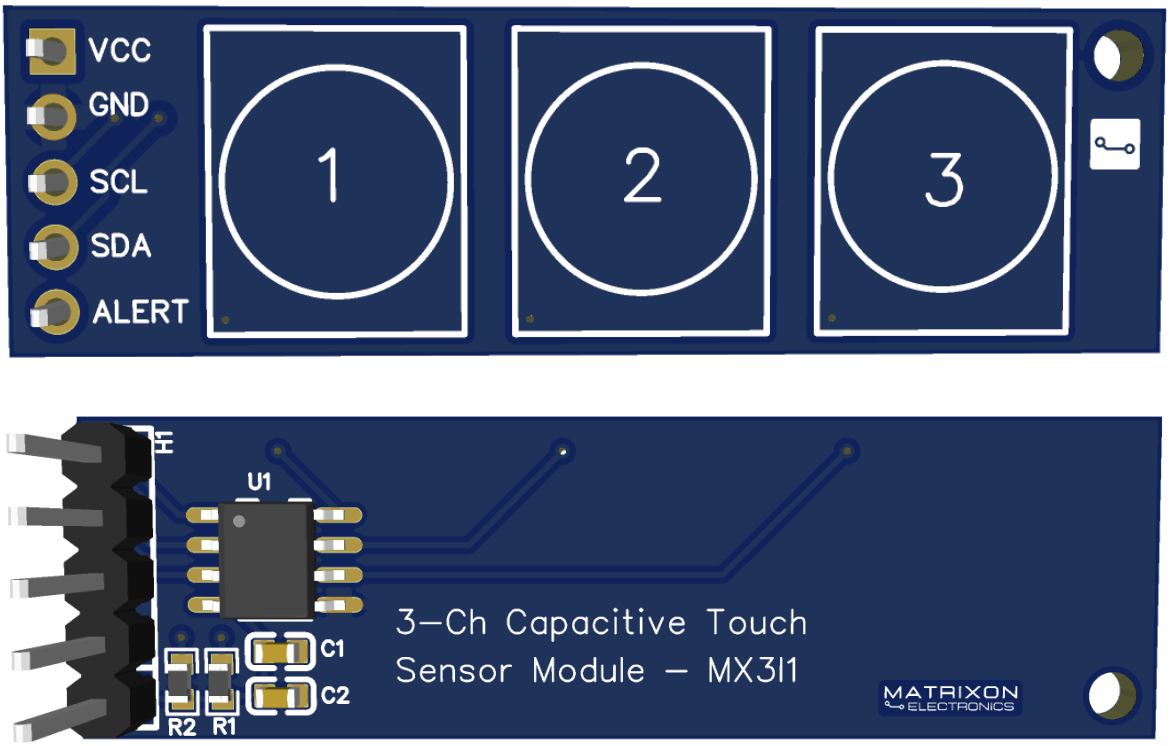
MATRIXON ELECTRONICS

3-Ch Capacitive Touch Sensor Module with I²C

MX3I1

Product Datasheet

A compact 3-channel capacitive touch sensor module based on the CAP1203, providing reliable touch input over I²C. Ideal for replacing mechanical buttons in Arduino, ESP32, and embedded projects.



Version: Rev 1.0
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Overview

The MX3I1 - 3-Ch Capacitive Touch Sensor Module is a compact 3-channel touch sensor module based on the Microchip CAP1203. It enables reliable touch detection using PCB pads or metal surfaces and communicates with microcontrollers through the I²C interface. Built-in calibration and drift compensation ensure stable operation across varying environmental conditions.

Key Features

- 3 independent capacitive touch input channels
- I²C interface for simple integration
- Operating voltage: 3.3V – 5V
- Fixed I²C address: 0x28 (7-bit)
- Programmable sensitivity and thresholds
- Automatic calibration and environmental drift compensation
- Active-low interrupt output (ALERT)
- Standard 2.54mm header, breadboard-friendly

Applications

- Touch buttons and control panels
- Smart home and IoT user interfaces
- Menu navigation and mode selection
- Appliance and device touch keys
- Educational and DIY electronics projects

Purchase Link

Download the Gerber files here: MX3I1 - Touch Sensor Module
Example Arduino sketch: Download ExampleCode.ino

Pinout Description

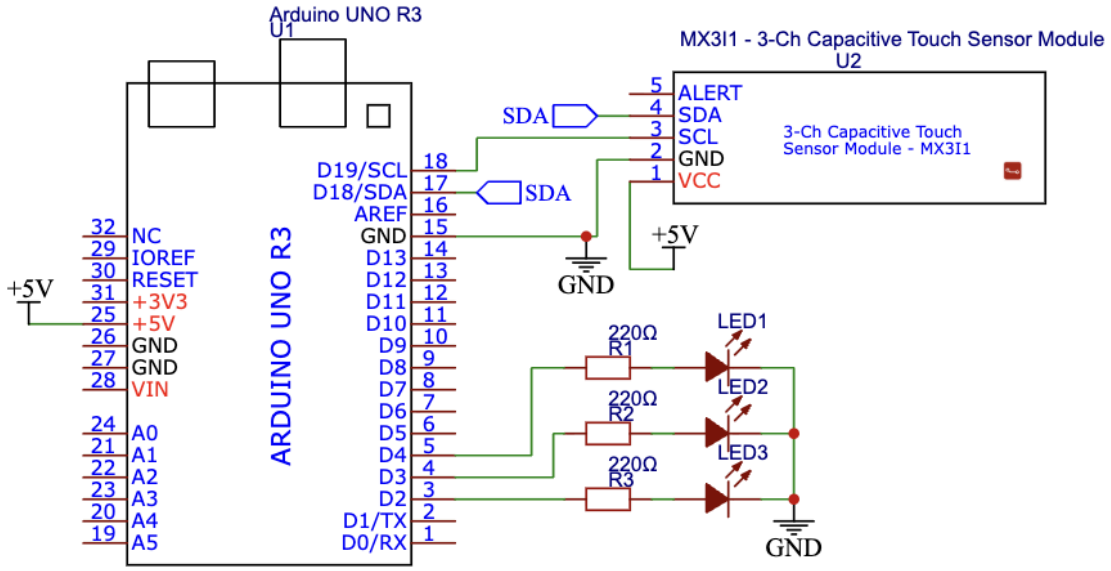
Pin	Label	Function
1	VCC	Power supply (3.3 V – 5 V)
2	GND	Ground
3	SCL	I²C clock line
4	SDA	I²C data line
5	ALERT	Active-low interrupt output (optional)

I²C Interface

- Interface type: I²C
- I²C address: 0x28 (fixed, 7-bit)
- Compatible with Arduino, ESP32, ESP8266, STM32, and similar MCUs

Example Application

In this example, three capacitive touch inputs are used to control three LEDs. Each touch pad toggles its corresponding LED ON or OFF. This demonstrates basic touch detection using the MX3I1 Module with an Arduino.



Example Arduino Code

```
#include <Wire.h>
#define CAP1203_ADDR 0x28
#define LED1 2
#define LED2 3
#define LED3 4

bool ledState[3] = {false, false, false};

void setup() {
 Wire.begin();
 pinMode(LED1, OUTPUT);
 pinMode(LED2, OUTPUT);
 pinMode(LED3, OUTPUT);}
uint8_t readTouchStatus() {
```

```
 Wire.beginTransmission(CAP1203_ADDR);
 Wire.write(0x03); // Sensor Input Status Register
 Wire.endTransmission(false);
 Wire.requestFrom(CAP1203_ADDR, 1);
 return Wire.read();}

void clearInterrupt() {
 Wire.beginTransmission(CAP1203_ADDR);
 Wire.write(0x00); // Main Control Register
 Wire.write(0x00);
 Wire.endTransmission();}

void loop() {
 uint8_t status = readTouchStatus();
 if (status & 0x01) ledState[0] = !ledState[0];
 if (status & 0x02) ledState[1] = !ledState[1];
 if (status & 0x04) ledState[2] = !ledState[2];

 digitalWrite(LED1, ledState[0]);
 digitalWrite(LED2, ledState[1]);
 digitalWrite(LED3, ledState[2]);
 clearInterrupt();
 delay(200);}
```

Touch Detection & Operation

The CAP1203 internally handles capacitive touch sensing, baseline calibration, and environmental drift compensation. Each touch input (CS1, CS2, CS3) is continuously monitored, and the touch status can be read from the Sensor Input Status Register (0x03), where each bit represents one channel.

ALERT Pin (Interrupt Output)

The ALERT pin is an active-low interrupt output that indicates a touch event or status change. When a touch is detected, the pin is driven LOW until the interrupt is cleared via I²C.
This pin is open-drain and requires an external pull-up resistor if used.

Note: The MX3I1 Module does not include a pull-up resistor on the ALERT pin. The pin may be left unconnected if interrupt functionality is not required.

Sensitivity & Configuration

The CAP1203 supports programmable sensitivity, touch thresholds, repeat rates, and noise filtering through internal registers. These settings allow tuning of the touch response for different electrode sizes and environments.

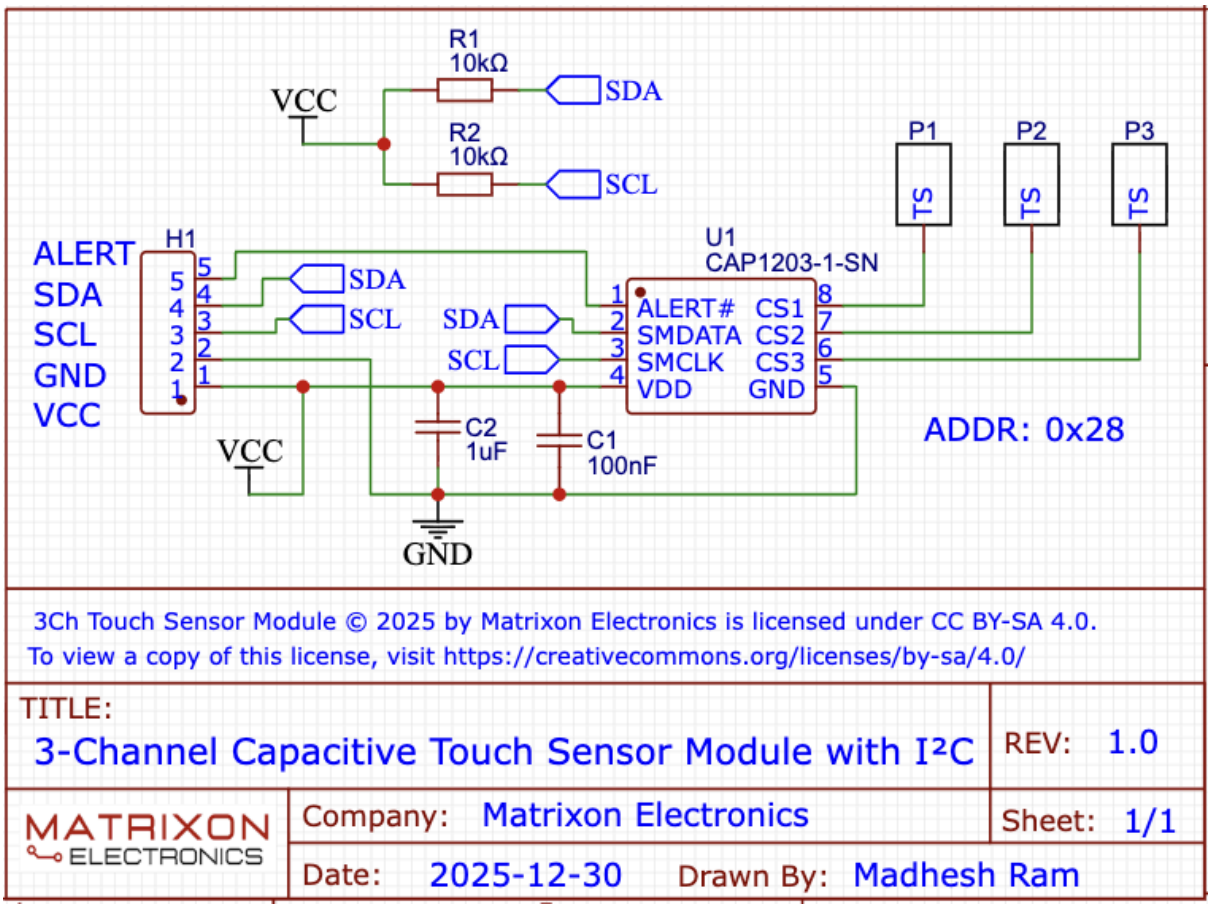
For advanced configuration and register-level control, refer to the CAP1203 IC datasheet.

Power Modes

The CAP1203 includes multiple power and standby modes to reduce power consumption in battery-operated applications. These modes can be configured via I²C registers depending on the application requirements.

For detailed power management configuration, refer to the CAP1203 IC datasheet.

Schematic Diagram



PCB Layout & Dimensions

Parameter	Value
Board Size	46mm x 14mm
Layers	2
Components Placement	Top layer (Single side)
Pin Pitch	2.54 mm
Pin Header	1×7 Male

Revision History

Date	Version	Modify Content
28/03/2026	Rev 1.0	New