ESP32 Touch Sensor Pins

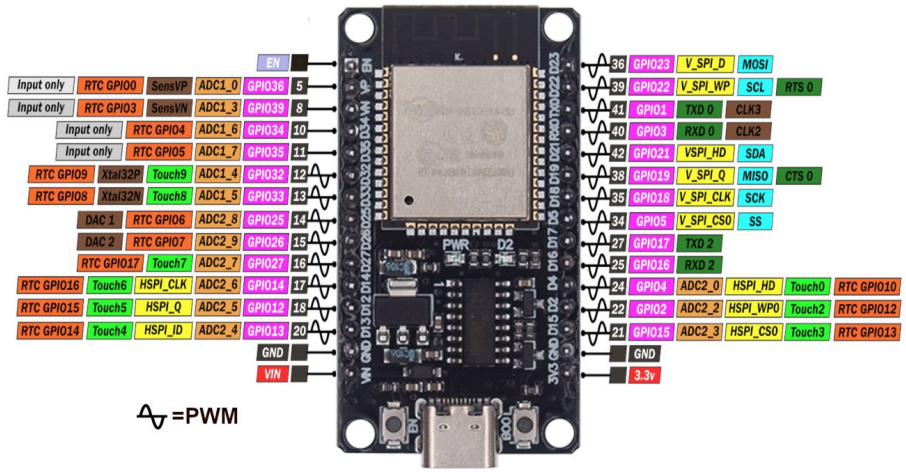

Figure 1: **ESP32 UART Communication Pins**

The ESP32 includes **10 capacitive touch sensor pins** that allow it to detect human touch or proximity. These touch-sensitive pins can be used in place of buttons or sliders for interactive applications.

Touch Pins Overview

- The ESP32 touch pins are connected to internal capacitive sensing circuitry.
- When a conductive object (like a human finger) approaches the pin, the capacitance changes, which the ESP32 can detect.
- Touch pins are generally labeled as **T0 to T9** in ESP32 documentation.

Corresponding GPIO Pins

- **T0: GPIO4**
- **T1: GPIO0**
- **T2: GPIO2**
- **T3: GPIO15**
- **T4: GPIO13**
- **T5: GPIO12**

- **T6: GPIO14**
- **T7: GPIO27**
- **T8: GPIO33**
- **T9: GPIO32**

Key Features of Touch Pins

- Can detect **capacitive touch or proximity** without mechanical contact.
- Useful for **buttons, sliders, or touch pads**.
- Integrated with ESP32 ADC system to read capacitance values as digital inputs.
- Supports interrupt-based detection for responsive applications.

Example Usage (Arduino IDE)

```
// Detect touch on GPIO4 (T0)
const int touchPin = 4;

void setup() {
  Serial.begin(115200);
}

void loop() {
  int touchValue = touchRead(touchPin);
  Serial.println(touchValue);  // Prints capacitance value

  if (touchValue < 40) {      // Threshold for touch detection
    Serial.println("Touched!");
  }
  delay(200);
}
```

Applications

- Touch-sensitive buttons in IoT devices.
- Interactive sliders or volume controls.
- Proximity detection for wake-up or security systems.
- Replacing mechanical switches in embedded systems for durability.