

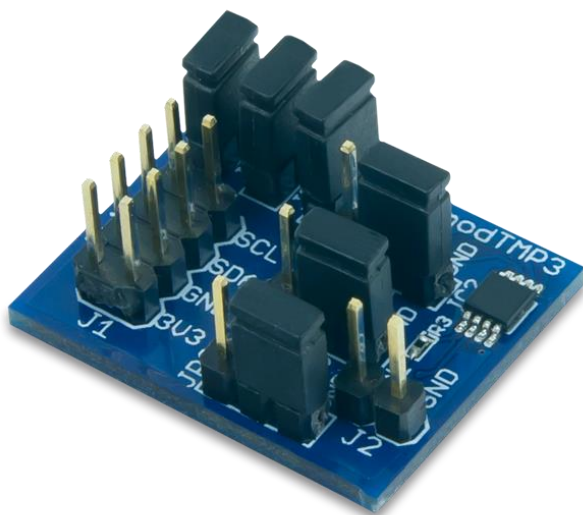
PmodTMP3™ Reference Manual

Revised April 8, 2016

This manual applies to the PmodTMP3 rev. A

Overview

The Digilent PmodTMP3 is a temperature sensor built around the Microchip TCN75AVUA.



Features include:

- Ambient temperature sensor with up to 12-bit resolution
- Typical accuracy of ± 1 °C
- Programmable temperature alert pin
- Multiple jumpers for eight selectable addresses
- 30ms to 240ms typical conversion times
- Small PCB size for flexible designs 1.0" × 0.8" (2.54 cm × 2.0 cm)
- 2×4-pin port with I²C interface
- Follows Digilent Pmod Interface Specification

PmodTMP3

1 Functional Description

The PmodTMP3 uses an 8-pin connector that allows for communication via I²C and provides pins to daisy-chain the PmodTMP3 to other I²C devices. The PmodTMP3 also provides three 3-pin headers for selecting the I²C address of the chip, and one 2-pin header for controlling external devices based upon temperature thresholds defined by the user in software. Temperature data measured by the device is formatted in two's complement and may be programmed for a resolution of 9-bits to 12-bits through the configuration register on the TCN75AVUA.

2 I²C Interface

The TCN75AVUA on the PmodTMP3 acts as a slave device using I²C serial communication. To communicate with the PmodTMP3, the master device must specify a slave address (0x48-0x4F) and a flag indicating whether the communication is a read (1) or a write (0). This is followed by the actual data transfer. For the TCN75AVUA, the data transfer should consist of the address of the desired device register followed by the data to be written to the specified register. To read from a register the master must write the desired register address to TCN75AVUA, then send an I²C restart condition, and send a read request to the TCN75AVUA.

Pin	Signal	Description
1, 2	SCL	I ² C Clock
3, 4	SDA	I ² C Data
5, 6	GND	Power Supply Ground
7, 8	3V3	Power Supply (3.3V)

Table 1. I²C interface connector signal description.

The I²C interface standard uses two signal lines. These are I²C data (SDA) and I²C clock (SCL). On the TCN75AVUA, both SDA and SCL are open-drain pins. For communication to be established, these pins must be connected to pull-up resistors. The PmodTMP3 has selectable pull-up resistors on jumpers JP4 and JP5. If the master device used to communicate with the PmodTMP3 does not have pull-up resistors on the SDA and SCL signals, both JP4 and JP5 must be shorted to establish communication via I²C. If the master device already has pull-up resistors, these jumpers may remain open.

JP4	JP5	Pull-Up State
Open	Open	Pull-ups disabled
Shorted	Shorted	Pull-ups enabled

Table 2. I²C Pull-up jumper settings.

3 I²C Address Selection

The PmodTMP3 I²C bus can be set to use one of eight valid addresses. The top four bits of the address are fixed, and the three least significant bits are specified by the states of jumpers JP1, JP2 and JP3. JP1 corresponds to bit zero of the address, JP2 corresponds to bit one of the address, and JP3 corresponds to bit two of the address. The address is set by shorting the AX pin on the PmodTMP3 (where X is the bit number) with either 3V3 or GND. Shorting a jumper in the GND position corresponds to a zero while shorting a jumper in the 3V3 position corresponds to a one.