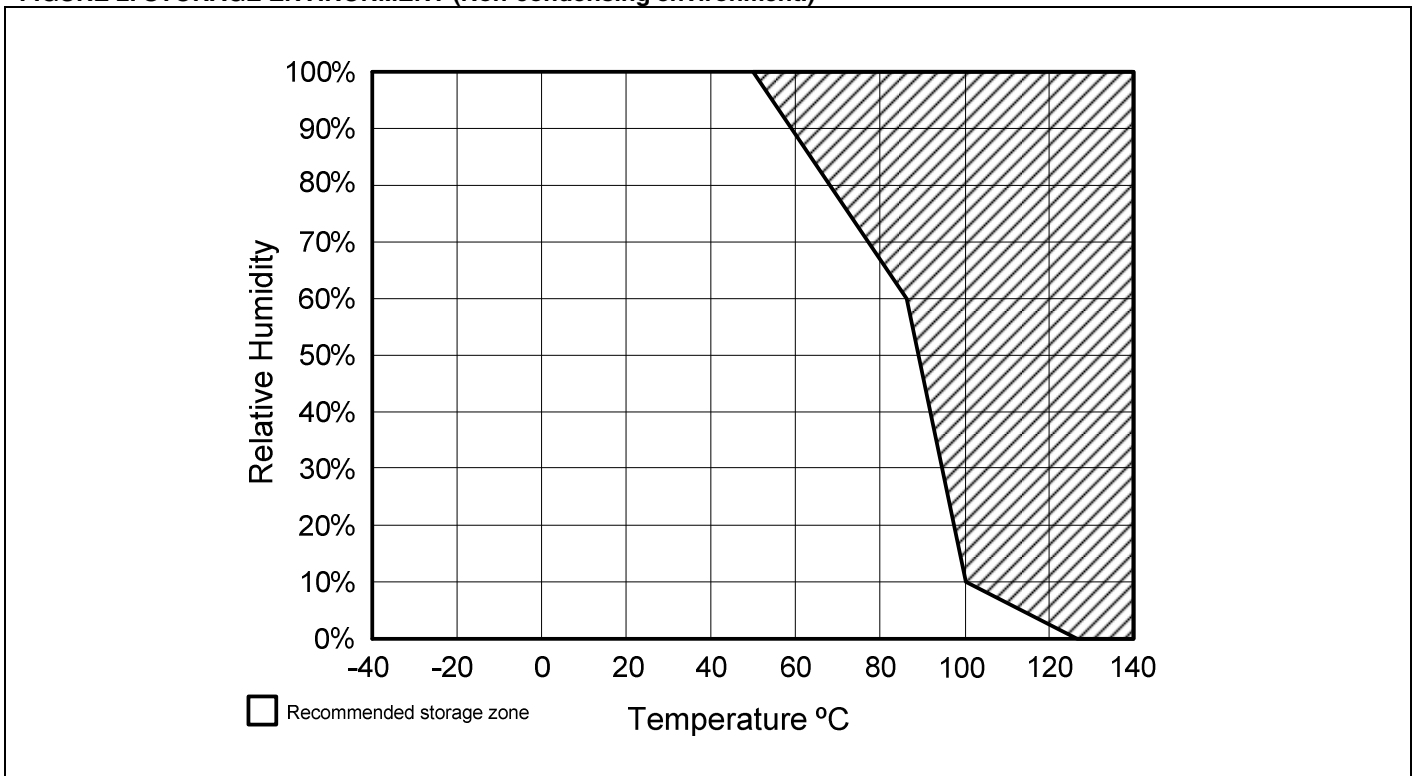


FIGURE 2. STORAGE ENVIRONMENT (Non-condensing environment.)



HIH-4602-A/C Series

FIGURE 3. TYPICAL OUTPUT VOLTAGE VS RELATIVE HUMIDITY (At 25 °C and 5 V.)

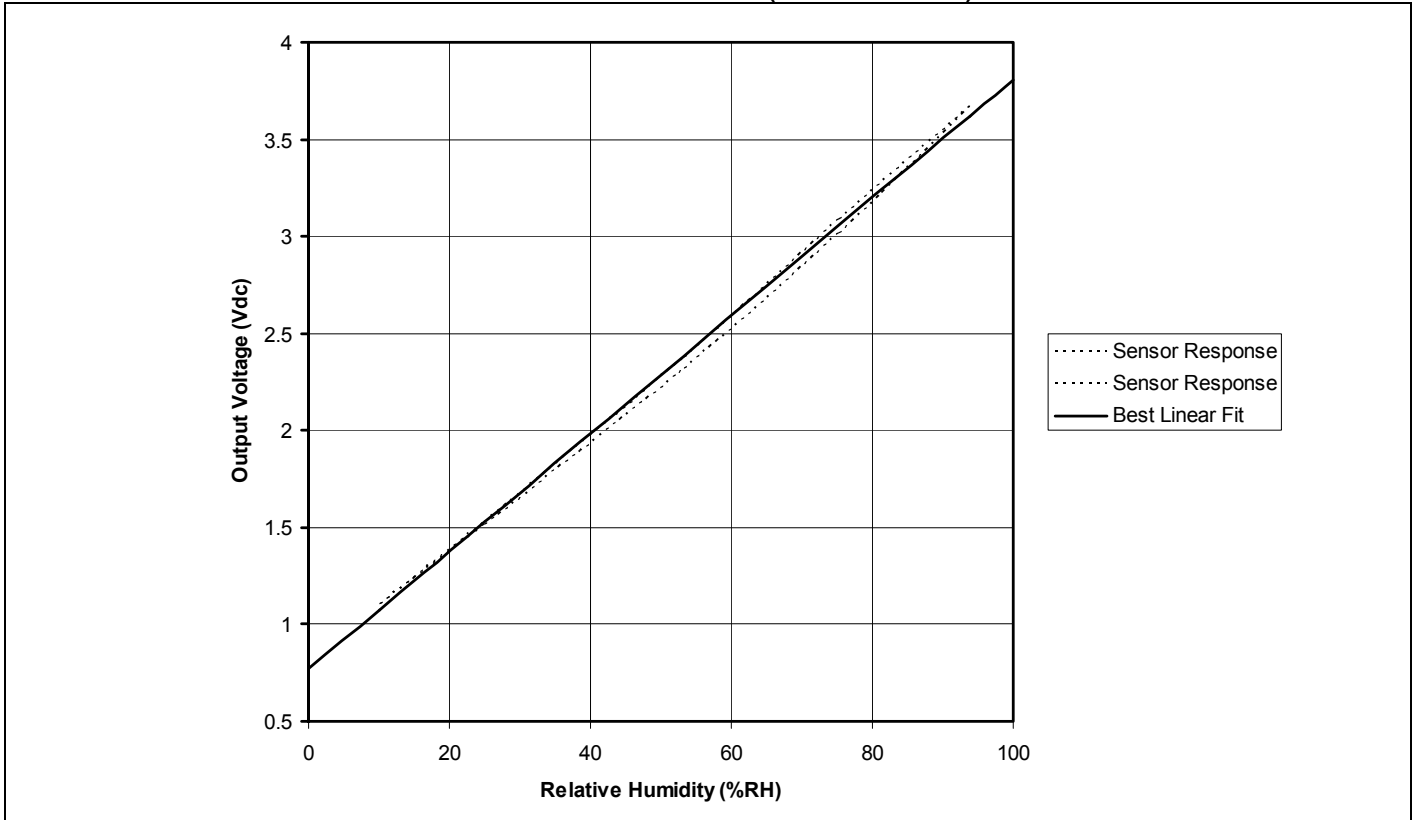
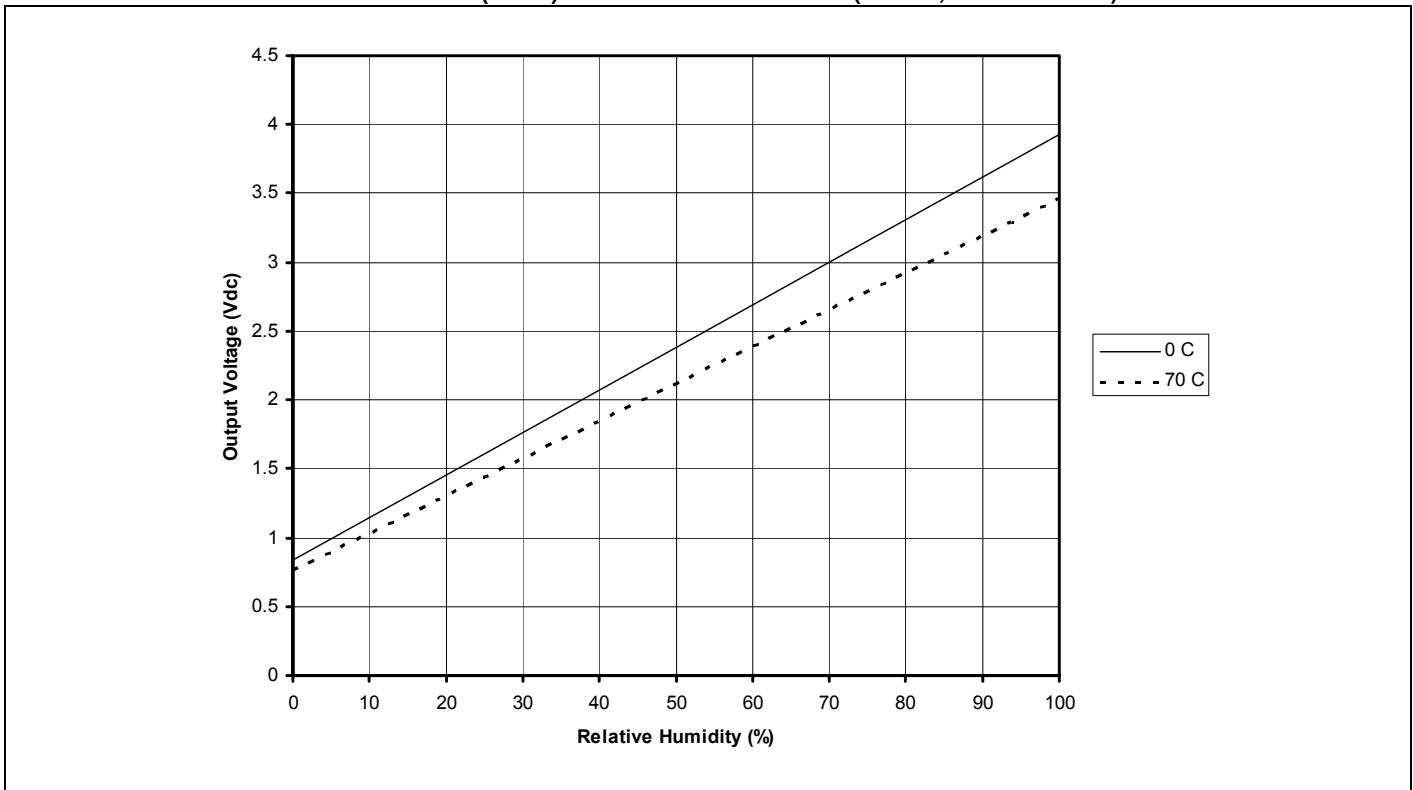


FIGURE 4. TYPICAL OUTPUT VOLTAGE (BFSL) VS RELATIVE HUMIDITY (At 0 °C, 70 °C and 5 V.)



Humidity Sensors

FIGURE 5. HIH-4602-A/C 1 MOUNTING DIMENSIONS (For reference only. mm/[in])

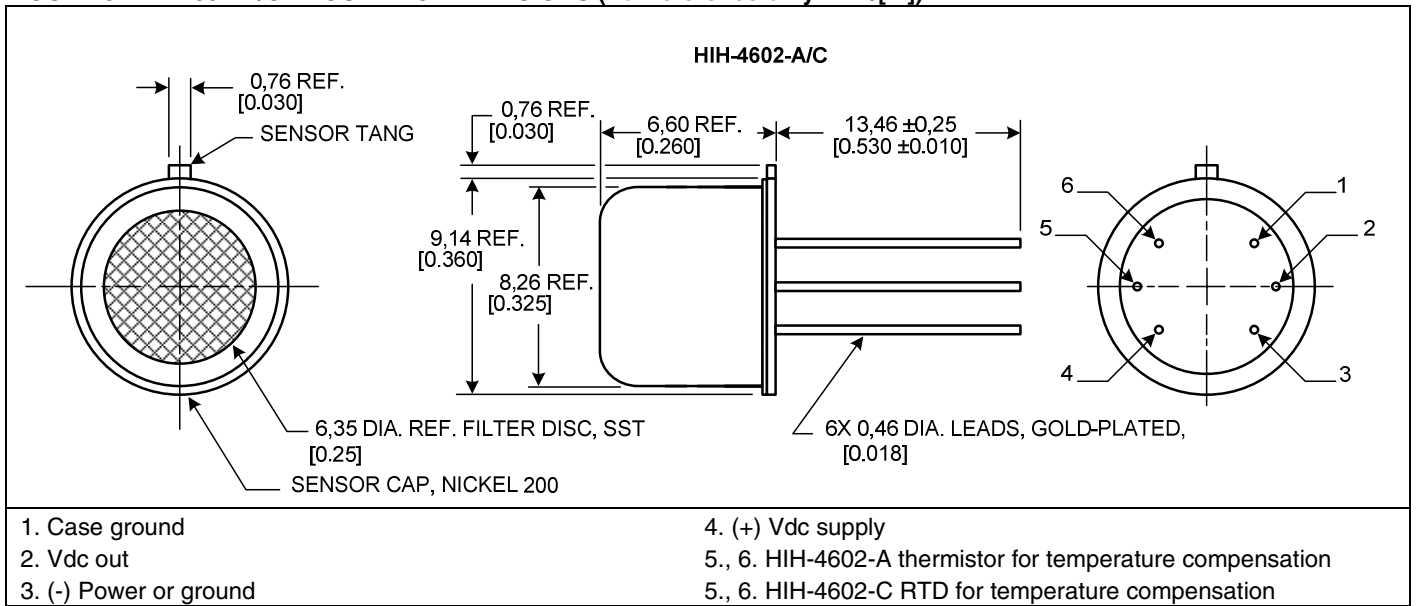
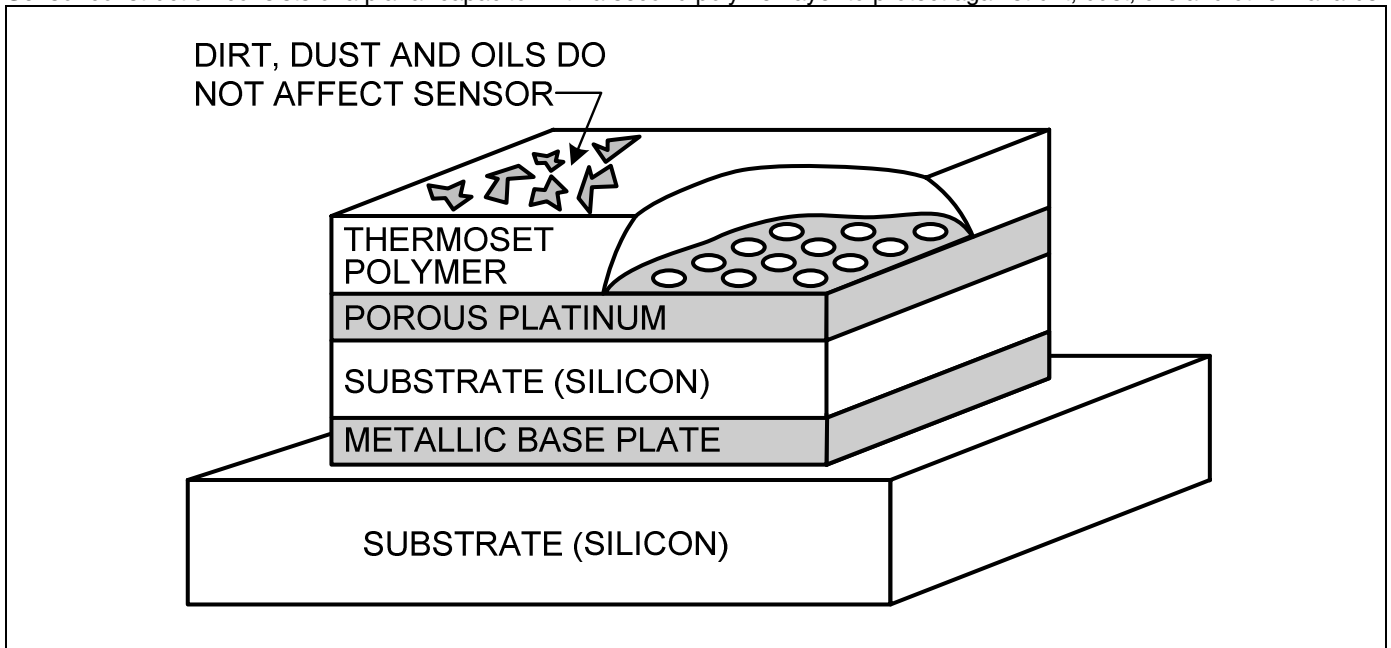


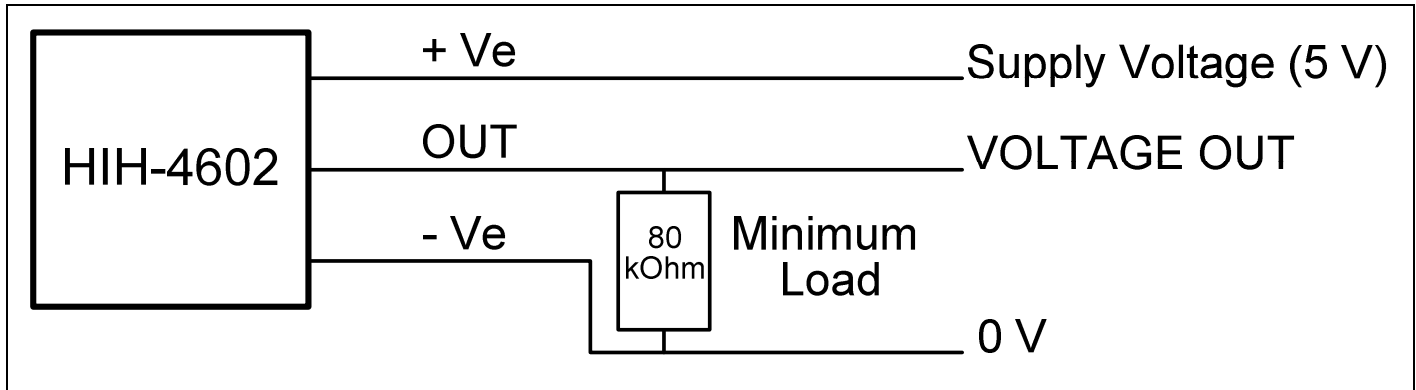
FIGURE 6. RH SENSOR CONSTRUCTION

Sensor construction consists of a planar capacitor with a second polymer layer to protect against dirt, dust, oils and other hazards.



HIH-4602-A/C Series

FIGURE 7. TYPICAL APPLICATION CIRCUIT



ORDER GUIDE

Catalog Listing	Description
HIH-4602-A	Monolithic IC humidity sensor with integral thermistor in TO-5 can
HIH-4602-C	Monolithic IC humidity sensor with integral precision RTD in TO-5 can

FURTHER HUMIDITY SENSOR INFORMATION

See the following associated literature at 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

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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.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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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.

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.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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