

KY-028 Temperature Sensor Module – Complete Guide

The KY-028 module is a **temperature sensor** that can be used in two ways:

1. **As an analog temperature sensor** (provides precise temperature readings).
2. **As a digital temperature limit switch** (turns on/off based on a threshold).

It is based on a **thermistor** (a resistor that changes resistance with temperature).

How Does KY-028 Work?

The KY-028 module has a **thermistor** that changes resistance as temperature changes.

- The thermistor forms a **voltage divider circuit** with a fixed resistor.
- The module has a **comparator (LM393)** that compares the thermistor voltage to a reference voltage set by a **potentiometer**.
- The comparator outputs **HIGH (1)** or **LOW (0)** depending on whether the temperature is above or below the threshold.

Key Components on the Module:

- **NTC Thermistor:** Changes resistance based on temperature.
- **LM393 Comparator:** Compares voltage from thermistor to threshold voltage.
- **Potentiometer:** Used to adjust the digital threshold.
- **LED Indicators:** One LED shows power status, another indicates HIGH/LOW output.

Using KY-028 as a Temperature Sensor (Analog Mode)

Steps to Use Analog Mode:

1. **Connect KY-028 to Arduino:**
 - VCC → 5V
 - GND → GND
 - A0 → Analog pin (e.g., A0)
2. **Read analog values from A0** and convert to temperature in Celsius or Fahrenheit.
3. **Display temperature on Serial Monitor or LCD.**

How It Works:

- Reads analog value from A0.
- Uses the **Steinhart-Hart equation** to convert it to temperature.
- Displays the temperature in **Celsius and Fahrenheit**.

Using KY-028 as a Temperature Limit Switch (Digital Mode)

Steps to Use Digital Mode:

1. **Connect KY-028 to Arduino:**
 - VCC → 5V
 - GND → GND
 - D0 → Digital pin (e.g., 2)
 - LED → Pin 13 (optional, for visual alert)
2. **Adjust the potentiometer** to set the **threshold temperature**.
3. The **D0** pin will be **HIGH (1)** if the temperature is above the threshold, and **LOW (0)** if below.
4. Use it to trigger an LED, buzzer, or relay.

How It Works:

- Reads **digital output (D0)** from the KY-028 module.
- Turns the **LED ON** if temperature is **above** the set threshold.
- Turns the **LED OFF** if temperature is **below** the set threshold.
- The threshold is **adjustable using the potentiometer** on the sensor.

KY-028 Applications

Temperature Monitoring Systems – Measure temperature in real-time

Overheat Protection – Turn ON a fan if temperature is too high

Fire Alarms – Trigger an alarm if the temperature exceeds a critical value

Smart Home Automation – Control devices based on temperature

KY-028 vs. Other Temperature Sensors

Feature	KY-028	LM35	DHT11	DS18B20
Output	Analog & Digital	Analog	Digital	Digital
Range	-10°C to 80°C	-55°C to 150°C	0°C to 50°C	-55°C to 125°C
Accuracy	±1°C	±0.5°C	±2°C	±0.5°C
Use Case	Simple temp detection	Precise analog temp	Humidity + temp	Waterproof temp

KY-028 is good for simple temperature monitoring and threshold alerts, but for accurate temperature sensing, DS18B20 or LM35 is better.

Final Thoughts

- **KY-028 is versatile** and can be used **both as a temperature sensor and a temperature switch**.
- **Analog mode** gives **precise temperature readings**.
- **Digital mode** acts as a **limit switch**, triggering an alert when a set temperature is exceeded.
- It's **not as accurate as LM35 or DS18B20**, but is great for basic projects.