Apollo

HIH-4000 Series

Humidity Sensors

The HIH-4000 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 linear voltage output. With a typical current draw of only 200 µA, the HIH-4000 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-4000 Series delivers instrumentation-quality RH (Relative Humidity) sensing performance in a competitively priced, solderable SIP (Single In-line Package). Available in two lead spacing configurations, the RH sensor is 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 wetting, dust, dirt, oils and common environmental chemicals.

FEATURES

- Molded thermoset plastic housing
- Linear voltage output vs %RH
- Laser trimmed interchangeability
- Low power design
- High accuracy
- Fast response time
- Stable, low drift performance
- Chemically resistant

TYPICAL APPLICATIONS

- Refrigeration equipment
- HVAC equipment
- Medical equipment
- Drying
- Metrology
- Battery-powered systems
- OEM assemblies

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TABLE 1. PERFORMANCE SPECIFICATIONS (At 5 Vdc supply and 25 ºC [77 ºF] unless otherwise noted.)
(%RH performance specifications include test system measurement errors (±0.5 % typical.)

Parameter	Minimum	Typical	Maximum	Unit
Interchangeability (best fit straight line)	–	–	–	–
0 % to 60 %	-5	–	5	%RH
60 % to 100 %	-8	–	8	%RH
Interchangeability (2nd order curve)	–	±3.5	–	%RH
Accuracy[1] (best fit straight line)	–	±3.5	–	%RH
Accuracy (2nd order curve)	–	±2.5	–	%RH
Hysterisis	–	3	–	%RH
Repeatability	–	±0.5	–	%RH
Settling time	–	–	70	ms
Response time (1/e in slow moving air)	–	15	–	s
Stability[2] (@ 50 %RH)	–	±1.2 (per year)	–	%RH
Stability[3] (@ 50 %RH)	–	±0.5 (per year)	–	%RH
Voltage supply	4	–	5.8	Vdc
Current supply	–	–	500	µA
Voltage output (1st order fit)	$V_{out}=V_{supply}(0.0062(\text{sensor RH})+0.16)$			
Voltage output (2nd order curve fit)	$V_{out}=0.00003(\text{sensor RH})^2+0.0281(\text{sensor RH})+0.820$, typical @ 25 ºC			
Temperature compensation	$V_{out}=(0.0305+0.000044T-0.0000011T^2)(\text{Sensor RH})+(0.9237-0.0041T+0.000040T^2)$, T=Temperature in ºC			
Operating temperature	-40[-40]	See Figure 1.	85[185]	ºC[ºF]
Operating humidity	0	See Figure 2.	100	%RH
Storage temperature	-40[-40]	–	125[257]	ºC[ºF]
Storage humidity	See Figure 2.			%RH

Notes:
1. For HIH-4000-003 and -004 only.
2. Specification includes testing outside of recommended operating zone.
3. Specification includes testing for recommended operating zone only.

NOTICE
- Do not expose sensor to condensing environments. Exposure to condensing environments will cause sensor output to indicate 0 %RH.
- Sensor is light sensitive. For best performance, shield sensor from bright light.
- Sensor is static sensitive. Sensor connection protected to 15 kV maximum.
- Sensor output is ratiometric to supply voltage.

Failure to comply with these instructions could result in death or serious injury.

FACTORY CALIBRATION DATA
HIH-4000 Sensors may be ordered with a calibration and data printout (Table 2). See order guide on back page.

TABLE 2. EXAMPLE DATA PRINTOUT

Model	HIH-4000-001
Channel	92
Wafer	030996M
MRP	337313
Calculated values at 5 V V_{out} @ 0 %RH V_{out} @ 75.3 %RH	 0.958 V 3.268 V
Linear output for 2 %RH accuracy @ 25 °C Zero offset Slope RH	 0.958 V 30.680 mV/%RH (V_{out}-zero offset)/slope (V_{out}-0.958)/0.0307
Ratiometric response for 0 % to 100 %RH V_{out}	 V_{supply} (0.1915 to 0.8130)

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FIGURE 1. RECOMMENDED OPERATING CONDITIONS

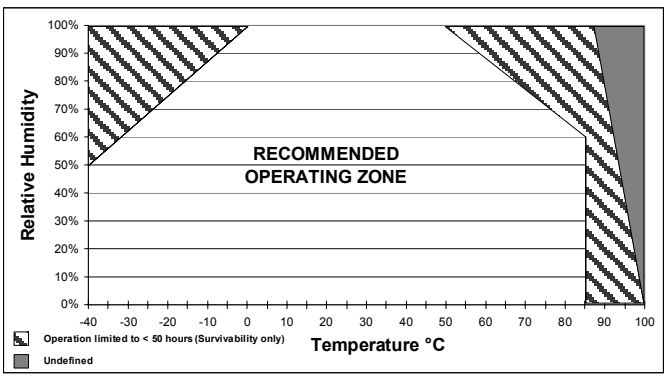


FIGURE 2. STORAGE ENVIRONMENT

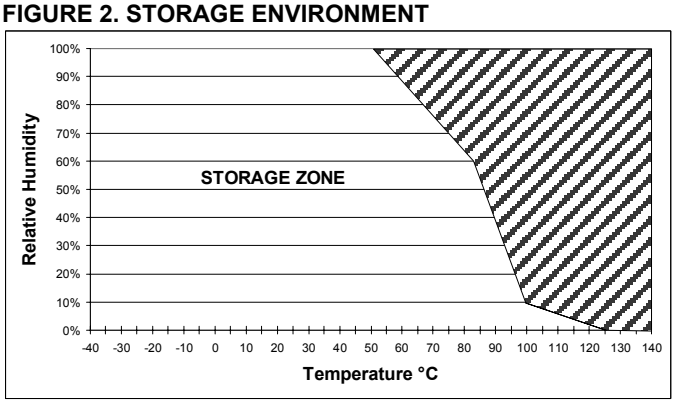


FIGURE 3. MOUNTING DIMENSIONS
for reference only mm/[in]

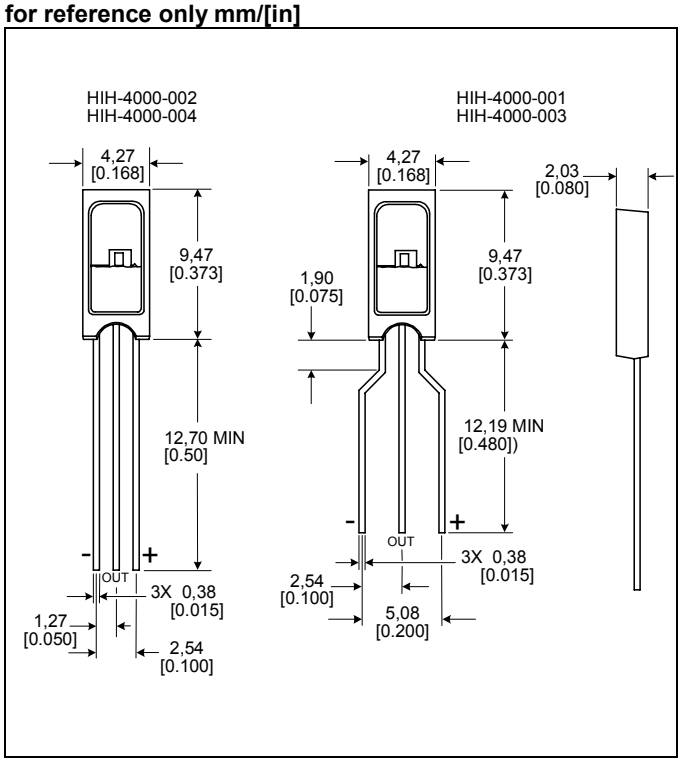


FIGURE 4. TYPICAL BEST FIT STRAIGHT LINE

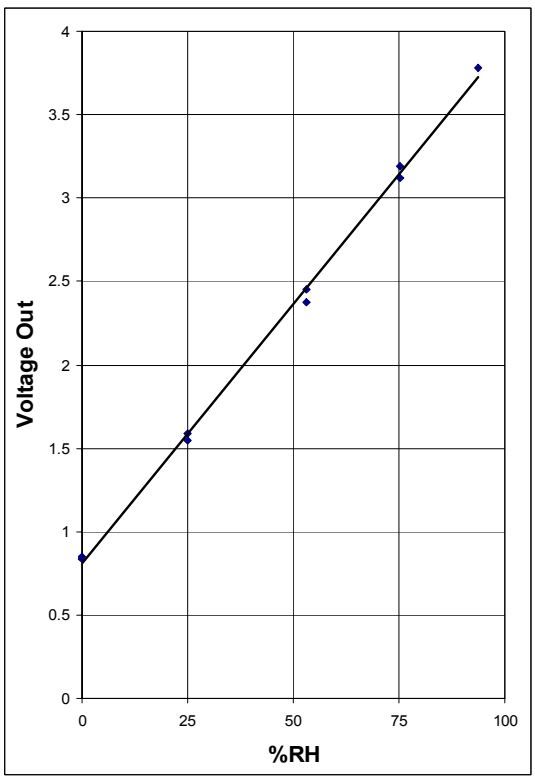
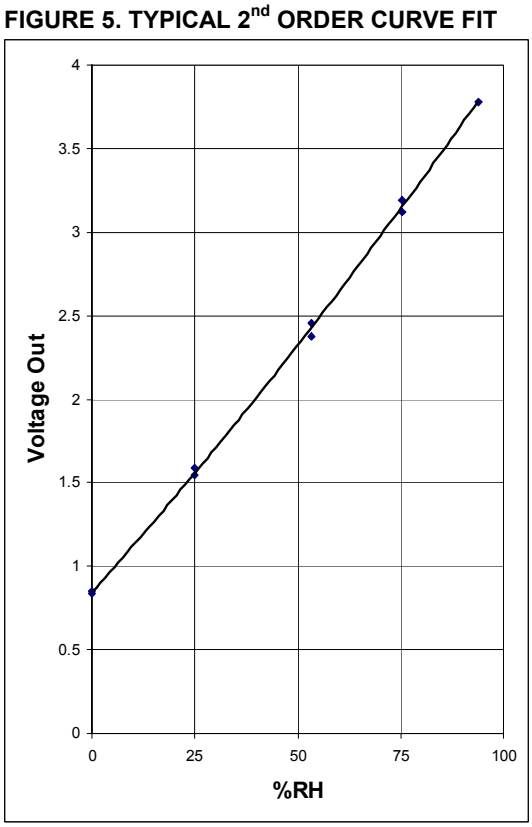


FIGURE 5. TYPICAL 2nd ORDER CURVE FIT



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ORDER GUIDE

Catalog Listing	Description
HIH-4000-001	Integrated circuitry humidity sensor, 0.100 in lead pitch SIP
HIH-4000-002	Integrated circuitry humidity sensor, 0.050 in lead pitch SIP
HIH-4000-003	Integrated circuitry humidity sensor, 0.100 in lead pitch SIP with calibration and data printout
HIH-4000-004	Integrated circuitry humidity sensor, 0.050 in lead pitch SIP with calibration and data printout

⚠ 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.

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