

HDC1010 Low Power, High Accuracy Digital Humidity Sensor with Temperature Sensor

1 Features

- Relative Humidity Accuracy $\pm 2\%$ (typical)
- Temperature Accuracy $\pm 0.2^\circ\text{C}$ (typical)
- Excellent Stability at High Humidity
- 14 Bit Measurement Resolution
- 100 nA Sleep Mode Current
- Average Supply Current:
 - 710 nA @ 1 sps, 11 bit RH Measurement
 - 1.3 μA @ 1 sps, 11 bit RH and Temperature Measurement
- Supply Voltage 2.7 V to 5.5 V
- Tiny 2 mm x 1.6 mm Device Footprint
- I²C Interface

2 Applications

- HVAC
- IoT Smart Thermostats and Room Monitors
- Refrigerators
- Printers
- White Goods
- Medical Devices
- Wireless Sensor (TIDA: [00374](#), [00484](#), [00524](#))

4 Typical Application

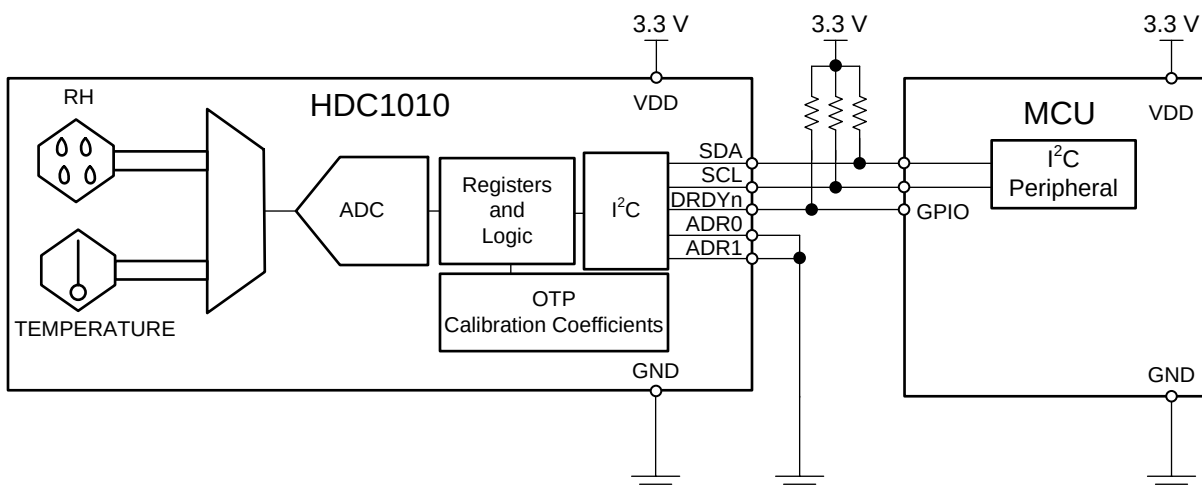
3 Description

The HDC1010 is a digital humidity sensor with integrated temperature sensor that provides excellent measurement accuracy at very low power. The HDC1010 operates over a wide supply range, and is a low cost, low power alternative to competitive solutions in a wide range of common applications. The innovative WLCSP (Wafer Level Chip Scale Package) simplifies board design with the use of an ultra-compact package. The sensing element of the HDC1010 is placed on the bottom part of the device, which makes the HDC1010 more robust against dirt, dust, and other environmental contaminants. The humidity and temperature sensors are factory calibrated and the calibration data is stored in the on-chip non-volatile memory.

Device Information ⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
HDC1010	DSBGA (8-bump)	2.04 mm x 1.59 mm

(1) For all available packages, see the orderable addendum at the end of the datasheet.



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5 Device and Documentation Support

5.1 Documentation Support

5.1.1 Related Documentation

Wireless Sensor Humidity & Temp Sensor Node for Star Networks Enabling 10+ Year Coin Cell Battery Life Ref Design [TIDA-00374](#)

Humidity & Temp Sensor Node for Sub-1GHz Star Networks Enabling 10+ Year Coin Cell Battery Life [TIDA-00484](#)

Ultralow Power Multi-sensor Data Logger with NFC Interface Reference Design [TIDA-00524](#)

HDC1010 Texas Instruments Humidity Sensors, [SNAA216](#)

5.2 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

TI E2E™ Online Community *TI's Engineer-to-Engineer (E2E) Community*. Created to foster collaboration among engineers. At [e2e.ti.com](#), you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support *TI's Design Support* Quickly find helpful E2E forums along with design support tools and contact information for technical support.

5.3 Trademarks

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5.4 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

5.5 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

6 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
HDC1010YPAR	PREVIEW	DSBGA	YPA	8	3000	TBD	Call TI	Call TI	-40 to 125		
HDC1010YPAT	PREVIEW	DSBGA	YPA	8	250	TBD	Call TI	Call TI	-40 to 125		

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

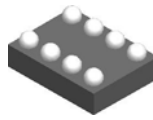
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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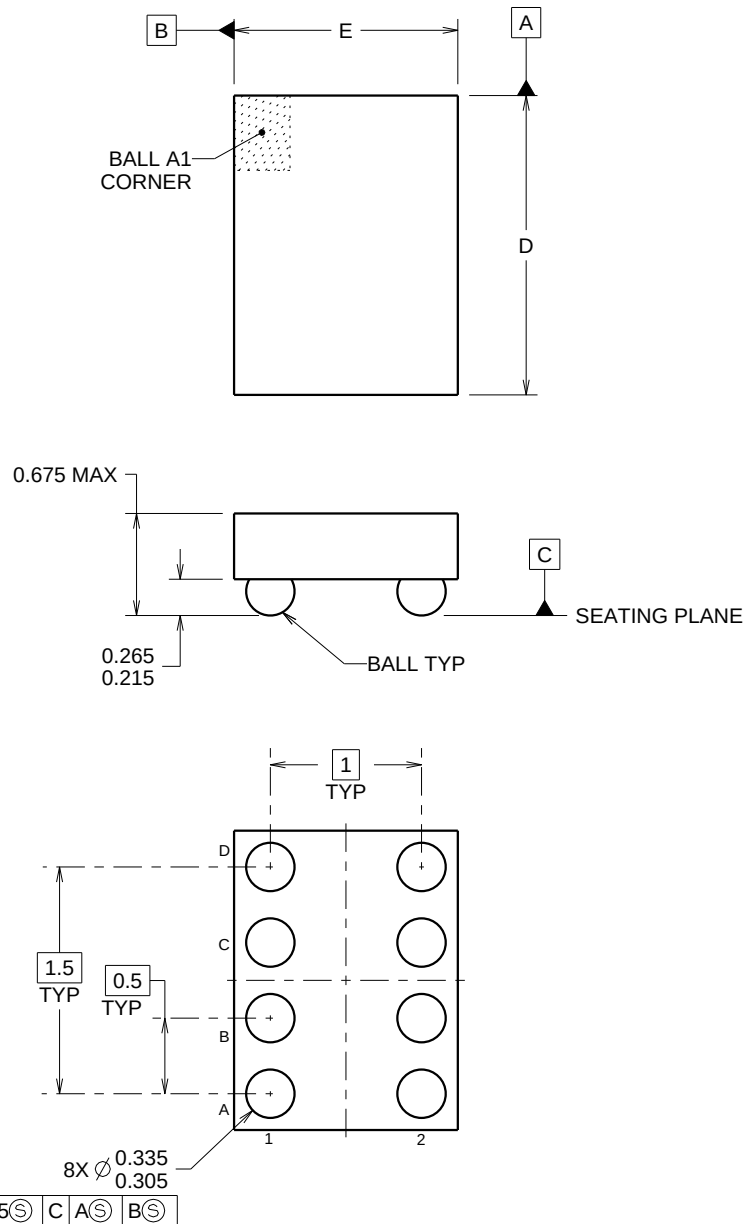
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YPA0008



DSBGA - 0.675 mm max height

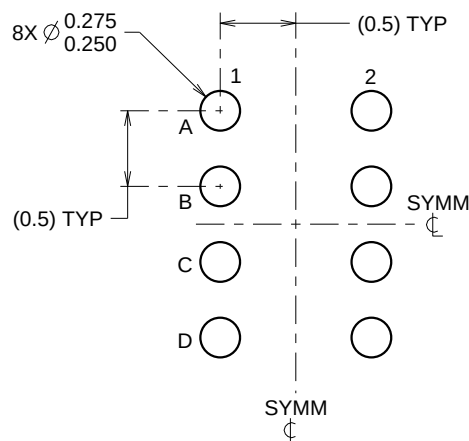
DIE SIZE BALL GRID ARRAY



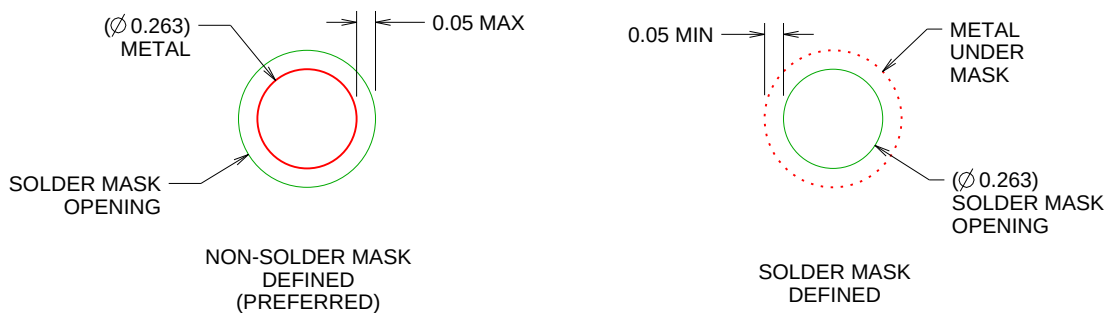
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NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.



LAND PATTERN EXAMPLE
SCALE:20X

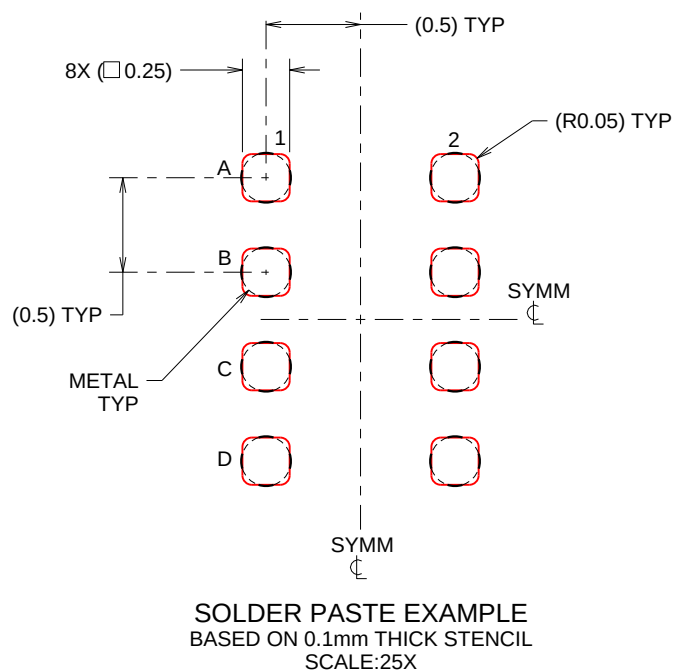


SOLDER MASK DETAILS
NOT TO SCALE

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NOTES: (continued)

- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. See Texas Instruments Literature No. SBVA017 (www.ti.com/lit/sbva017).



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NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release.

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