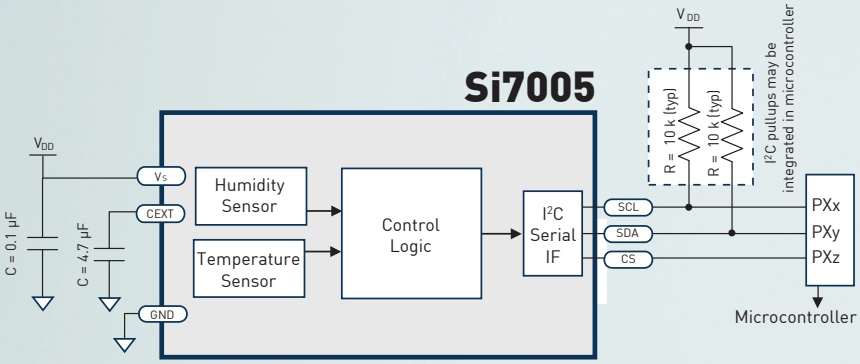
# Humidity and Temperature Sensors

www.silabs.com/humidity-sensor

## DIGITAL I²C HUMIDITY AND TEMPERATURE SENSORS

The Si7005 is a digital relative humidity and temperature sensor. This monolithic CMOS IC integrates temperature and humidity sensor elements, an analog-to-digital converter, signal processing, calibration data, and an I²C host interface. The patented use of industry-standard, low-K polymeric dielectrics for sensing humidity enables the construction of a low-power, monolithic CMOS sensor IC with low drift and hysteresis and excellent long term stability. Both the temperature and humidity sensors are factory-calibrated and the calibration data is stored in the on-chip non-volatile memory. This ensures that the sensors are fully interchangeable, with no recalibration or software changes required. The Si7005 is packaged in a 4 mm x 4 mm QFN package and is reflow solderable.




## FEATURES

- Relative Humidity Sensor:
  - ± 4.5% RH (maximum @ 20–80% RH)
- Temperature Sensor:
  - ±0.5 °C accuracy (typical)
  - ±1 °C accuracy (maximum @ 0 to 70 °C)
- 0 to 100% RH operating range
- –40 to +85 °C (-GM)
- 0 to +70 °C operating range (-FM)
- Wide operating voltage range (2.1 to 3.6 V)
- Low Power Consumption:
  240 µA during RH conversion
- I²C host interface
- Integrated on-chip heater
- 4 mm x 4 mm QFN package
- Excellent long term stability
- Factory calibrated
- Optional factory-installed filter/cover
  - Low-profile
  - Protection during reflow
  - Excludes liquids and particulates (hydrophobic/oleophobic)

## APPLICATIONS

- Industrial HVAC/R
- Thermostats/humidistats
- Respiratory therapy
- White goods
- Micro-environments/data centers
- Automotive climate control and de-fogging
- Asset and goods tracking

**LOWEST POWER INTEGRATED RH SENSOR**

MORE INFORMATION AND DOCUMENTATION DOWNLOADS AT: www.silabs.com/humidity-sensor

SILICON LABS

Engineering for a mixed-signal world.

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## Si7005 Development Tools

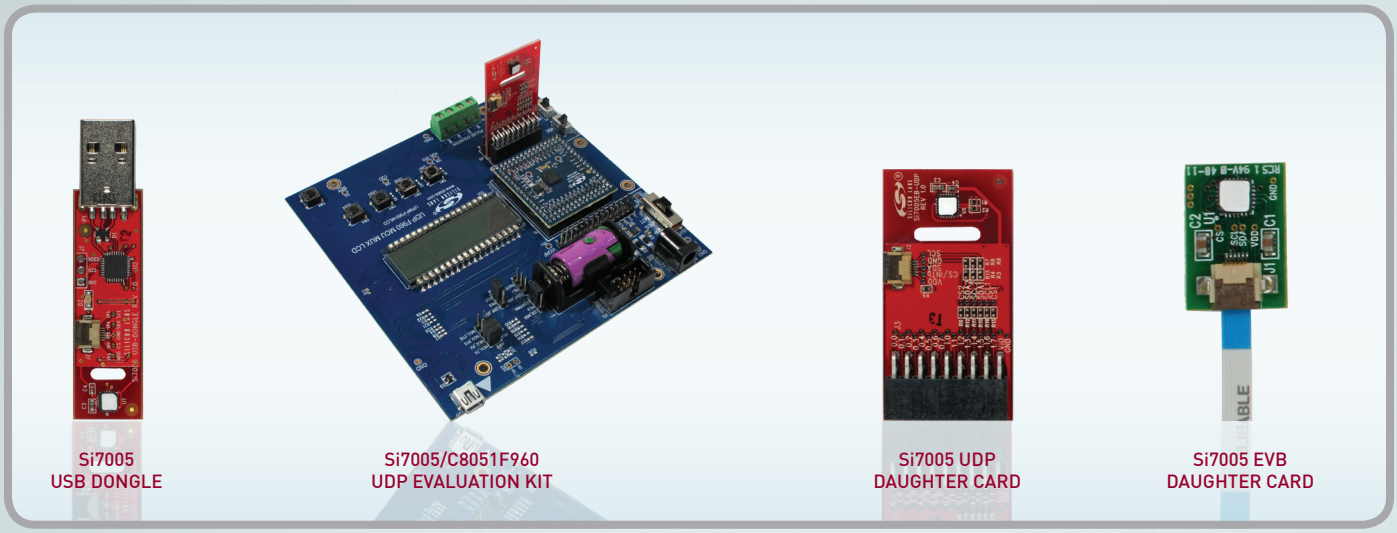
The Si7005 is supported by a suite of hardware and software development tools that facilitate testing/characterization, prototyping and software development.

The **Si7005USB-DONGLE** Evaluation kit comes with everything developers need to demonstrate and evaluate the Si7005. The board plugs into a PC via a USB socket. It has a connector for adding the Si7005USB-EVB.

The optional **Si7005-EVB** is a small daughter card that permits evaluation of the Si7005 at the end of a flex cable. It is a useful add-on to the Si7005USB-DONGLE (it plugs right in) if the user wants to put a sensor in a temperature/humidity chamber or a product prototype.

The **Si7005EVB-UDP** is a small daughter card that permits evaluation of the Si7005 in conjunction with certain Unified Development Platform (UDP) components such as the C8051F960 Ultra-Low Power Microcontroller Development Kit It plugs directly into UDP MCU cards for fast prototyping and software development. In addition to an on-board Si7005, there is a connector for adding an Si7005-EVB via its flex cable, allowing the user to place the Si7005 in a temperature/humidity chamber or a product prototype.

The **Si7005EVB-UDP-F960** Development Kit combines the C8051F960 Ultra-Low Power Microcontroller Development Kit and the Si7005EVB-UDP daughter card with data logger demonstration code. It is a complete package designed to support hardware and software development using the Si7005 and Silicon Lab's ultra-low power MCUs. It ships with example software that implements a portable, battery-powered data logger/asset tracker.



Si7005
USB DONGLE

Si7005/C8051F960
UDP EVALUATION KIT

Si7005 UDP
DAUGHTER CARD

Si7005 EVB
DAUGHTER CARD

## Digital I²C Humidity and Temperature Sensors

| PART NUMBER | DESCRIPTION | TYP ACCURACY | | TEMPERATURE RANGE | FILTER COVER | PACKAGE FORMAT | PACKAGE |
|---|---|---|---|---|---|---|---|
| | | TEMP. | RH | | | | |
| Si7005-B-FM | Compact digital relative humidity (RH) and temperature sensor IC, commercial grade | ±0.5 °C | ±3% | 0 to 70 °C | | Tube | QFN24 |
| Si7005-B-FM1 | Compact digital relative humidity (RH) and temperature sensor IC, commercial grade with pre-installed protective cover | ±0.5 °C | ±3% | 0 to 70 °C | • | Tray | QFN24 |
| Si7005-B-FM1R | Compact digital relative humidity (RH) and temperature sensor IC, commercial grade with pre-installed protective cover on tape and reel | ±0.5 °C | ±3% | 0 to 70 °C | • | Tape-and-Reel | QFN24 |
| Si7005-FMR | Compact digital relative humidity (RH) and temperature sensor IC, commercial grade on tape and reel | ±0.5 °C | ±3% | 0 to 70 °C | | Tape-and-Reel | QFN24 |
| Si7005-B-GM | Compact digital relative humidity (RH) and temperature sensor IC, industrial grade | ±0.5 °C | ±3% | –40 to 85 °C | | Tube | QFN24 |
| Si7005-B-GM1 | Compact digital relative humidity (RH) and temperature sensor IC, industrial grade with pre-installed protective cover | ±0.5 °C | ±3% | –40 to 85 °C | • | Tray | QFN24 |
| Si7005-B-GM1R | Compact digital relative humidity (RH) and temperature sensor IC, industrial grade with pre-installed protective cover on tape and reel | ±0.5 °C | ±3% | –40 to 85 °C | • | Tape-and-Reel | QFN24 |
| Si7005-GMR | Compact digital relative humidity (RH) and temperature sensor IC, industrial grade on tape and reel | ±0.5 °C | ±3% | –40 to 85 °C | | Tape-and-Reel | QFN24 |

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