WisNode Map products are now under WisGate Network Coverage Solutions. View the updated category. X

RAK12035 WisBlock Soil Moisture Sensor Module Datasheet

Overview

Figure 1: RAK12035 WisBlock Soil Moisture Sensor Probe

Description

RAK12035 is a soil sensor probe module based on the ATTINY441-SSU microcontroller from Atmel. It uses capacitive sensing to measure moisture. A 1 MHz square wave is the output from the chip through a resistor into a big pad, and the surrounding ground plane acts as a parasitic capacitor. Both the resistor and the capacitor form a low-pass filter whose cutoff frequency changes when there is a change in capacitance.

The soil around the sensor acts as an electrolyte whose dielectric constant changes depending on the amount of moisture in it, resulting in changing the capacitance of our makeshift capacitor too. The filtered square wave is fed into a peak detector, formed by a diode and capacitor. The diode allows the positive peaks to go through, while the capacitor stores the maximum voltage of those peaks. The voltage is measured by an ADC in the MCU. An NTC element is used to measure the temperature of the soil.

RAK12035 is a separate soil moisture sensor probe that can be connected to the RAK12023 module.

Because you need to bury the RAK12035 sensor probe into the soil, the electronics on the PCB of the soil sensor, together with the cable, are covered by a shrinkable tube for additional protection from getting wet.

Features

- Separate connector PCB RAK12023 is required.

- Measures soil moisture
- I2C address is programmable
- Calibration via software
- Chipset: Atmel ATTINY441-SSU
- Module size: 18.1 × 149 mm

Specifications

Hardware

The hardware specification is categorized into four (4) parts. It shows the chipset of the module and discusses the pinouts and their corresponding functions and diagrams. It also covers the mechanical characteristics that include the tabular data of the functionalities and standard values of the RAK12035 WisBlock Soil Moisture Sensor Module.

Chipset

Vendor	Part number
Atmel	ATTINY441-SSU

Pin Definition

The pin order of the connector and the pinout definition of the RAK12035 is shown in **Figure 2**.

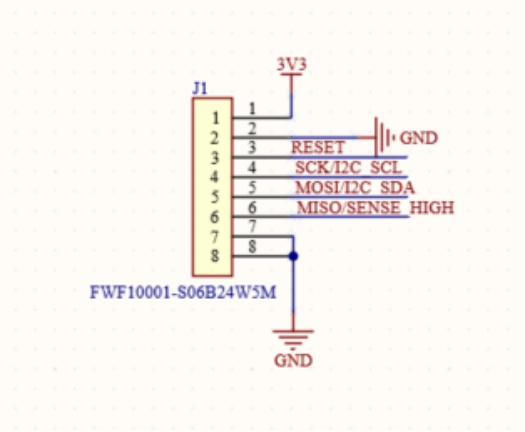

Figure 2: RAK12035 Pinout Schematic

> **NOTE**
>
> - Only **I2C** related pin, **SENSE_HIGH**, **3V3**, and **RESET** are connected to the module.

Mechanical Characteristics

Board Dimensions

Figure 3 shows the board dimensions of the RAK12035 Module.

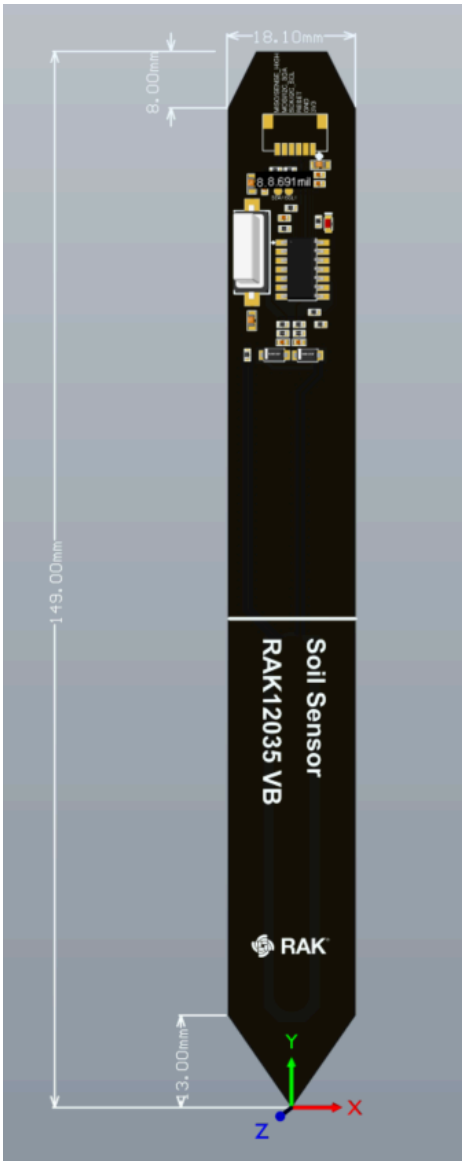

Figure 3: RAK12035 Board Dimensions

Schematic Diagram

Figure 4 shows the schematic of the RAK12035 module.

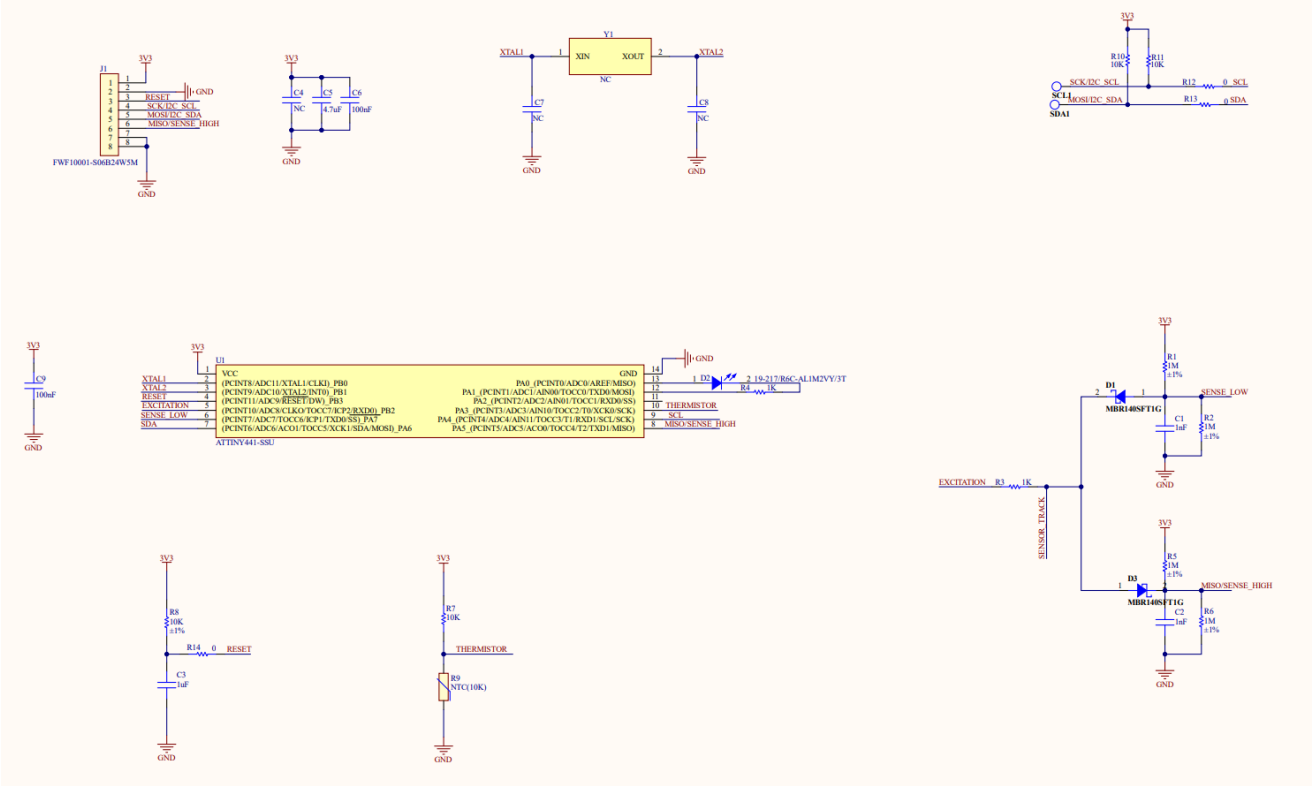

Figure 4: RAK12035 WisBlock Module Schematics

MCU Configuration Circuit

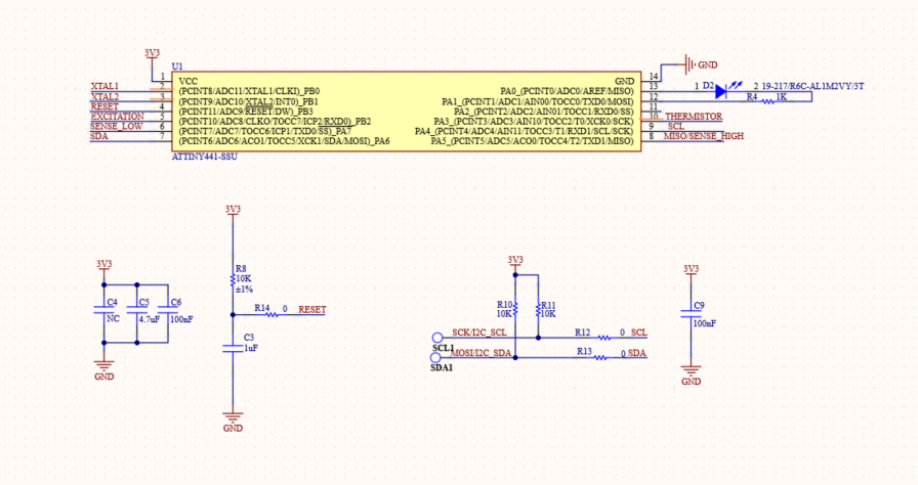

Figure 5: MCU Configuration Circuit

Sensor Circuit

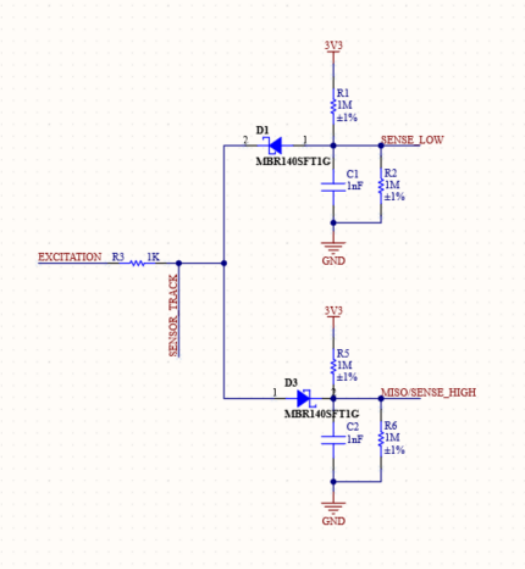

Figure 6: Sensor Circuit

Thermistor

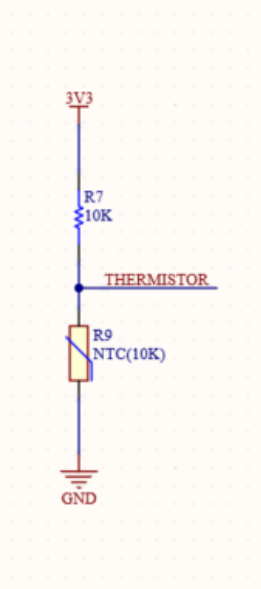

Figure 7: Thermistor

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