7SEMI

DS18B20 Waterproof Temperature Sensor Probe 1M Cable

Version 1.0

Table of Contents

1.Introduction

The **7Semi DS18B20 Waterproof Temperature Sensor Probe 1M Cable** is a highly accurate and reliable sensor designed for temperature monitoring in various environments. It utilizes **1-Wire communication**, allowing easy integration with microcontrollers and embedded systems. With its **stainless steel waterproof probe**, it is ideal for use in harsh conditions such as liquid temperature monitoring and industrial applications.

1.1   Features

- Measures temperatures from **-55°C to +125°C**
- Accuracy of **±0.5°C** from -10°C to +85°C
- **Programmable Resolution:** 9-bit to 12-bit
- **1-Wire Interface:** Requires only one data pin
- **Stainless Steel Waterproof Probe** for durability
- **Parasitic Power Mode** available

2. Technical Specification

The **Technical Specification** table provides detailed information about the **7Semi DS18B20 Waterproof Temperature Sensor Probe 1M Cable**, including its operating voltage, current consumption, and electrical characteristics. This data helps users understand the power requirements, communication parameters, and performance capabilities of the sensor. It ensures compatibility with different microcontrollers and embedded systems while providing guidelines for efficient integration into various applications.

DS18B20 Specifications

- Temperature Range: -55°C to +125°C

- Accuracy: ±0.5°C from -10°C to +85°C

- Resolution: 9-bit to 12-bit (Programmable)

- Operating Voltage: 3.0V to 5.5V

- Communication Protocol: 1-Wire

- Probe Material: Stainless Steel

- Probe wire length: 1 meters
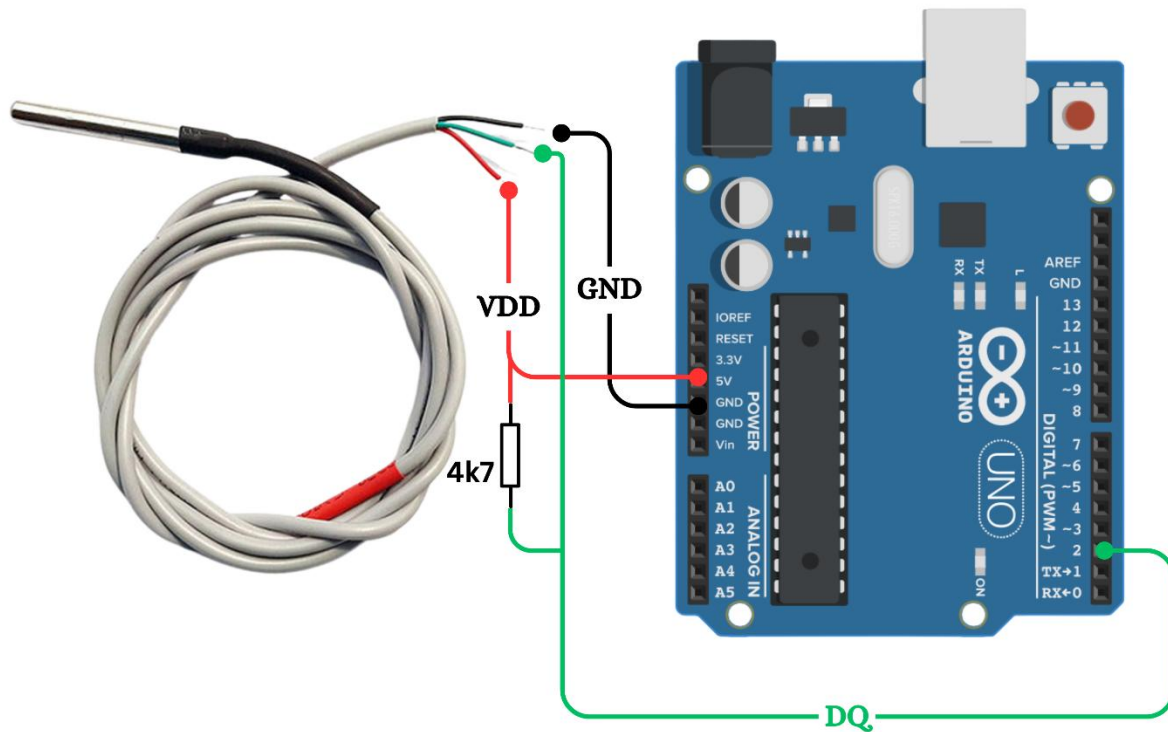
- Probe Dimensions: 6mm diameter, 50mm length

3.Pinouts
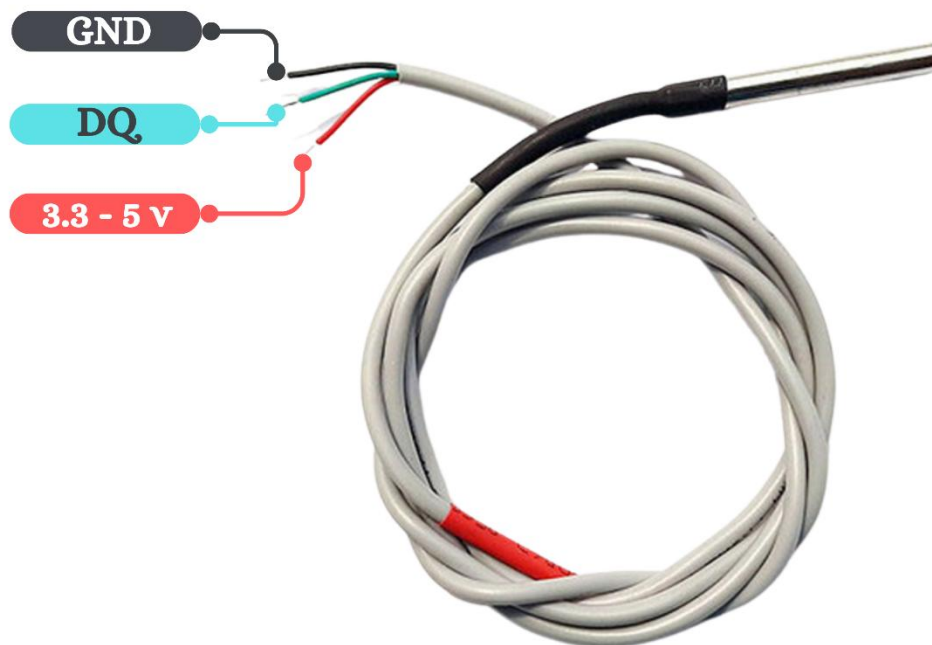
Pin	Name	Description
1	GND	Ground (Black Wire)
2	DQ	Data Line (Green Wire)
3	VDD	Power Supply (Red Wire)

Connection Guidelines

- Ensure a stable 3.3V - 5V DC power source.
- Connect DQ to digital I/O pin for proper communication.

4.Hardware Interface

Connection Explanation :

- Connect VDD to 3.3V or 5V
- Connect GND to Ground.
- Connect DQ to a digital I/O pin on a microcontroller.
- Use a 4.7kΩ pull-up resistor between DQ and VDD.

5.Example code link

We provide example codes to help you get started with the **7Semi DS18B20 Waterproof Temperature Sensor Probe 1M Cable**. These examples demonstrate how to communicate with the sensor and retrieve CO_2, temperature, and humidity data using the I²C protocol. The code is available for two popular platforms: Arduino and ESP32.

Code Explanation

1. Including Necessary Libraries

```
#include <OneWire.h>
#include <DallasTemperature.h>
```

- OneWire.h: Manages communication with 1-Wire devices.
- DallasTemperature.h: Provides functions to interact with the DS18B20 sensor.

2. Defining the Data Pin

```
#define ONE_WIRE_BUS 2
```

- Specifies the digital pin where the DS18B20 sensor is connected.

3. Initializing OneWire and DallasTemperature Objects

```
OneWire oneWire(ONE_WIRE_BUS);
DallasTemperature sensors(&oneWire);
```

- OneWire object (`oneWire`) initializes communication with the sensor.
- DallasTemperature object (`sensors`) uses the `oneWire` object to access DS18B20.

4. Setup Function

```
void setup() {
  Serial.begin(9600);
  sensors.begin();
}
```

- Serial.begin(9600): Initializes serial communication for debugging.
- sensors.begin(): Initializes the DS18B20 sensor.

5. Requesting and Reading Temperature in Loop

```
void loop() {
  sensors.requestTemperatures();
  float tempC = sensors.getTempCByIndex(0);

  Serial.print("Temperature: ");
  Serial.print(tempC);
  Serial.println(" °C");

  delay(1000);
}
```

- sensors.requestTemperatures(): Sends a command to DS18B20 to measure temperature.
- sensors.getTempCByIndex(0): Reads the temperature from the first sensor.
- Serial.print(): Displays the temperature on the serial monitor.
- delay(1000): Waits 1 second before the next reading.

6. Arduino Example Code

This example is designed for Arduino-compatible boards and demonstrates:

- Initializing the 1-Wire communication with the DS18B20 sensor Board.

- Reading temperature data from the sensor.

- Printing the sensor data to the Serial Monitor.

7. ESP32 Example Code
This example targets ESP32 boards and showcases:

- Configuring the ESP32 1-Wire interface to communicate with the DS18B20 sensor Board.

- Reading temperature data from the sensor.

- Printing the sensor data to the Serial Monitor.

How to Access the Code

- **Download Link for Arduino and ESP32 Example**: Click Here

5.1 Sample Serial Output Arduino

Sample output Image of Arduino:


```
14:27:50.895 -> Temperature is: 27.25 Requesting temperatures...DONE
14:27:52.530 -> Temperature is: 27.19 Requesting temperatures...DONE
14:27:54.168 -> Temperature is: 27.19 Requesting temperatures...DONE
14:27:55.824 -> Temperature is: 27.19 Requesting temperatures...DONE
14:27:57.458 -> Temperature is: 27.19 Requesting temperatures...DONE
14:27:59.074 -> Temperature is: 27.19 Requesting temperatures...DONE
14:28:00.724 -> Temperature is: 27.69 Requesting temperatures...DONE
14:28:02.362 -> Temperature is: 28.31 Requesting temperatures...DONE
14:28:03.977 -> Temperature is: 28.94 Requesting temperatures...DONE
14:28:05.618 -> Temperature is: 29.31 Requesting temperatures...DONE
14:28:07.246 -> Temperature is: 29.50 Requesting temperatures...DONE
14:28:08.880 -> Temperature is: 29.62 Requesting temperatures...DONE
14:28:10.518 -> Temperature is: 29.69 Requesting temperatures...DONE
14:28:12.131 -> Temperature is: 29.69 Requesting temperatures...DONE
```

6.Mechanical Specification
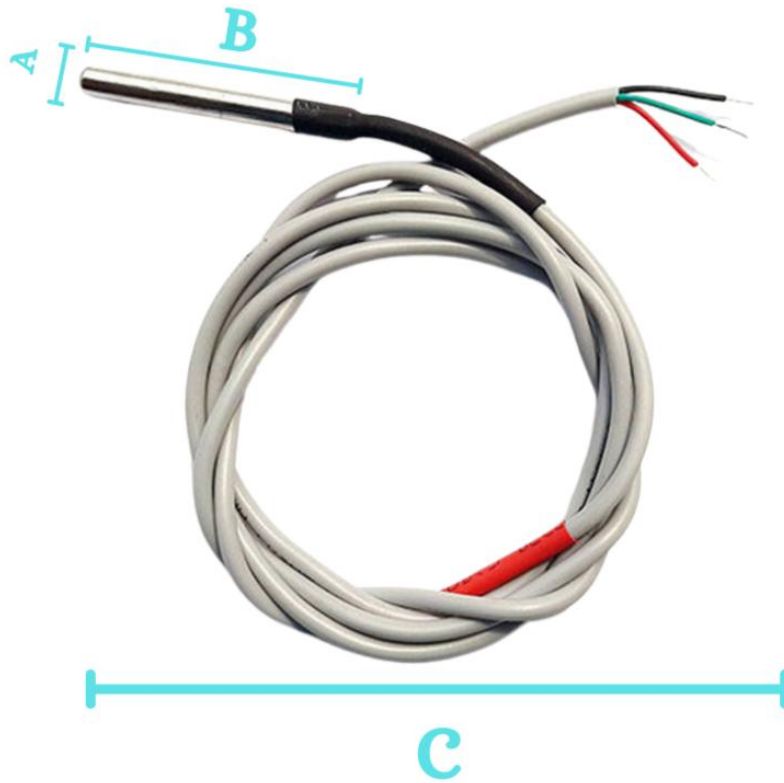
S.No	Symbol	Mesurement
1	A (Probe Diameter)	6mm
2	B (Probe length)	50mm
3	C (wire length)	1meter