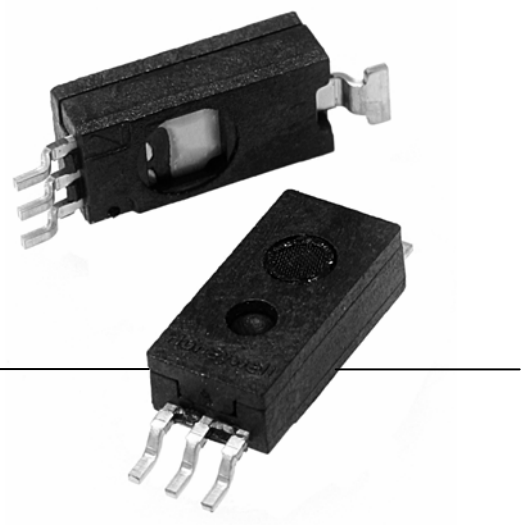
Honeywell



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 through-hole.

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 µA, 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.

The HIH-4030/4031 Series delivers instrumentation-quality RH (Relative Humidity) sensing performance in a competitively priced, solderable SMD.

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 conditioning.

The sensing element's multilayer construction provides excellent resistance to most application hazards such as condensation, dust, dirt, oils and common environmental chemicals.

Sample packs are available. See order guide.

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
- HVAC (Heating, Ventilation and Air Conditioning) equipment
- Medical equipment
- Drying
- Metrology
- Battery-powered systems
- OEM assemblies

HIH-4030/31 Series

TABLE 1. PERFORMANCE SPECIFICATIONS (At 5 Vdc supply and 25 ºC [77 ºF] 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 (1st order curve fit)	$V_{OUT}=(V_{SUPPLY})(0.0062(\text{sensor RH}) + 0.16)$, typical at 25 ºC				
Temperature compensation	True RH = (Sensor RH)/(1.0546 – 0.00216T), T in ºC				
Output voltage temp. coefficient at 50% RH, 5 V	–	-4	–	mV/ºC	–
Operating temperature	-40[-40]	See Figure 1.	85[185]	ºC[ºF]	–
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]	ºC[ºF]	–
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 ºC.
5. Non-condensing environment. When liquid water falls on the humidity sensor die, output goes to a low rail condition indicating no humidity.

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-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

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_{OUT} - zero offset)/slope (V_{OUT} - 0.958)/0.0307
Ratiometric response for 0% RH to 100% RH V_{OUT}	 V_{SUPPLY} (0.1915 to 0.8130)



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

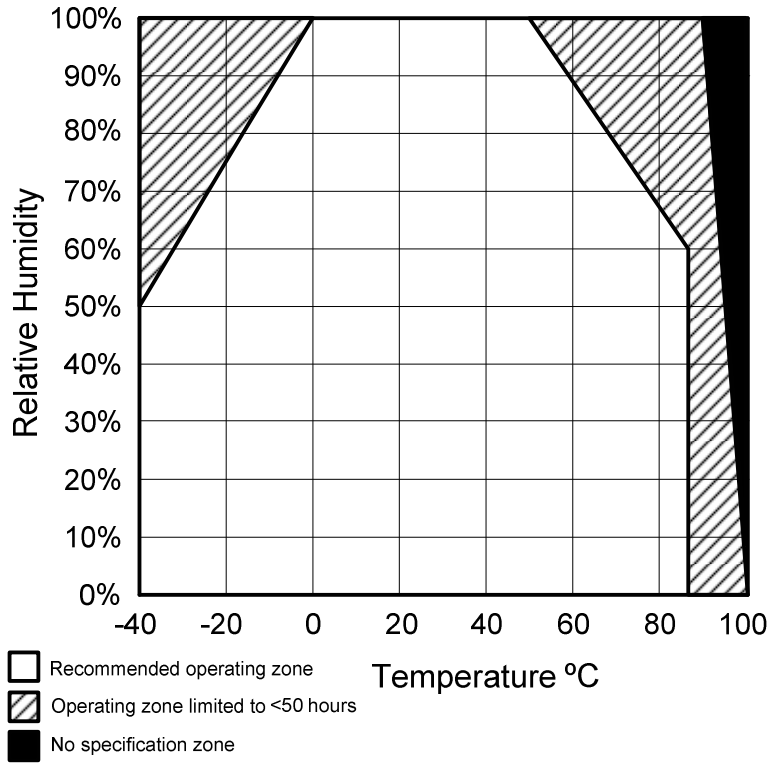


FIGURE 2. STORAGE ENVIRONMENT (Non-condensing environment for HIH-4030 catalog listings only.)

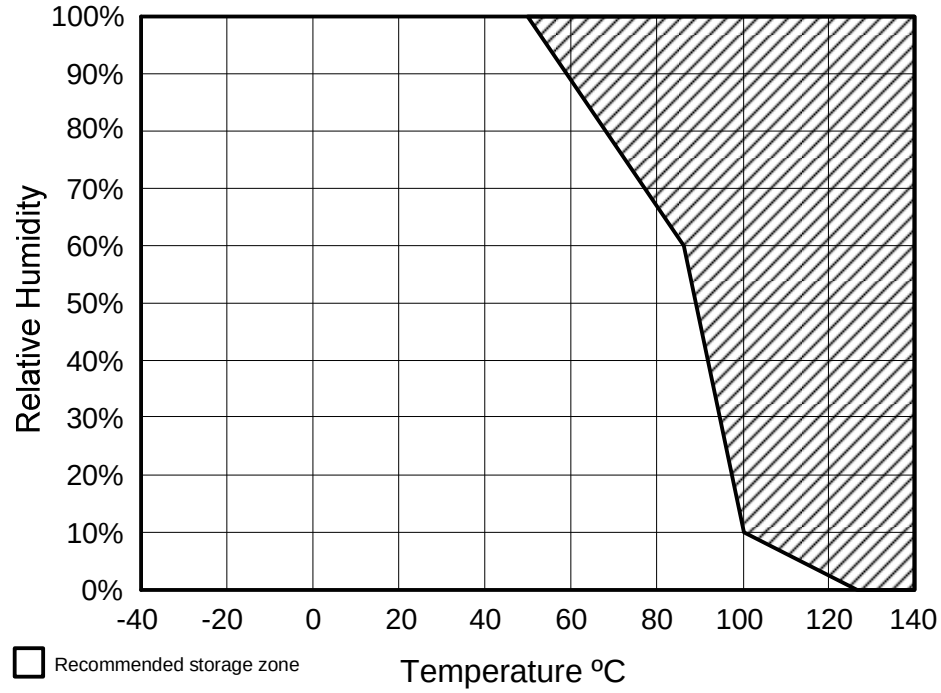


FIGURE 3. TYPICAL OUTPUT VOLTAGE VS RELATIVE HUMIDITY (At 25 ºC and 5 V.)

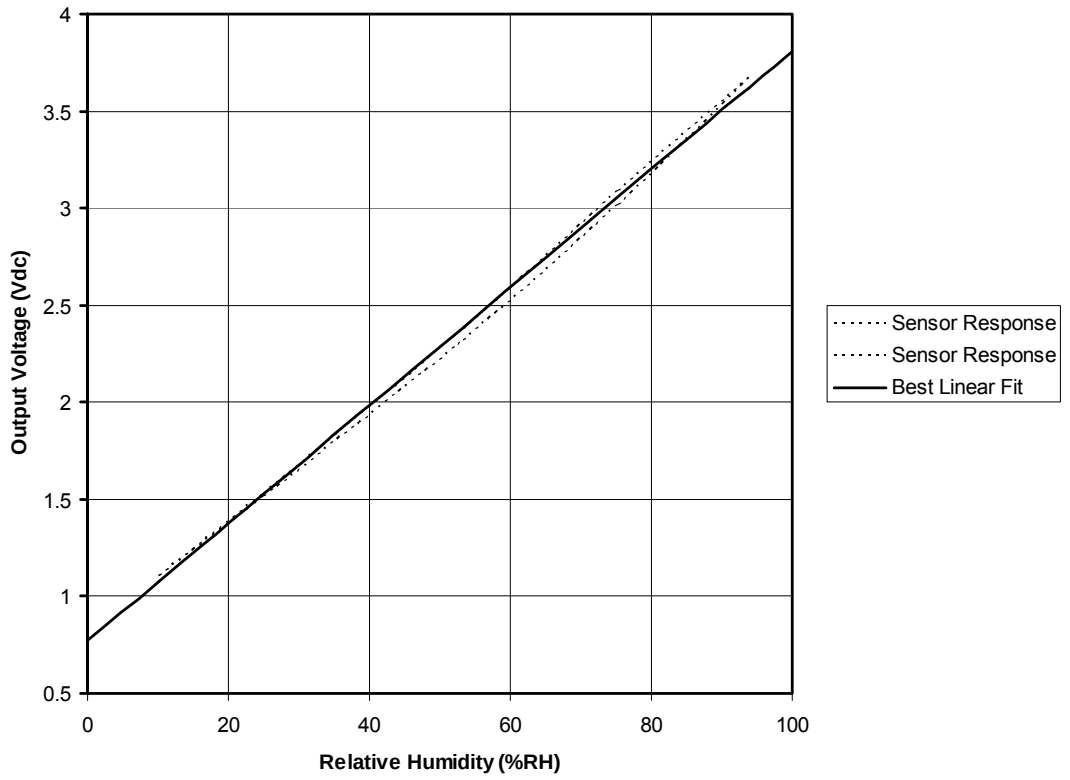


FIGURE 4. TYPICAL OUTPUT VOLTAGE (BFSL) VS RELATIVE HUMIDITY (At 0 ºC, 70 ºC and 5 V.)

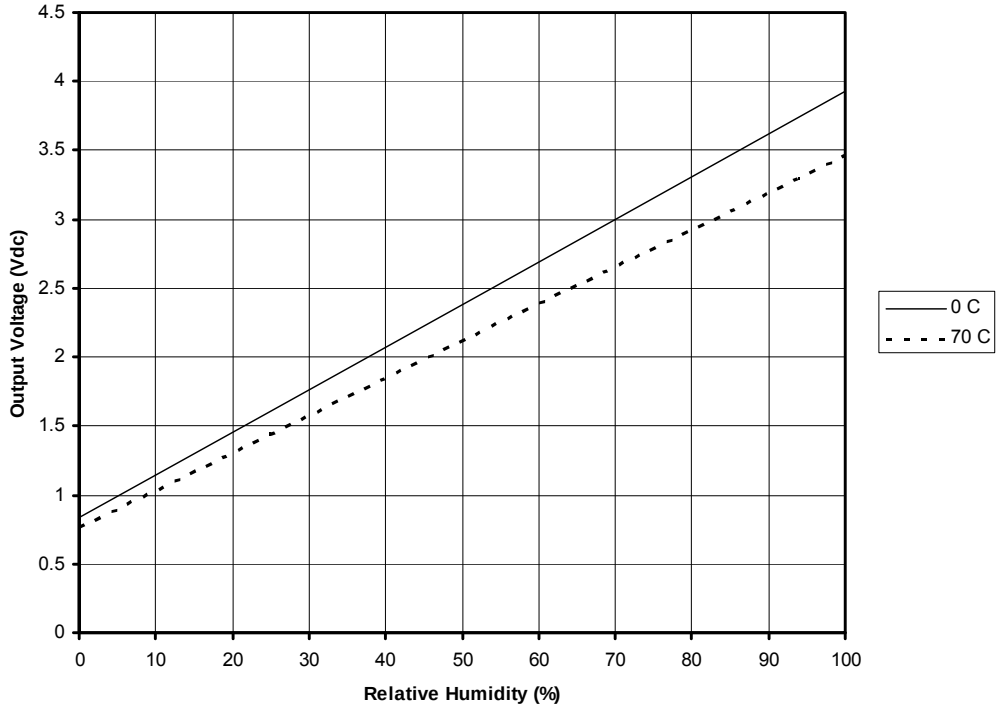


FIGURE 5. HIH-4030 MOUNTING DIMENSIONS (For reference only. mm/[in])

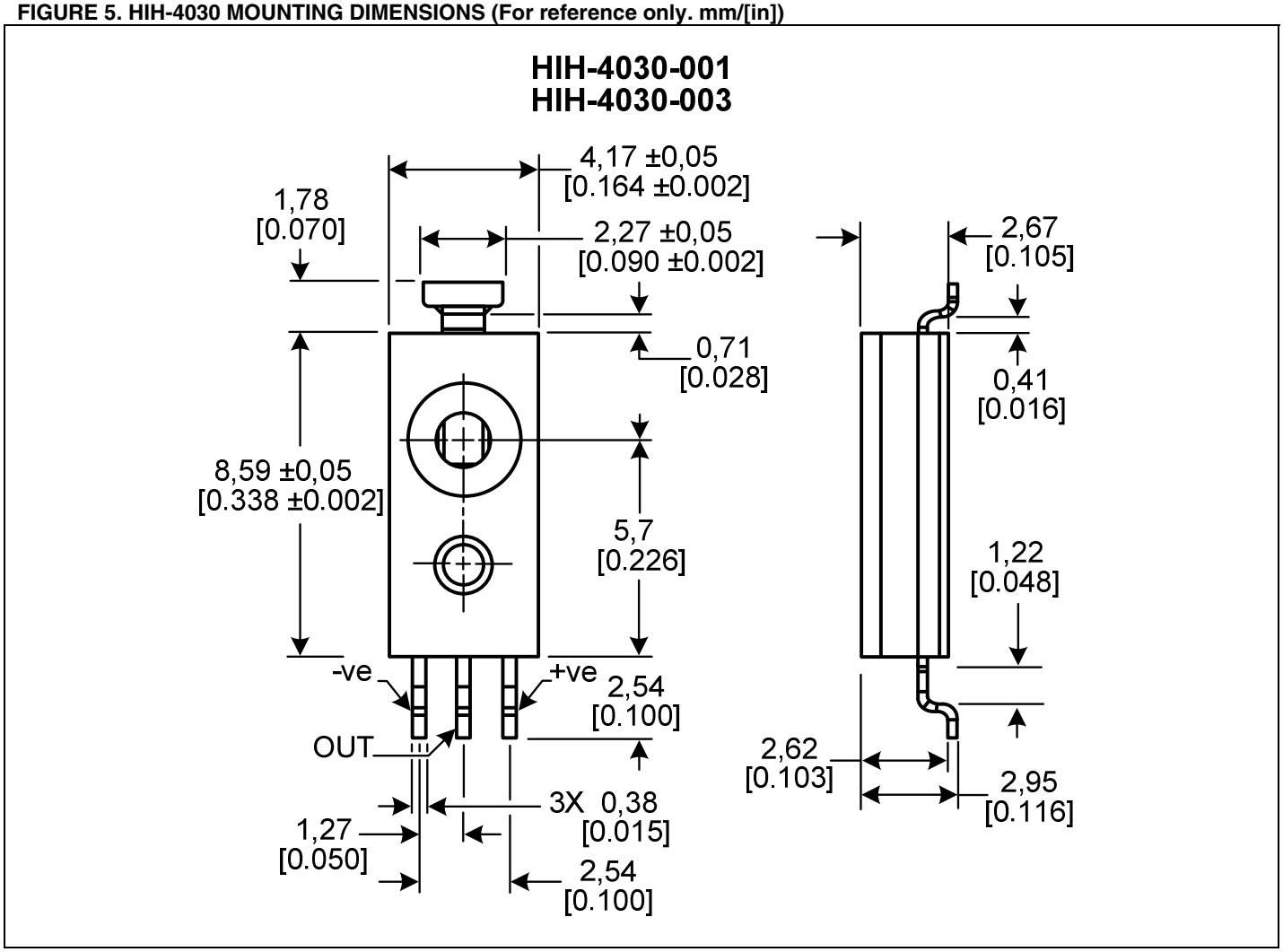


FIGURE 6. HIH-4031 MOUNTING DIMENSIONS (For reference only. mm/[in])

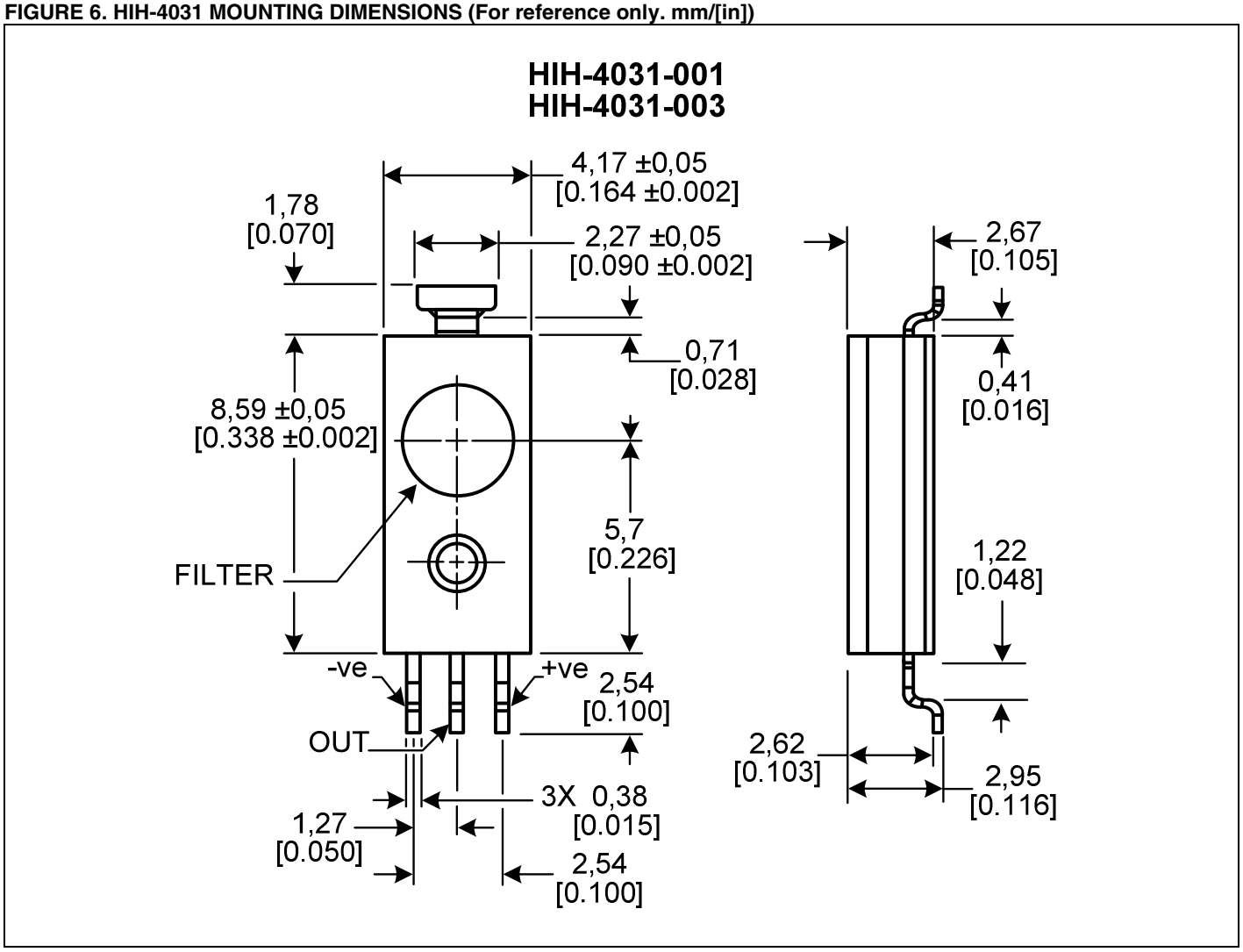


FIGURE 7. HIH-4031 PCB LANDING PATTERN (For reference only. mm/[in])

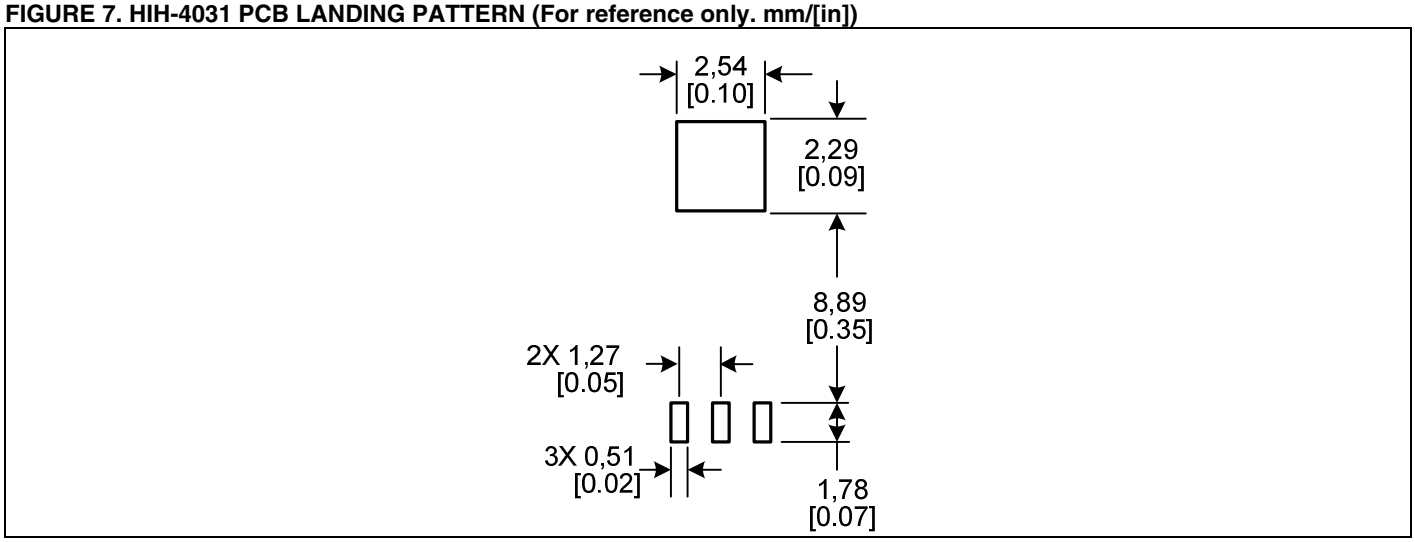


FIGURE 8. TAPE AND REEL DIMENSIONS (For reference only. mm/[in])

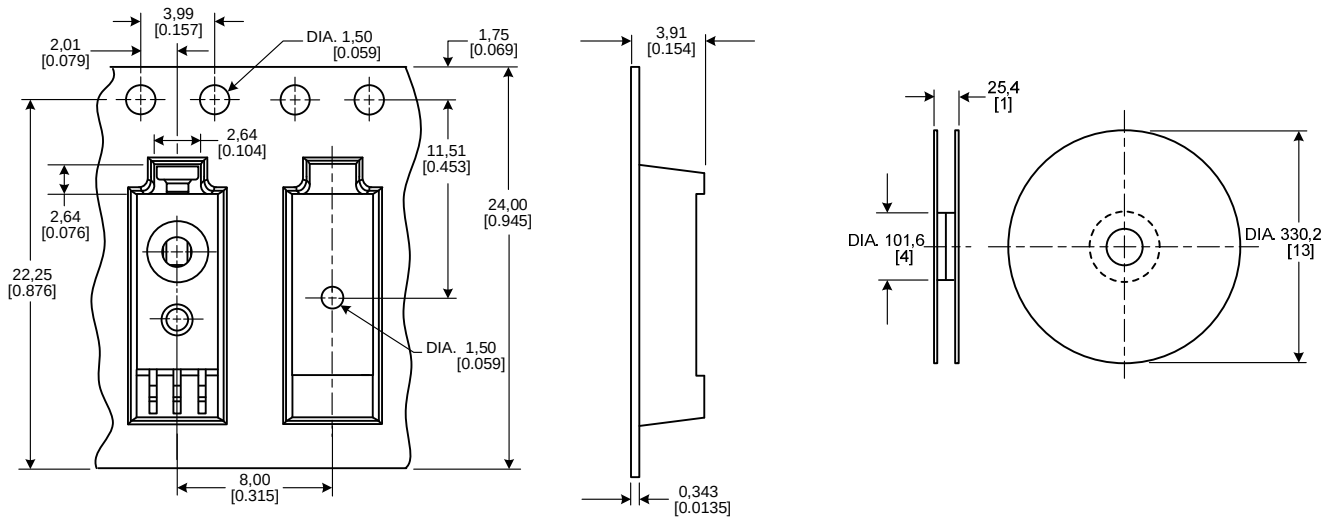
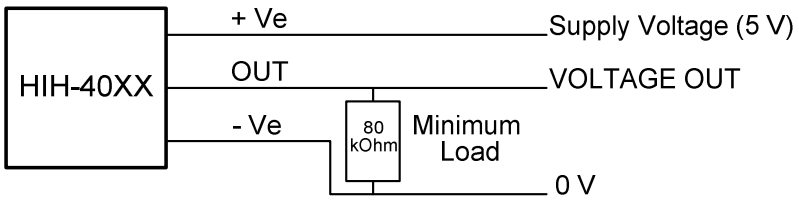


FIGURE 9. TYPICAL APPLICATION CIRCUIT



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 reel
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

⚠ 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.

⚠ 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:

E-mail: info.sc@honeywell.com

Internet: www.honeywell.com/sensing

Phone and Fax:

Asia Pacific	+65 6355-2828
	+65 6445-3033 Fax
Europe	+44 (0) 1698 481481
	+44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188
	+1-305-883-8257 Fax
USA/Canada	+1-800-537-6945
	+1-815-235-6847
	+1-815-235-6545 Fax

Sensing and Control
Honeywell
1985 Douglas Drive North
Minneapolis, MN 55422
www.honeywell.com/sensing

Honeywell

009021-4-EN IL50 GLO Printed in USA
March 2008
© 2008 Honeywell International Inc. All rights reserved.

Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

Honeywell:

SZL-VL-S-G-N-M 3150U 00090147 LSZ1UB SSCDANN150PG2A3 SSCSNBN005PDAA5 TSCSMNN100PDUCV 14CX1 3106 00030136 LSZ1R SSCMRRN005PD7A3 V15H16-CZ300A02-K SSCDRRN005PD2A3 LSZ4012 SSCDRNT1.6BAAA3 SSCMRNN600MDAA5 SZL-WLC-A 1865-13G-LDN LSZ53 SSCDLNN001PDAA5 SZL-VL-S-B-N-M LSZ1MB LSZ55D SSCDANT030PASA5 SSCDRRN001PD2A5 SZRMY21PAC110120V SSCDRNN100PG2A5 SSCDRRN060MDAA5 SZL-VL-E SSCMANN006BGAA3 SZL-WLC-A-N