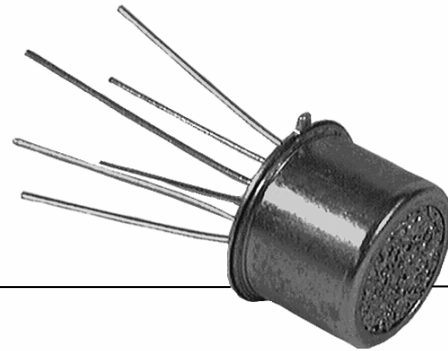


## HIH-4602-A/C Series

### 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  $\pm 3.5$  %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 <sub>OUT</sub> at 0% RH	0.826 V
V <sub>OUT</sub> 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 <sub>OUT</sub> - zero offset)/slope (V <sub>OUT</sub> - 0.826)/0.0315
Ratiometric response for 0% RH to 100% RH	
V <sub>OUT</sub>	V <sub>SUPPLY</sub> (0.1652 to 0.7952)

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

R <sub>b</sub> = 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		
	<b>Temp. °C</b>	<b>Resistance</b>
Low	0	351000
Mid	50	33590
High	100	5569
a = 0.000828083		
b = 0.000208691		
c = 8.0812E-08		

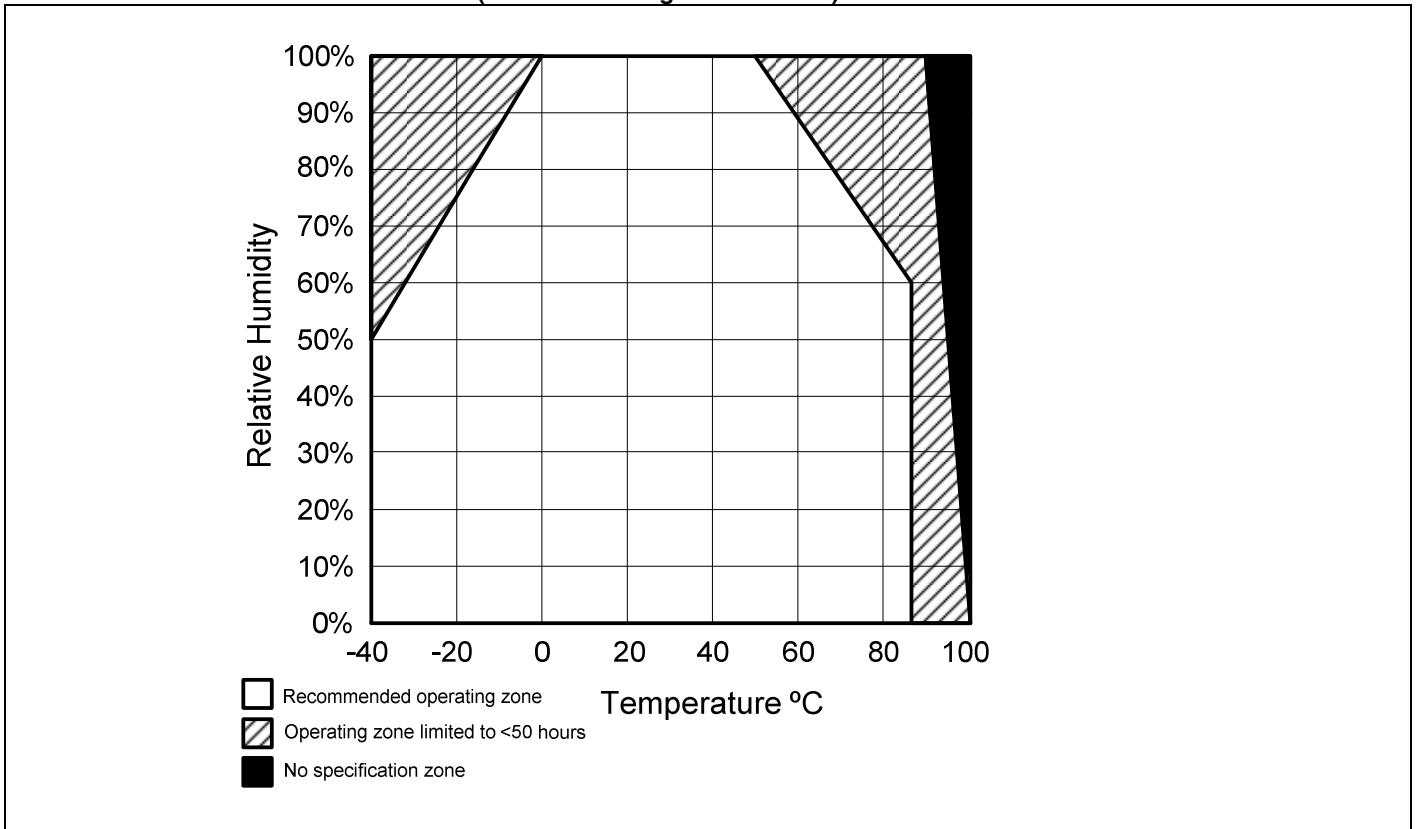
**TABLE 4. HIH-4602-C RTD TEMPERATURE SENSOR SPECIFICATIONS**

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]

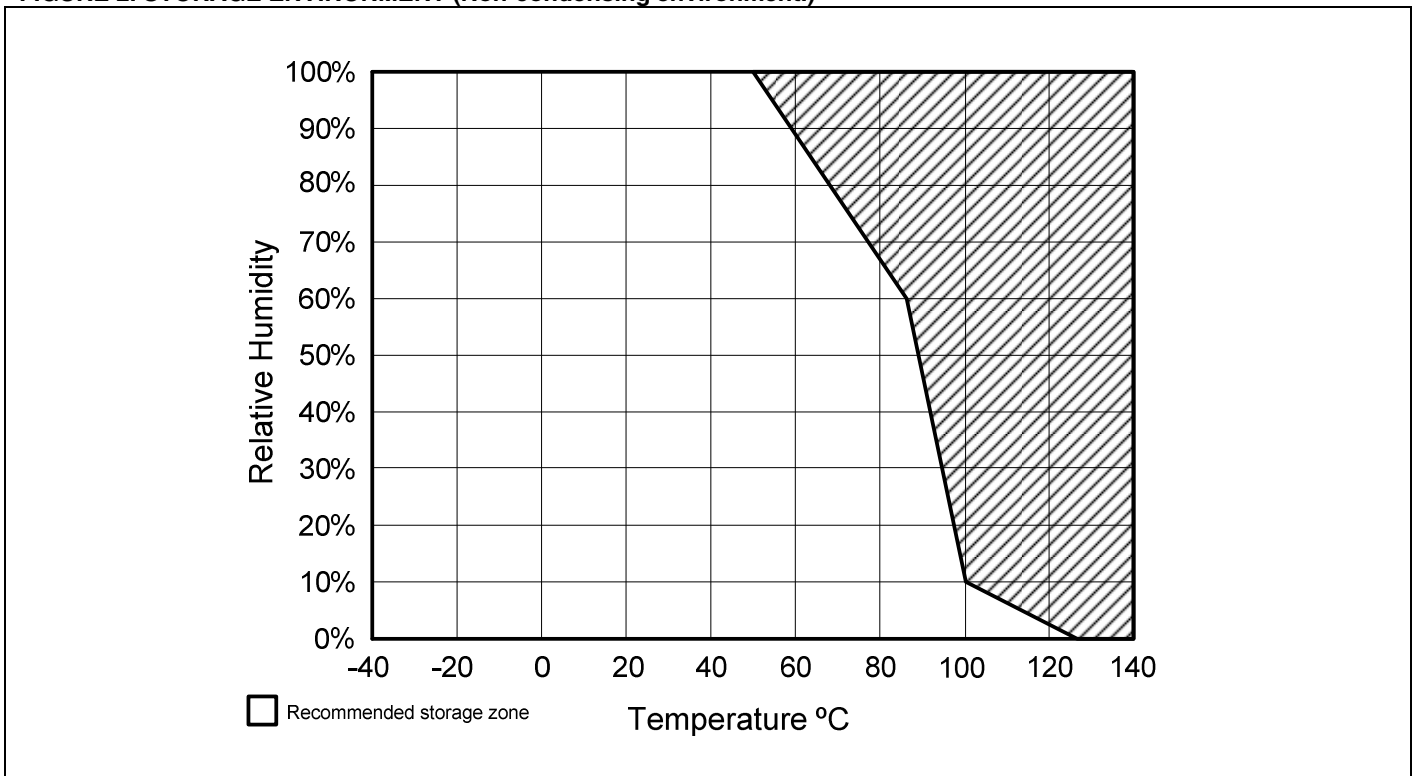


# Humidity Sensors

**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.)

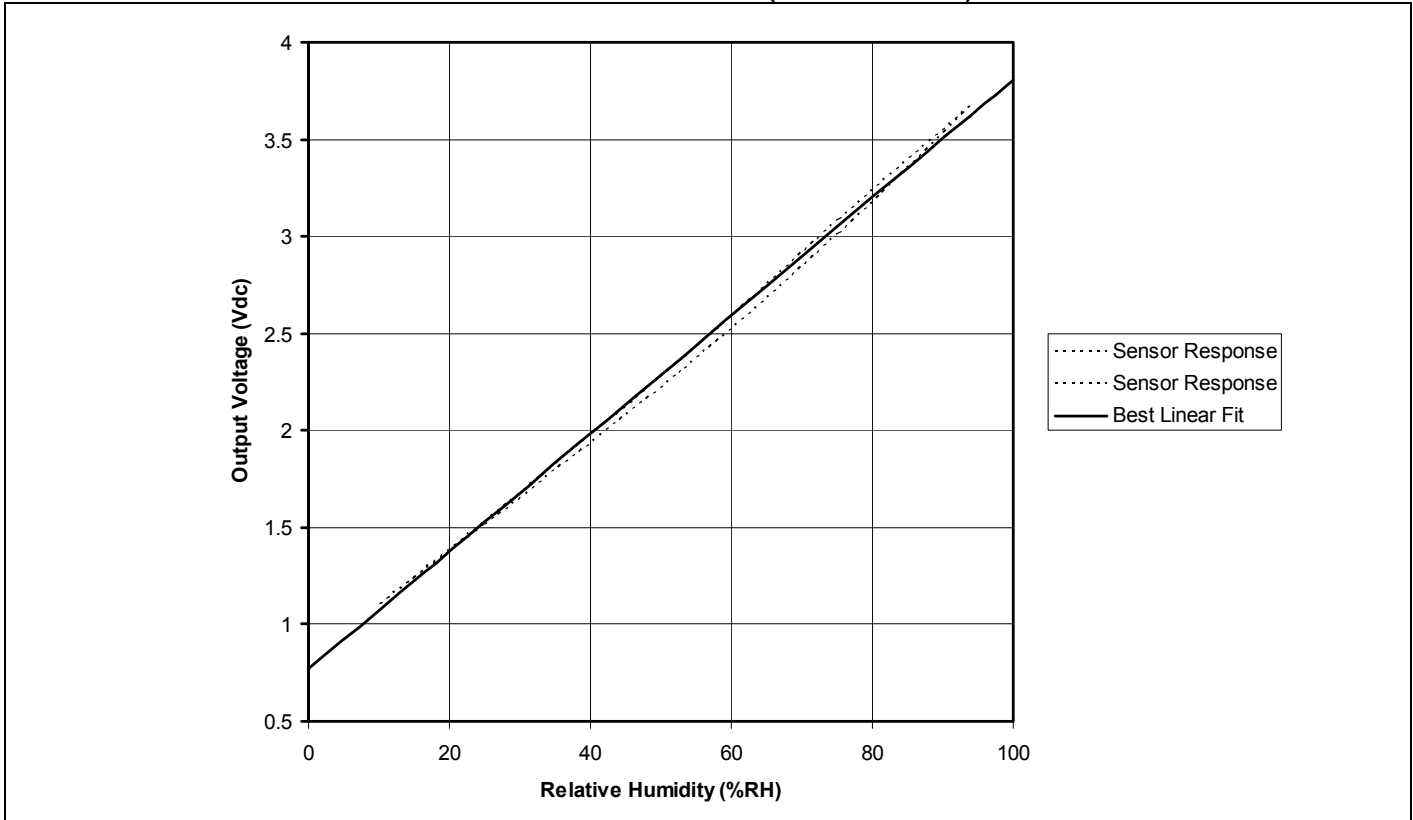
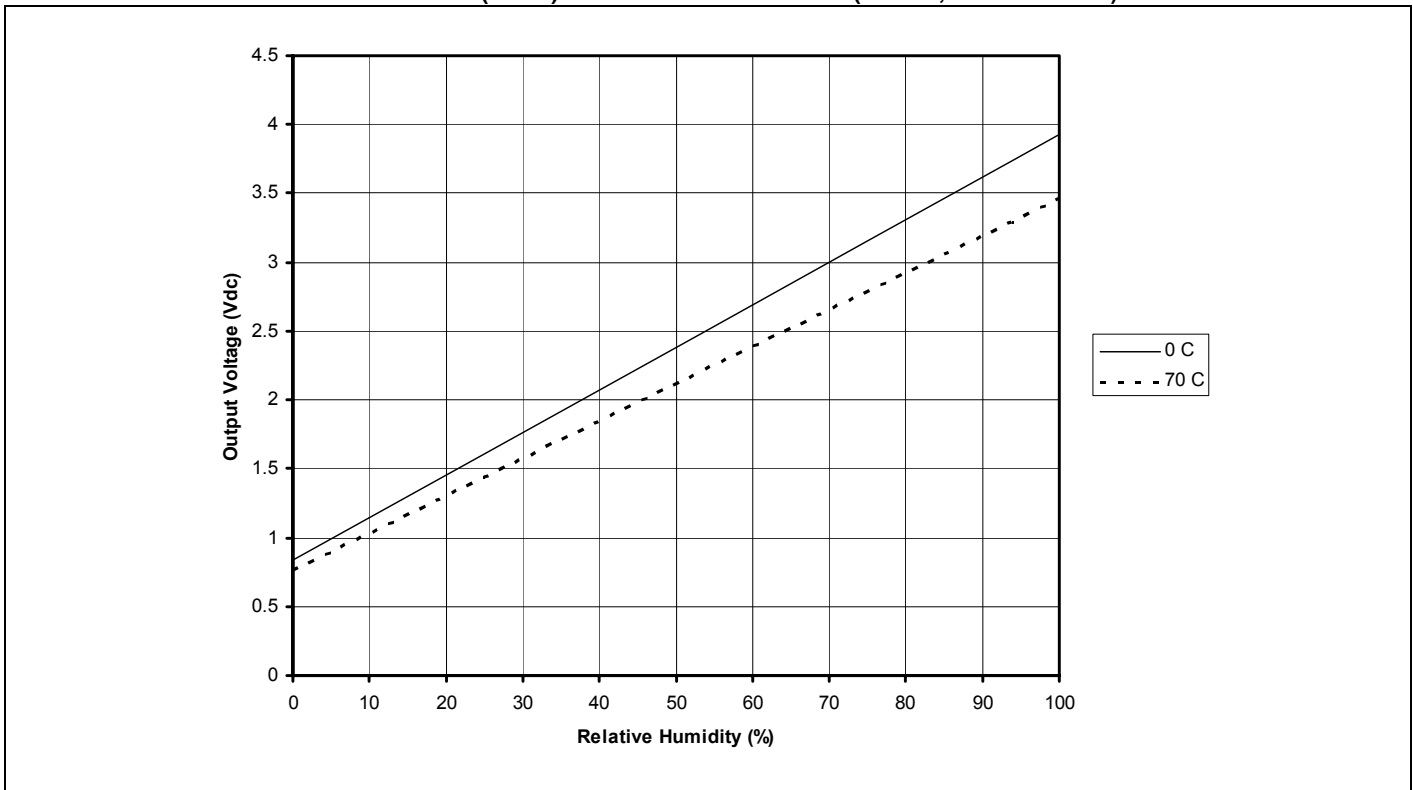
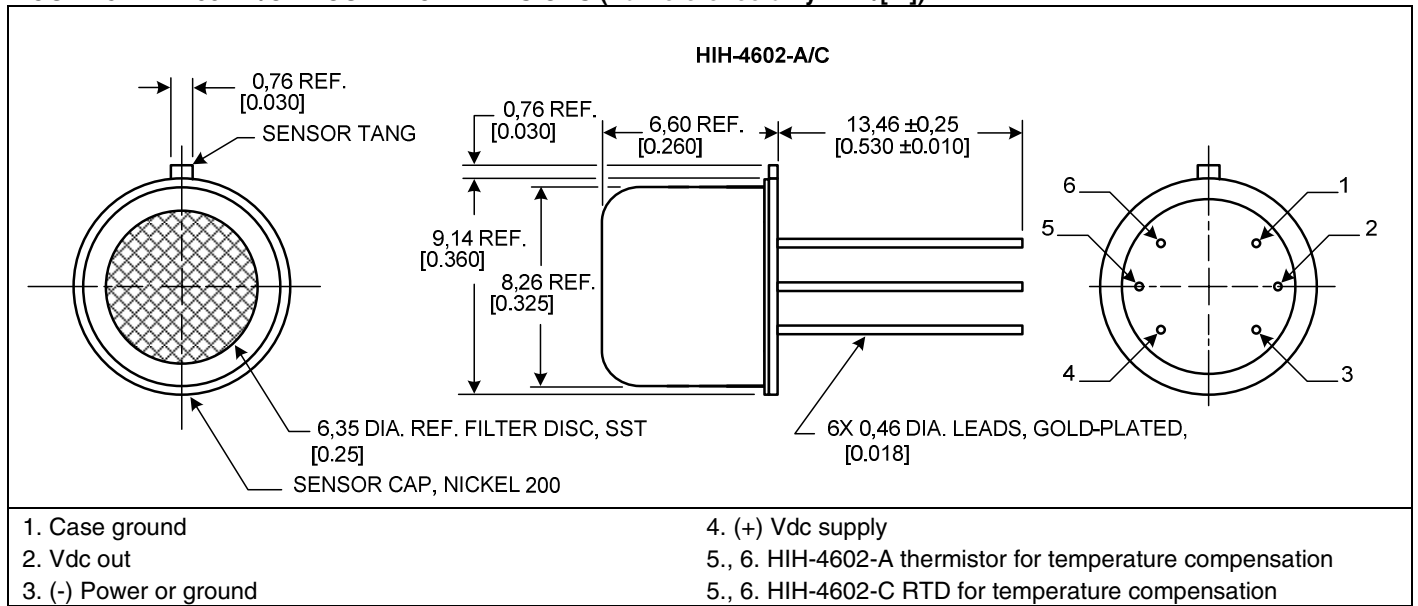


FIGURE 4. TYPICAL OUTPUT VOLTAGE (BFSL) VS RELATIVE HUMIDITY (At 0 °C, 70 °C and 5 V.)



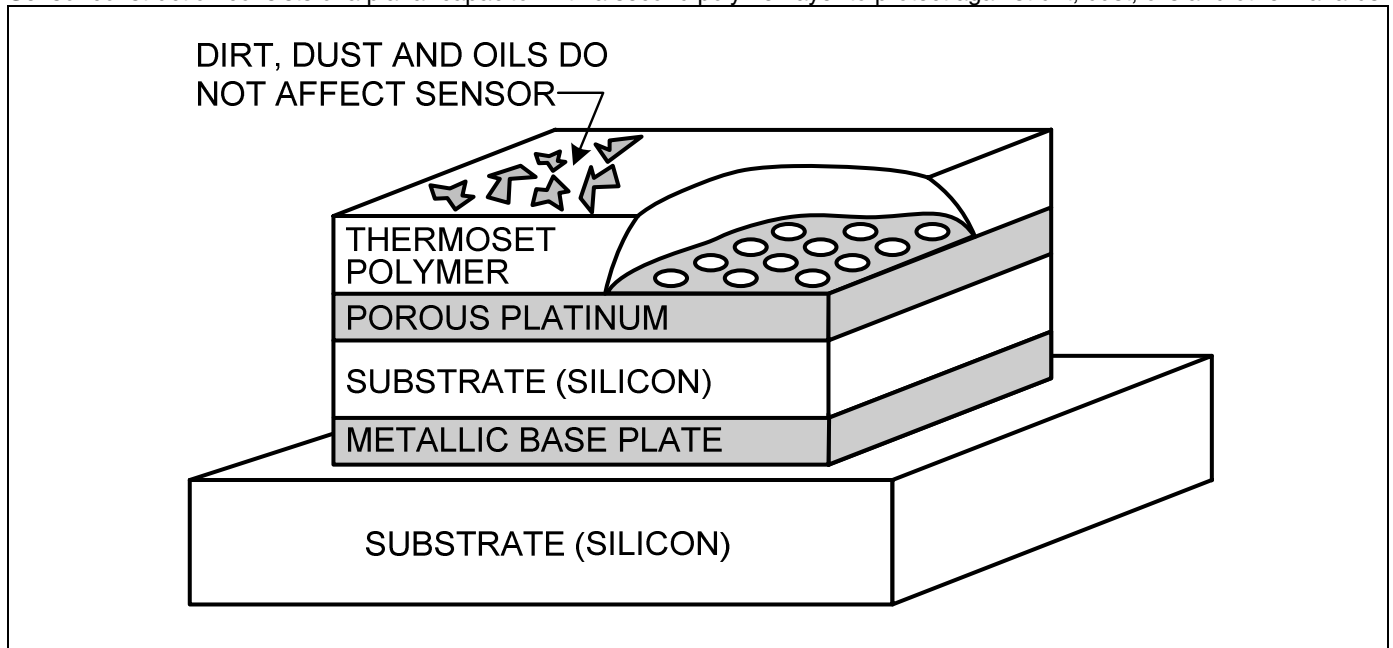
# Humidity Sensors

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



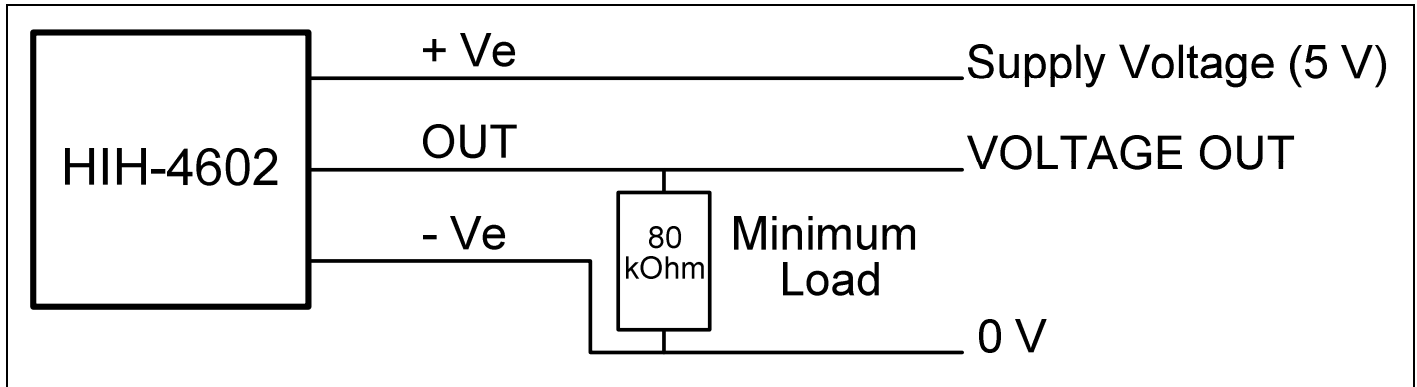
**FIGURE 6. RH SENSOR CONSTRUCTION**

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

- Product installation instructions
- Application sheets:
  - Humidity Sensor Performance Characteristics
  - Humidity Sensor Theory and Behavior
  - Humidity Sensor Moisture and Psychrometrics
  - Thermoset Polymer-based Capacitive Sensors

# Humidity 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.**

## 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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