

SKU:SEN0428 (<https://www.dfrobot.com/product-2437.html>)

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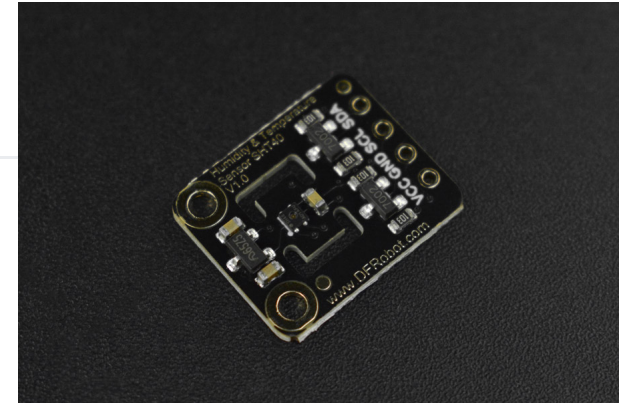
(<https://www.dfrobot.com/product-2437.html>)

Introduction

The SHT4X is the 4th generation digital temperature and humidity sensor from Sensirion. In line with Sensirion's industry-proven humidity and temperature sensors, the SHT40 offers consistent high accuracy within measuring range.

The SHT40 sensor covers a humidity measurement range of 0 to 100%RH and a temperature detection range of -40°C to 125°C with a typical accuracy of $\pm 1.8\%$ RH and $\pm 0.2^\circ\text{C}$. The internal variable power heater enables the device to work properly under extreme operating conditions like condensing environment.

The board supply voltage of 3.3V to 5V and an current consumption below 0.15mA in low power mode make the SHT40 perfectly suitable for mobile or wireless battery-driven applications. It is suitable for urban environment monitoring, intelligent buildings, industrial automation, smart home and other Internet of Things applications.



Features

- High Accuracy
- Low Power Consumption
- Small Size
- Fast Response

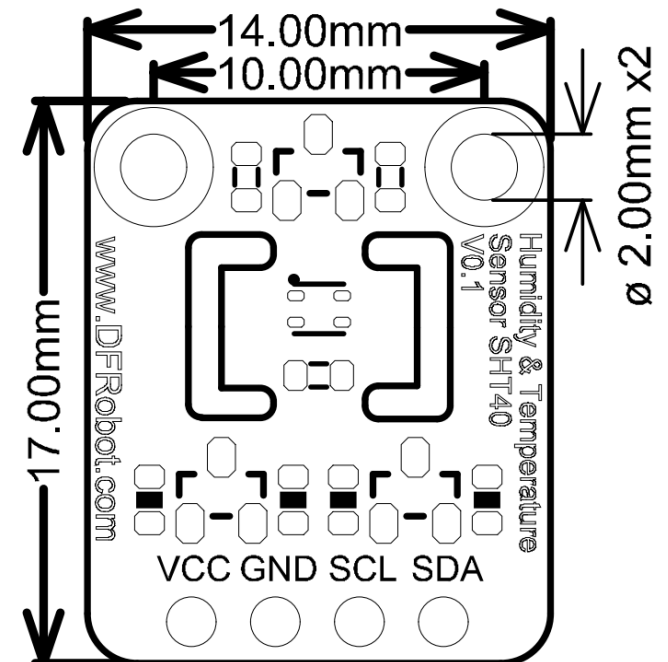
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Applications

- Intelligent Buildings and Furniture
- Weather Station
- Warehouses
- Animals and Plants Culture
- Animal Incubator
- Germinating Box for plant seed

Specification

- Operating Voltage: 3.3V-5V
- Operating Current: 0.45mA
- Communication Interface: I2C
- Response Time: 8s (tau63%)
- Humidity Measurement Range: 0~100%RH
- Humidity Measurement Accuracy: $\pm 1.8\%$
- Temperature Measurement Range: $-40\sim+125^{\circ}\text{C}$
(-40 to $+275^{\circ}\text{F}$)
- Temperature Measurement Accuracy: $\pm 0.2^{\circ}\text{C}$
- Dimension: $14\times 17\text{mm}/0.55\times 0.67''$
- Mounting Hole Size: M2 (2mm)
- Mounting Hole Pitch: 10mm



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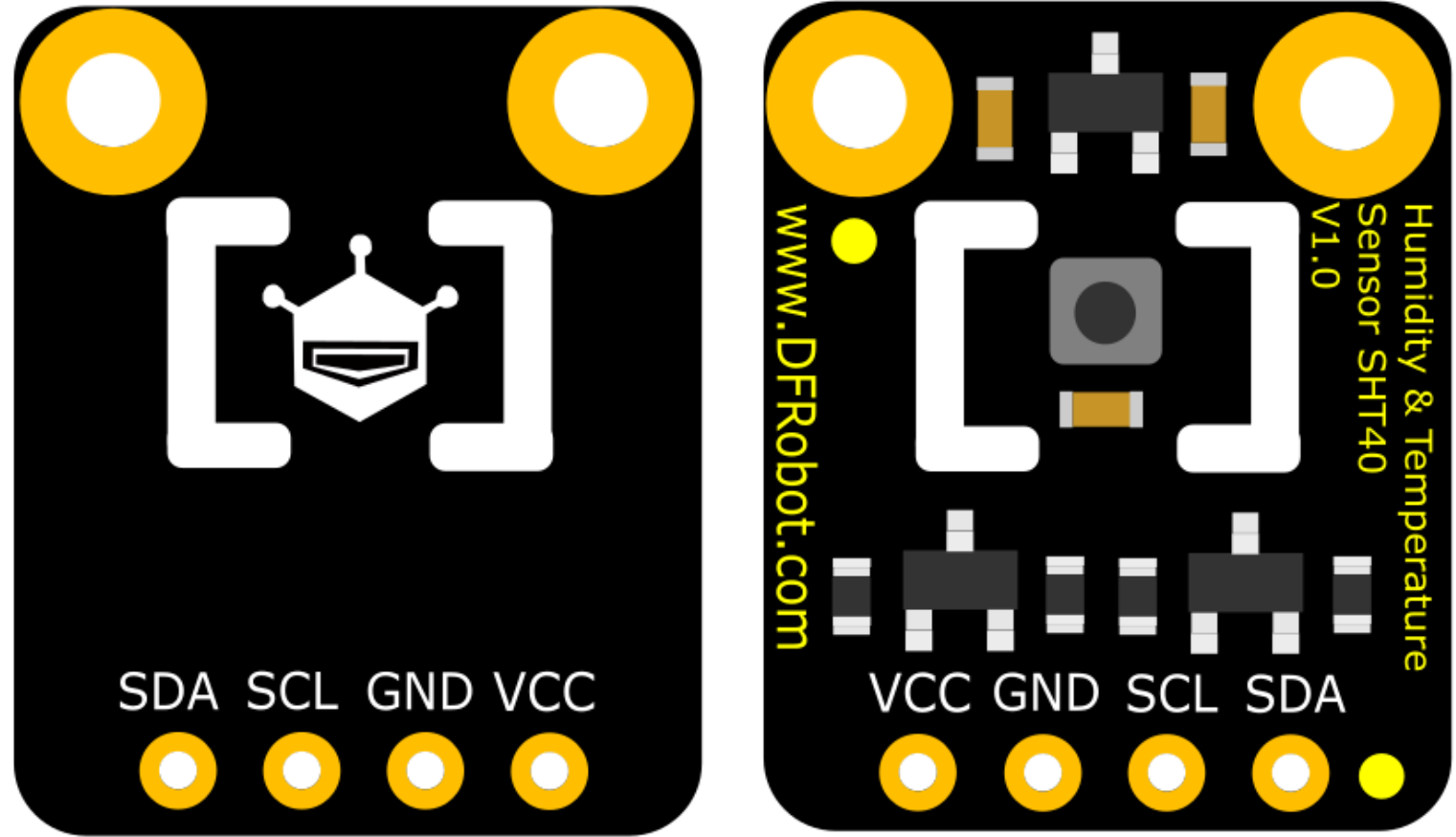
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NO.	Silkscreen	Function
1	VCC	Positive Pole
2	GND	Negative Pole

NO.	Silkscreen	Function
3	SCL	I2C ClockLine
4	SDA	I2C Data Line

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Tutorial

Requirements

- **Hardware**
 - DFRduino UNO R3 (<https://www.dfrobot.com/product-838.html>) (or similar) x 1
 - SHTC3 Digital Temperature and Humidity Sensor x 1#
 - M-M/F-M/F-F Jumper wires
- **Software**
 - Arduino IDE (<https://www.arduino.cc/en/software>)
 - Download and install the **SHT Library** (https://github.com/cdjq/DFRobot_SHTXX) (About how to install the library? (<https://www.arduino.cc/en/Guide/Libraries#UxU8mdzF9H0>))
- **API Functions**

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```

/**
 * @brief 对主控板的IIC进行了初始化
 */
void begin();

/**
 * @brief 获取温度数据
 * @return 温度值,单位: 摄氏度
 */
float getTemperature();

/**
 * @brief 获取湿度数据
 * @return 湿度值,单位: %RH
 */
float getHumidity();

/**
 * @brief 获取温湿度数据
 * @param tem 存放温度数据的引用
 * @param hum 存放湿度数据的引用
 */
void getTemHum(float &tem, float &hum);

/**
 * @brief 设置传感器工作模式
 * @param mode 传感器的工作模式
 * @n          SHTC3:
 * @n          PRECISION_HIGH_CLKSTRETCH_ON           Clock St
 * @n          PRECISION_HIGH_CLKSTRETCH_OFF          Clock St
 * @n          PRECISION_LOW_CLKSTRETCH_ON            Clock St
 * @n          PRECISION_LOW_CLKSTRETCH_OFF           Clock St
 * @n          SHT40:
 * @n          PRECISION_HIGH_HEATER_OFF              measure

```

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```

* @n          PRECISION_MID_HEATER_OFF          measure
* @n          PRECISION_LOW_HEATER_OFF          measure
* @n          PRECISION_HIGH_HEATER_1S          activate
* @n          PRECISION_HIGH_HEATER_100MS       activate
* @n          PRECISION_MID_HEATER_1S           activate
* @n          PRECISION_MID_HEATER_100MS        activate
* @n          PRECISION_LOW_HEATER_1S           activate
* @n          PRECISION_LOW_HEATER_100MS        activate
*/
void setMode(uint16_t mode) ;

/**
 * @brief  获取传感器的唯一标识符
 * @return 获取成功返回传感器的唯一标识符,失败返回0
 */
uint32_t getDeviceID();

/**
 * @brief  software reset
 */
void softwareReset() ;

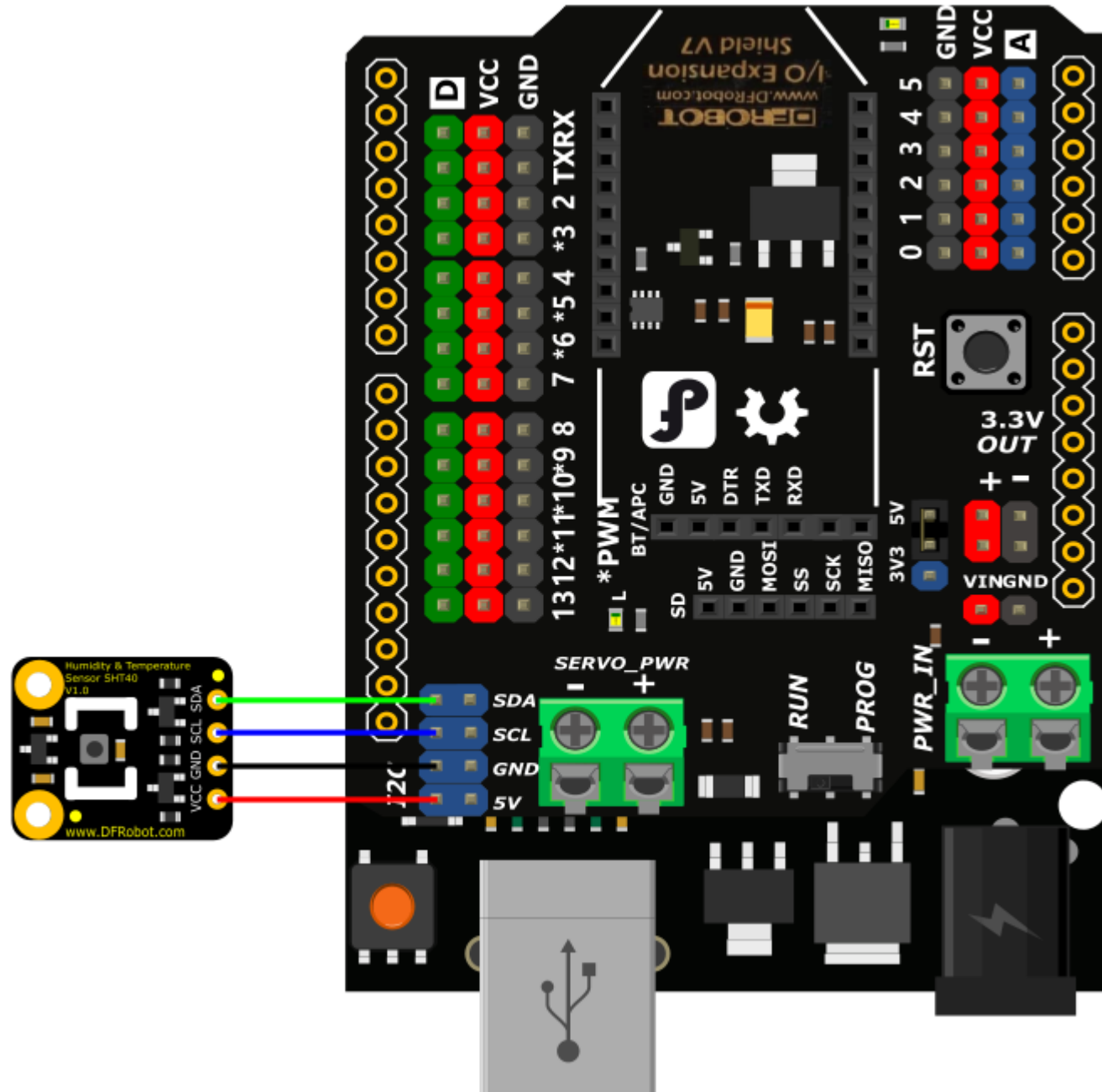
/**
 * @brief  Obtain raw data of temperature and humidity
 * @param  temp Pointer to the address of the original value of the temperature
 * @param  hun  Pointer to the address of the original value of the humidity
 * @return Is the data obtained correct? return true The data is correct ; return false T
 */
bool getTandRHRawData(uint16_t *temp, uint16_t *hum);

```

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Connection Diagram

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Sample Code - Read Data

Record program and read the current temperature and humidity data.

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```

/#!
* @file temperatureAndHumidity.ino
* @brief Measurement of temperature and humidity
* @n 本传感器可测量温湿度数据,温度的测量范围在-40~125 °C ,湿度的测量范围在 0~100 %RH。
* @n 本传感器提供高、中、低,三种测量精度,还提供了高、中、低,三种加热功率对片上加热器进行加热。
* @n 使用加热器的主要情景:
* @n 1、Removal of condensed / spray water on the sensor surface. Although condensed water i
* @n 2、Creep-free operation in high humid environments. Periodic heating pulses allow for c
* @n 实验现象 每次1秒钟测量一次温湿度数据并且通过串口打印,当湿度超过80%RH时,启动一次加热器。
* @copyright Copyright (c) 2010 DFRobot Co.Ltd (http://www.dfrobot.com)
* @licence The MIT License (MIT)
* @author [yangfeng]<feng.yang@dfrobot.com>
* @version V1.0
* @date 2021-03-19
* @get from https://www.dfrobot.com
* @url https://github.com/DFRobot/DFRobot_SHT
*/
#include"DFRobot_SHT40.h"

/**
* 对于SHT40传感器这里支持两种型号,第一种是SHT40_AD1B,第二种是SHT40_BD1B,这两种型号对应不同的IIC设备地址
* 型号为SHT40_AD1B的传感器使用: SHT40_AD1B_IIC_ADDR
* 型号为SHT40_BD1B的传感器使用: SHT40_BD1B_IIC_ADDR
*/
DFRobot_SHT40 SHT40(SHT40_AD1B_IIC_ADDR);

uint32_t id = 0;
float temperature, humidity;

void setup() {

    Serial.begin(9600);
    SHT40.begin();

```

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```
while((id = SHT40.getDeviceID()) == 0){
    Serial.println("ID retrieval error, please check whether the device is connected correctly");
    delay(1000);
}

delay(1000);
Serial.print("id :0x"); Serial.println(id, HEX);
}

void loop() {
    /**
     * mode 用来配置传感器的工作模式
     *          PRECISION_HIGH           measure T & RH with high precision
     *          PRECISION_MID            measure T & RH with medium precision
     *          PRECISION_LOW            measure T & RH with lowest precision
     */
    temperature = SHT40.getTemperature(/*mode = */PRECISION_HIGH);
    /**
     * mode 用来配置传感器的工作模式
     *          PRECISION_HIGH           measure T & RH with high precision
     *          PRECISION_MID            measure T & RH with medium precision
     *          PRECISION_LOW            measure T & RH with lowest precision
     */
    humidity = SHT40.getHumidity(/*mode = */PRECISION_HIGH);

    if(temperature == MODE_ERR){
        Serial.println("Incorrect mode configuration to get temperature");
    } else{
        Serial.print("Temperature :"); Serial.print(temperature); Serial.println(" C");
    }
    if(humidity == MODE_ERR){
        Serial.println("The mode for getting humidity was misconfigured");
    } else{
        Serial.print("Humidity :"); Serial.print(humidity); Serial.println(" %RH");
    }
}
```

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```

/**
 *   mode 用来配置传感器的工作模式
 *
 *           PRECISION_HIGH           measure T & RH with high precision
 *           PRECISION_MID            measure T & RH with medium precision
 *           PRECISION_LOW            measure T & RH with lowest precision
 */
//if(SHT40.getTemHum(temperature, humidity, PRECISION_HIGH)){
//  Serial.print("Temperature :"); Serial.print(temperature); Serial.println(" C");
//  Serial.print("Humidity :"); Serial.print(humidity); Serial.println(" %RH");
//} else{
//  Serial.println("Pattern configuration error");
//}
if(humidity > 80){
/**
 *   mode 用来配置传感器的工作模式
 *
 *           POWER_CONSUMPTION_H_HEATER_1S           activate highest h
 *           POWER_CONSUMPTION_H_HEATER_100MS       activate highest h
 *           POWER_CONSUMPTION_M_HEATER_1S           activate medium h
 *           POWER_CONSUMPTION_M_HEATER_100MS       activate medium h
 *           POWER_CONSUMPTION_L_HEATER_1S           activate lowest h
 *           POWER_CONSUMPTION_L_HEATER_100MS       activate lowest h
 */
  SHT40.enHeater(/*mode = */POWER_CONSUMPTION_H_HEATER_1S);
}
delay(1000);

Serial.println("-----");
}

```

Expected Results

Open the serial port to display the current temperature and humidity data.

COM17



发送

```
id :0xFBB1517
Temperature :23.00 C
Humidity :51.04 %RH
-----
Temperature :22.96 C
Humidity :51.09 %RH
-----
Temperature :22.93 C
Humidity :51.13 %RH
-----
Temperature :22.93 C
Humidity :51.16 %RH
-----
Temperature :22.89 C
Humidity :51.19 %RH
-----
Temperature :22.87 C
Humidity :51.23 %RH
-----
Temperature :22.85 C
Humidity :51.27 %RH
-----
Temperature :22.84 C
Humidity :51.33 %RH
```

自动滚屏 Show timestamp

没有结束符 ▾

9600 波特率 ▾

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FAQ

For any questions, advice or cool ideas to share, please visit the **DFRobot Forum** (<https://www.dfrobot.com/forum/>).

More Documents

- Schematics (<https://dfimg.dfrobot.com/nobody/wiki/98f2c498d566ea02fed2d9801510c47f.PDF>)
- SHTC3 Datasheet (<https://dfimg.dfrobot.com/nobody/wiki/66b61b400c70f1332ed2bed69538296b.pdf>)

 **Get Fermion: SHT40 Humidity & Temperature Sensor** (<https://www.dfrobot.com/product-2437.html>) from DFRobot Store or **DFRobot Distributor**. (<https://www.dfrobot.com/distributor>)

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