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I2C-TMP^{TM} I^{2}C 12-Bit Digital Temperature Sensor
User Manual

Description

The I2C-TMP board is a 6-pin CMOS 12-bit digital temperature sensor device using I^{2}C bus. There are no external components required. Only two signal lines SDA and SCL plus supply voltage and ground are required to be connected. This makes it perfect for embedded systems that require temperature measurement.

This board features innovations that set it apart from other temperature sensor module. Innovations feature like on-board I^{2}C address jumpers, pull-up resistors, and power LED. The module can be quickly connected directly on to the breadboard. The board is small and compact in size 0.70 x 0.60 inches.

The I2C-TMP is designed base on TMP175 IC. It is digital temperature sensors that are optimal for thermal management and thermal protection applications. The device is specified over a temperature range of −40°C to +125°C.

The sensing device is the chip itself. Thermal paths run through the package leads as well as the plastic package. The lower thermal resistance of metal causes the leads to provide the primary thermal path.

A jumper pins vary the fixed I^{2}C address and allow up to 27 devices to share the same I^{2}C bus.

Features

- 27 addresses
- Resolution: 9- to 12-bit, user-selectable
- Accuracy:
  +/- 1.5°C (max) from -25°C to +85°C
  +/- 2.0°C (max) from -40°C to +125°C
- Stand alone module, no external components required
- On-board I^{2}C address jumpers, pull-up resistors and power LED
- Decoupling supply voltage
- Design easy for breadboard
- High quality double sided PCB
- All SMT components
- Small and compact in size 1.50 x 2.05 inches
- Dual row 0.6" width, 0.1" pitch header pins
- Flexible operating power supply voltage range of 2.7V to 5.5V
- Suitable for 3.3V or 5.0V microcontroller

Applications

- Power supply temperature monitoring
- Thermal management
- Thermal protection
- Thermostat controls
- Environmental monitoring
- Electromechanical device temperature
- And much more…

* I^{2}C is a trademark of Philips Semiconductors Corporation.

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Pin Configuration

ALT (1) NC (2) GND (3) U1 VCC (6) SDA (5) SCL (4)
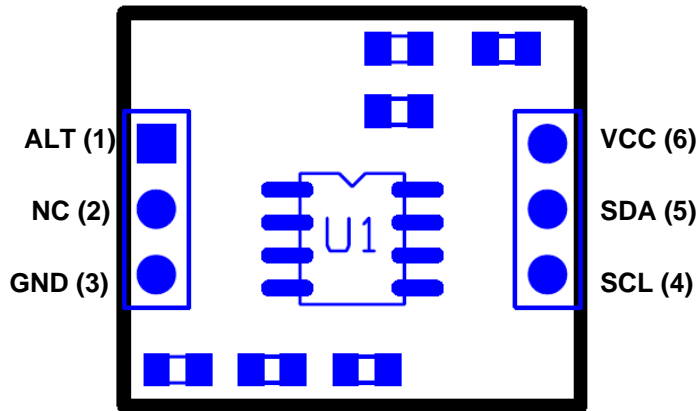
Pin No.	Name	Type	Description
1	ALT	Output	Alert output
2	NC	NC	No connect
3	GND	PWR	Supply ground
4	SCL	Input	Serial clock line
5	SDA	I/O	Serial data line
6	VCC	PWR	Supply voltage

Interfaces

Power:

The I2C-TMP board needs an external 2.7VDC – 5.5VDC supply.

- **VCC:** is an input power 2.7VDC – 5.5VDC to I2C-TMP board.

- **GND:** is a common ground for every pin. This pin MUST be connected to ground of the external power supply.

I²C pins:

The I2C-TMP operates as a slave on the I²C bus. Only two signal lines SDA and SCL are required for I²C bus. Please refer to I²C specification for more information.

ALT pin:

In Interrupt Mode: alert pin is active when the temperature is above or below user settable trip points (T_{HIGH} and T_{LOW}). It is software selectable for active HIGH or LOW.

In Comparator Mode: the ALERT pin becomes active when the temperature equals or exceeds the value in T_{HIGH} and generates a consecutive number of faults according to fault bits F1 and F0. The ALERT pin will remain active until the temperature falls below the indicated T_{LOW} value for the same number of faults.
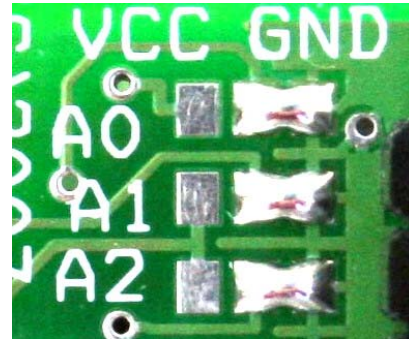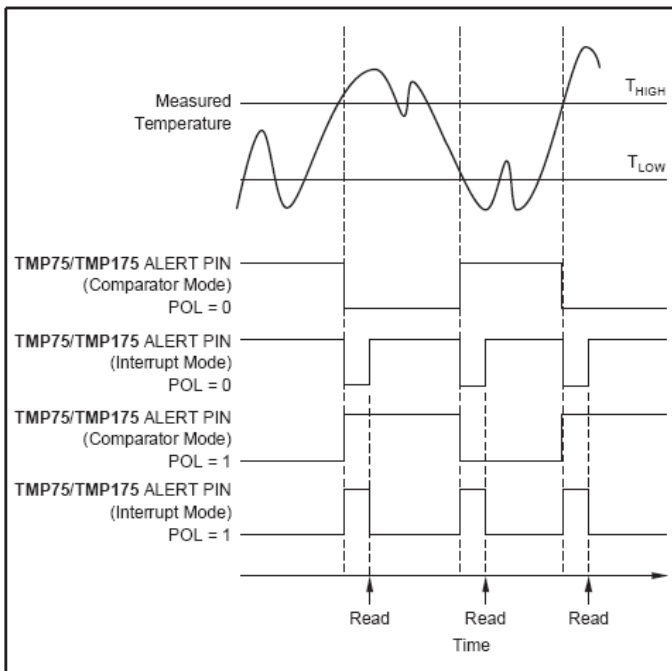
The I2C-TMP features three address pins to allow up to 27 devices to be addressed on a single bus interface.
Table below describes the pin logic levels used to properly connect up to 27 devices.

'1' indicates solder a bridge from the middle pad to VCC.

'0' indicates solder a bridge from middle pad to GND.

'Float' indicates no solder bridge to any pads.

Module Configuration

I²C address:

Default address shipped from the manufacture is 0x90.

A0 = GND
A1 = GND
A2 = GND

A2	A1	A0	SLAVE ADDRESS
0	0	0	1001000
0	0	1	1001001
0	1	0	1001010
0	1	1	1001011
1	0	0	1001100
1	0	1	1001101
1	1	0	1001110
1	1	1	1001111
Float	0	0	1110000
Float	0	Float	1110001
Float	0	1	1110010
Float	1	0	1110011
Float	1	Float	1110100
Float	1	1	1110101
Float	Float	0	1110110
Float	Float	1	1110111
0	Float	0	0101000
0	Float	1	0101001
1	Float	0	0101010
1	Float	1	0101001
0	0	Float	0101100
0	1	Float	0101101
1	0	Float	0101110
1	1	Float	0101111
0	Float	Float	0110101
1	Float	Float	0110110
Float	Float	Float	0110111

Power-on LED:

The green LED on the module is illuminating when the power applied. The power-on LED is enabled from the manufacture. It can be disabling for light sensitive or low current requirement application by remove the solder bridge on "LD" at the bottom of the module.

I²C pull-up resistors:

I²C bus specification required to have pull-up resistors on SDA and SCL pin. I2C-TMP come with these two pull-up resistors enabled from the manufacture. It can be disabling when connect to I²C bus that already have pull-up resistors by remove the solder bridge on the "SPU" at the bottom of the module.
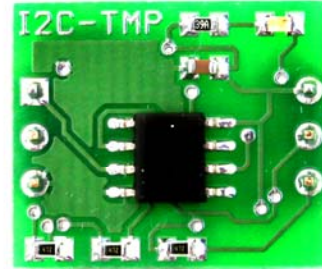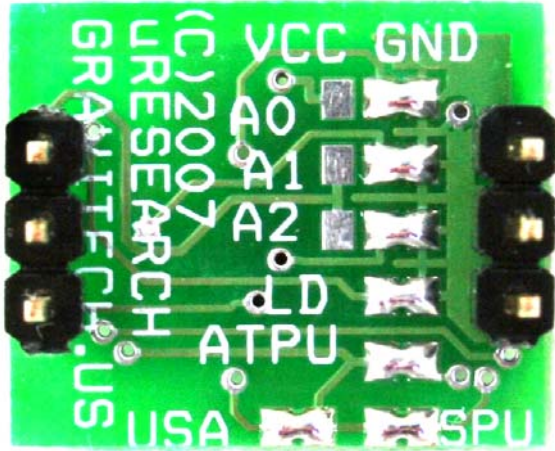

Alert pull-up resistors:

ALT pin is required to have a pull-up resistor. I2C-TMP come with this pull-up resistor enabled from the manufacture. It can be disabling by remove the solder bridge on the "ATPU" at the bottom of the module.

Below are the default settings from the manufacture.

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Notes

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