Honeywell



The HIH-4030/4031 Series delivers instrumentation-guality RH

(Relative Humidity) sensing performance in a competitively

The HIH-4030 is a covered integrated circuit humidity sensor.

The HIH-4031 is a covered, condensation-resistant, integrated

circuit humidity sensor that is factory-fitted with a hydrophobic filter allowing it to be used in condensing environments

including industrial, medical and commercial applications.

The RH sensor uses a laser trimmed, thermoset polymer

capacitive sensing element with on-chip integrated signal

The sensing element's multilayer construction provides

excellent resistance to most application hazards such as

condensation, dust, dirt, oils and common environmental

HIH-4030/31 Series Humidity Sensors

DESCRIPTION

Honeywell has expanded our HIH Series to include an SMD (Surface Mount Device) product line: the new HIH 4030/4031. The HIH 4030/4031 complements our existing line of non-SMD humidity sensors. SMD packaging on tape and reel allows for use in high volume, automated pick and place manufacturing, eliminating lead misalignment to printed circuit board throughhole.

The HIH-4030/4031 Series Humidity Sensors are designed specifically for high volume OEM (Original Equipment Manufacturer) users.

Direct input to a controller or other device is made possible by this sensor's near linear voltage output. With a typical current draw of only 200 μ A, the HIH-4030/4031 Series is often ideally suited for low drain, battery operated systems.

Tight sensor interchangeability reduces or eliminates OEM production calibration costs. Individual sensor calibration data is available.

FEATURES

- Tape and reel packaging allows for use in high volume pick and place manufacturing (1,000 units per tape and reel)
- Molded thermoset plastic housing
- Near linear voltage output vs %RH
- Laser trimmed interchangeability
- Low power design
- Enhanced accuracy
- Fast response time
- Stable, low drift performance
- Chemically resistant

POTENTIAL APPLICATIONS

• Refrigeration equipment

priced, solderable SMD.

 HVAC (Heating, Ventilation and Air Conditioning) equipment

Sample packs are available. See order guide.

- Medical equipment
- Drying
- Metrology

conditioning.

chemicals.

- Battery-powered systems
- OEM assemblies

HIH-4030/31 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
Hysterisis	_	3		% RH	_
Repeatability	_	±0.5		% RH	_
Settling time	_	_	70	ms	_
Response time (1/e in slow moving air)	_	5	-	s	_
Stability (at 50% RH in a year)	_	±1.2		% RH	2
Stability (at 50% RH in a year)	_	±0.5		% RH	3
Voltage supply	4	-	5.8	Vdc	4
Current supply	-	200	500	μA	_
Voltage output (1 st order curve fit)	V _{out} =(V _{supply})(0.0062(sensor RH) + 0.16), typical at 25 °C				
Temperature compensation	True RH = (Sensor RH)/(1.0546 – 0.00216T), T in °C				
Output voltage temp. coefficient at 50% RH, 5 V	_	-4		mV/ºC	_
Operating temperature	-40[-40]	See Figure 1.	85[185]	°C[°F]	_
Operating humidity (HIH-4030)	0	See Figure 1.	100	% RH	5
Operating humidity (HIH-4031)	0	See Figure 1.	100	% RH	_
Storage temperature	-50[-58]	_	125[257]	°C[°F]	_
Storage humidity		See Figure 2.		% RH	5

Specific Notes:

- 1. Can only be achieved with the supplied slope and offset. For HIH-4030/31-003 catalog listings only.
- 2. Includes testing outside of recommended operating zone.
- 3. Includes testing for recommended operating zone only.
- 4. Device is calibrated at 5 Vdc and 25 °C.
- 5. Non-condensing environment. When liquid water falls on the humidity sensor die, output goes to a low rail condition indicating no humidity.

FACTORY CALIBRATION DATA

HIH-4030/31 Sensors may be ordered with a calibration and data printout. See Table 2 and the order guide on the back page.

TABLE 2. EXAMPLE DATA PRINTOUT

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Model	HIH-4030-003			
Channel	92			
Wafer	030996M			
MRP	337313			
Calculated values at 5 V V _{out} at 0% RH V _{out} at 75.3% RH	0.958 V 3.268 V			
Linear output for 3.5% RH accuracy at 25 °C Zero offset Slope Sensor RH	0.958 V 30.680 mV/%RH (V _{ουτ} - zero offset)/slope (V _{ουτ} - 0.958)/0.0307			
Ratiometric response for 0% RH to 100% RH V _{out}	V _{SUPPLY} (0.1915 to 0.8130)			

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.



Humidity Sensors



FIGURE 1. OPERATING ENVIRONMENT (Non-condensing environment for HIH-4030 catalog listings only.)





HIH-4030/31 Series



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





Humidity Sensors



FIGURE 5. HIH-4030 MOUNTING DIMENSIONS (For reference only. mm/[in])

HIH-4030/31 Series



FIGURE 6. HIH-4031 MOUNTING DIMENSIONS (For reference only. mm/[in])

FIGURE 7. HIH-4031 PCB LANDING PATTERN (For reference only. mm/[in])



Humidity Sensors



FIGURE 8. TAPE AND REEL DIMENSIONS (For reference only. mm/[in])

FIGURE 9. TYPICAL APPLICATION CIRCUIT



ORDER GUIDE

Catalog Listing	Description
HIH-4030-001	Covered integrated circuit humidity sensor, SMD, 1000 units on tape and reel
HIH-4030-003	Covered integrated circuit humidity sensor, SMD, calibration and data printout, 1000 units on tape and ree
HIH-4031-001	Covered, filtered integrated circuit humidity sensor, SMD, 1000 units on tape and reel
HIH-4031-003	Covered, filtered integrated circuit humidity sensor, SMD, calibration and data printout, 1000 units on tape and reel
HIH-4030-001S	Sample pack: covered integrated circuit humidity sensor, SMD, five units on tape
HIH-4030-003S	Sample pack: covered integrated circuit humidity sensor, SMD, calibration and data printout, five units on tape
HIH-4031-001S	Sample pack: covered, filtered integrated circuit humidity sensor, SMD, sample pack, five units on tape
HIH-4031-003S	Sample pack: covered, filtered integrated circuit humidity sensor, SMD, calibration and data printout, five units on tape

FURTHER HUMIDITY SENSOR INFORMATION

See the following associated literature is available on the Web:

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

A 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.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

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.

A 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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