QUICK REFERENCE · TK43

Touch Sensor

SIGNAL is HIGH while a finger is on the gold pad. TTP223, momentary, active high.

VCC is the voltage your pin sees

SIGNAL is the TTP223's own push-pull output, driven from VCC, so touched it sits at about VCC. **Beside an ESP32, an ESP32-S3 or a Pico, VCC goes to 3V3, never 5V**. Beside an Uno, 5V. The chip runs on anything from 2.0 to 5.5 V.

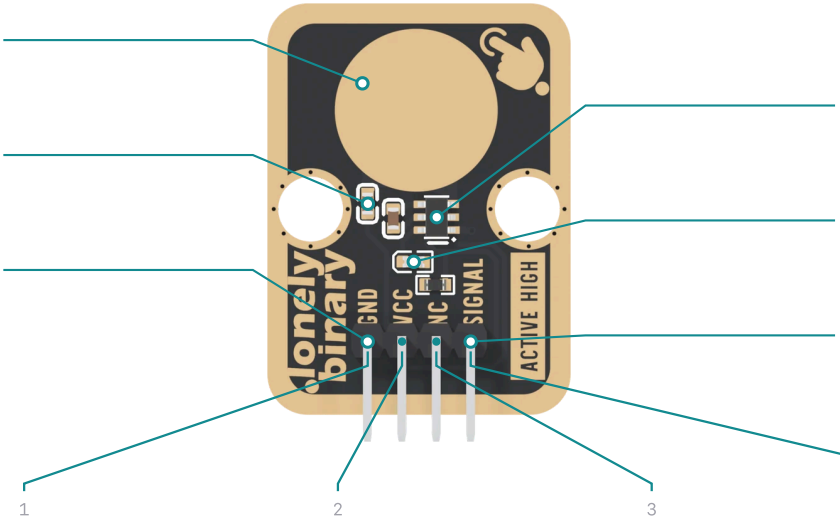
Pins, and which to wire

Pad up, header at the bottom. Wire GND, VCC and SIGNAL; NC is connected to nothing on the board. Keep hands off the pad while it powers up.

The pad, 12 mm
Works through plastic or glass; not metal.

22 pF to GND
Sets how keen the pad is. Smaller is keener.

GND is the square pad
Count from it. The back prints no pin names.



TTP223 touch chip
TOG, AHLB on GND: momentary, active high.

Red LED on SIGNAL
Lit while touched. Not a power light.

SIGNAL: the chip's output
HIGH while touched. INPUT, no pull-up.

Front	GND	VCC	NC	SIGNAL
Touch	GND	VCC	●	SIGNAL

Hands off for the first half second

For about 0.5 s after power-up the chip learns what the pad reads untouched. A finger there becomes the baseline and later touches may be missed. Something left on the pad holds SIGNAL HIGH for as long as it stays: this chip never times a touch out.

How fast, and how high

From rest

220 ms, at most

Idle, the chip looks about every 160 ms on 1.5 µA. The first touch waits for a look.

Awake

60 ms, at most

A touch wakes it to a look about every 20 ms, for about 12 s after release.

SIGNAL on 3V3

3.1 V, touched

VCC less the output's drop lighting the LED, about 1.1 mA. Worked out, not measured.

Both response times are quick for a finger. The one wire that matters is VCC: it is the HIGH your pin receives, so match it to your board.

Response times, currents and the 0.5 s settling time from Tontek's TTP223 datasheets, at 3 V. The touched voltage and LED current are arithmetic on the datasheet's output figure, not measured. The sketch compiles for an ESP32-S3 and an Uno; the block has not been bench-tested for this sheet.

The first touch, on an ESP32-S3

Arduino IDE · Board: ESP32S3 Dev Module · USB CDC On Boot: Enabled · No library

```
// The GPIO number SIGNAL is wired to.
// Uno: 2. ESP32: 25. ESP32-S3: 4. Pico: 15.
const int TOUCH_PIN = 4;

int last = LOW;

void setup() {
  Serial.begin(115200);
  pinMode(TOUCH_PIN, INPUT);    // the chip drives SIGNAL both ways
}

void loop() {
  int reading = digitalRead(TOUCH_PIN);

  if (reading != last) {        // print only when it changes
    if (reading == HIGH) {
      Serial.println("HIGH  touched");
    } else {
      Serial.println("LOW   released");
    }
    last = reading;
  }
}
```

```
HIGH touched
LOW released
```

Serial Monitor at 115200, a pair of lines per touch, with the red LED lit while it says HIGH.

Wiring

	FRONT	S3	UNO	ESP32	PICO
1	GND	GND	GND	GND	GND
2	VCC	3V3	5V	3V3	3V3
3	NC				
4	SIGNAL	GPIO 4	D2	GPIO 25	GP15

Hole 1 is the square pad. VCC is each board's logic supply, because SIGNAL's HIGH is VCC. Set the pin to INPUT: the chip drives SIGNAL both ways, so no pull-up.

Toggle in the sketch

The chip's toggle mode is switched off in copper (TOG on GND), and there is no jumper. For one touch on, the next off, keep a variable and flip it each time SIGNAL changes from LOW to HIGH. No debounce is needed: the chip drives SIGNAL cleanly, once per look at the pad.

When it does not work

LED dark when touched

Check VCC and GND from the square pad, then power-cycle with hands clear of the pad.

Stuck HIGH

Something is on or near the pad. It never times out: clear it, then power-cycle.

Dull through a panel

Thinner panel, no metal or metallic paint. A smaller C5 makes it keener.

LED lit, sketch sees nothing

Wrong pin number, or the wire is on NC (hole 3) instead of SIGNAL (hole 4).

Touches nobody made

A jumpy supply or long leads near the pad. Keep leads short, supply steady.

First touch feels slow

Idle, it looks only every 160 ms or so. Up to 220 ms from rest is normal.

Specifications

Chip	Tontek TTP223, SOT-23-6	**Supply**	2.0 to 5.5 V, your logic supply
Output	Push-pull, HIGH while touched	**Mode**	Momentary, active high, fixed
Response	220 ms from rest, 60 ms awake	**Current**	1.5 µA idle, typical at 3 V
Pad	12 mm; 22 pF sensitivity capacitor	**Settling**	about 0.5 s after power-up