**LM35 temperature sensor with an ESP8266 and sending the data to ThingSpeak**

To create a program for interfacing an LM35 temperature sensor with an ESP8266 and sending the data to ThingSpeak, you can use the Arduino IDE. Below is a step-by-step guide along with sample code.

Requirements

1. \*\*Hardware:\*\*

- ESP8266 (e.g., NodeMCU or Wemos D1 Mini)

- LM35 temperature sensor

- Breadboard and jumper wires

- Resistor (optional for stabilization)

2. \*\*Software:\*\*

- Arduino IDE

- ESP8266 Board library

- ThingSpeak library (optional for easier data handling)

### Wiring Diagram

Connect the LM35 to the ESP8266 as follows:

- \*\*LM35 Pin 1 (Vout)\*\* → ESP8266 Analog Pin (A0)

- \*\*LM35 Pin 2 (GND)\*\* → ESP8266 GND

- \*\*LM35 Pin 3 (Vs)\*\* → ESP8266 3.3V

Arduino Code

1. \*\*Install Libraries:\*\*

- Install the `ESP8266WiFi` and `ThingSpeak` libraries through the Library Manager in the Arduino IDE.

2. \*\*Code:\*\*

Here’s a sample code to read the LM35 and send the data to ThingSpeak:

#include <ESP8266WiFi.h>

#include <ThingSpeak.h>

const char\* ssid = "your\_SSID"; // Your WiFi SSID

const char\* password = "your\_PASSWORD"; // Your WiFi password

const char\* apiKey = "your\_THINGSPEAK\_API\_KEY"; // Your ThingSpeak API Key

WiFiClient client;

void setup() {

Serial.begin(115200);

WiFi.begin(ssid, password);

while (WiFi.status() != WL\_CONNECTED) {

delay(1000);

Serial.println("Connecting to WiFi...");

}

Serial.println("Connected to WiFi");

ThingSpeak.begin(client); // Initialize ThingSpeak

}

void loop() {

// Read the temperature from the LM35

int sensorValue = analogRead(A0); // Read the analog value

float temperature = (sensorValue \* 3.3 / 1023.0) \* 100; // Convert to Celsius

// Send the data to ThingSpeak

ThingSpeak.setField(1, temperature);

int responseCode = ThingSpeak.writeFields(your\_channel\_id, apiKey);

if (responseCode == 200) {

Serial.println("Data sent successfully");

} else {

Serial.print("Error sending data: ");

Serial.println(responseCode);

}

delay(20000); // Wait for 20 seconds before sending the next data

}

```

### Instructions:

1. Replace `your\_SSID`, `your\_PASSWORD`, and `your\_THINGSPEAK\_API\_KEY` with your actual WiFi credentials and ThingSpeak API key.

2. Set your ThingSpeak channel ID in the `ThingSpeak.writeFields()` function.

3. Upload the code to your ESP8266 using the Arduino IDE.

### Testing:

Once the code is uploaded, open the Serial Monitor to see the connection status and any error messages. You should also be able to see the temperature data on your ThingSpeak channel after a few moments.

### Additional Notes:

- Ensure your LM35 is powered correctly; it operates at 4 to 30V but can be used with 3.3V.

- The analog readings from the LM35 should be calibrated based on the specific configuration.