

SENSYLINK Microelectronics

(CT7468)

***Digital Temperature Sensor for remote
measurement(-200°C~200°C)***

CT7468 is a 9-channel (8-channel Remote and 1-channel Local) Temperature Sensor with Remote measurement range up to -200°C~200°C and SMBus Digital Interface.

It is ideally used in Temperature Sensing and Monitoring Systems, such as Cold-chain, BBQ oven and Liquid nitrogen etc.

Digital Temperature Sensor for remote measurement(-200°C~200°C)

Description

The CT7468 is a 9channels digital temperature sensor with $\pm 1^\circ\text{C}$ accuracy. Temperature data can be read out directly via SMBus/I²C interface by MCU or SoC chip.

CT7468 has 9 independent channels: 8 remote channels and 1 local channel. The remote channels could be connected to an external Diode, BJT transistor (diode-connected mode), or parasitic PNP BJT transistor inside the CPU, FPGA or SOC chip. Based on this, this chip can be used to monitor CPU, GPU, MCU, SOC, FPGA or DSP chip die and case temperature.

Each chip is calibrated in factory before shipment to customers. There is no need for re-calibration anymore for $\pm 1^\circ\text{C}$ accuracy. The chip builds in a band-gap circuit, an analog to digital converter, a calibration unit with non-volatile memory and a digital interface block.

It integrates a 13-bit ADC, which can offer 0.0625°C resolution and -50°C to 150°C temperature range. There are 2 individual thermal limit registers for each channel, which can be programmed from -255°C to 255°C range with 0.5°C step as threshold temperature. It has 2 logic THERM output pins(**THERM**, **THERM2**) with open drain structure and active low.

Available Package:QFN3x3-16.

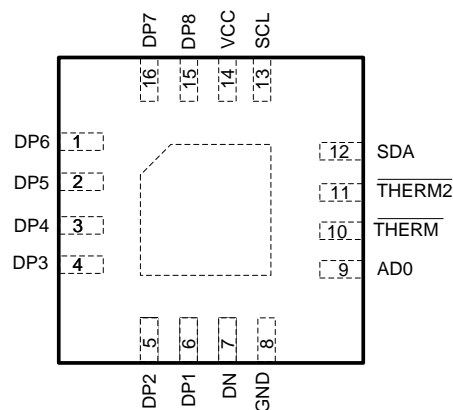
Features

- Operation Voltage: 1.75V to 5.5V
- Average Operating Current: 45uA (Typ.)for all channels one time measurement at VCC = 3.3V
- Standby Current: 3.0uA (Typ.)
- Temperature Accuracy without calibration for all channels: $\pm 1^\circ\text{C}$ from 0°C to 50°C
- 13 bit ADC for 0.0625°C resolution
- Digital interface compatible with SMBus and I²C
- Series Resistance Cancellation, n-Factor correction, Offset correction and Diode fault detection for each remote channel.
- Individually programmable THERM limit temperature for any of 9 channels with share Hysterisis data
- Register lock feature to protect register data
- 8 slave addresses available by setting AD0 pin
- Temperature Range:
 - 40°C to 125°C for local channel
 - 200°C to 200°C for remote channels
- The measurement range can be extended from -200°C to 200°C for remote channels with 9018 transistor.

Applications

- Cold-chain, BBQ oven
- Liquid nitrogen

PIN Configurations (Top View)



QFN3x3-16 (Package Code, QN)

Typical Application

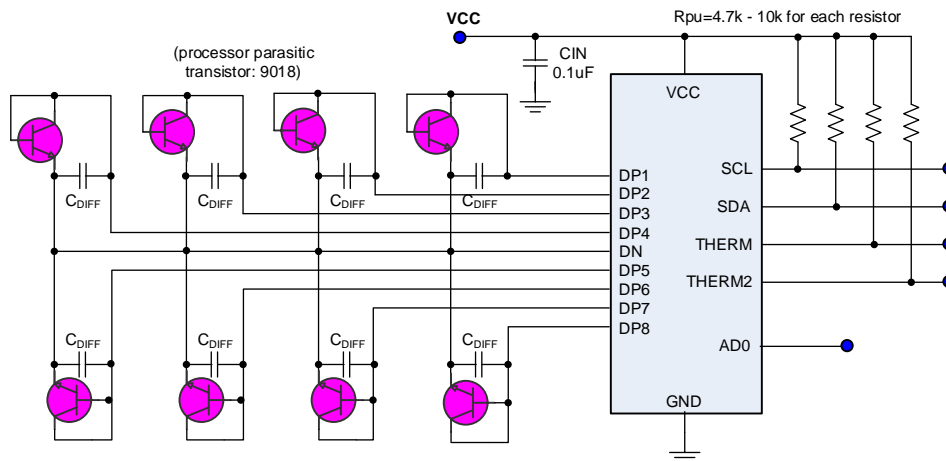


Figure 1. Typical Application of CT7468

Pin Description

PIN No.	PIN Name	Description
1	DP6	Remote channel 6 positive input pin, it could be positive node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP6 and DN pin.
2	DP5	Remote channel 5 positive input pin, it could be positive node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP5 and DN pin.
3	DP4	Remote channel 4 positive input pin, it could be positive node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP4 and DN pin.
4	DP3	Remote channel 3 positive input pin, it could be positive node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP3 and DN pin.
5	DP2	Remote channel 2 positive input pin, it could be positive node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP2 and DN pin.
6	DP1	Remote channel 1 positive input pin, it could be positive node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP1 and DN pin.
7	DN	Remote channel common negative input pin, it could be negative node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP1 to DP8 pins and this pin respectively.
8	GND	Ground pin.

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9	AD0	Slave address setup pin, it will generate 4 different slave addresses by connecting to VCC, GND, SCL and SDA. For suffix -A part, there will generate another 4 different slave addresses by connecting AD0 pin to VCC, GND, SCL and SDA. Total there is 8 slave addresses for selection.
10	<u>THERM</u>	Open drain output with active low. Need a pull-up resistor to VCC If the measured temperature meets or exceeds THERM-limit (programmable by user), this pin will be activated. This pin can be used to control Fan on/off.
11	<u>THERM2</u>	Another THERM (THERM2) pin, it is also open drain output with active low. Need a pull-up resistor to VCC If the measured temperature meets or exceeds THERM2-limit (programmable by user), this pin will be activated.
12	SDA	Digital interface data input or output pin, need a pull-up resistor to VCC.
13	SCL	Digital interface clock input pin, need a pull-up resistor to VCC.
14	VCC	Power supply input pin, using 0.1uF low ESR ceramic capacitor to ground
15	DP8	Remote channel 8 positive input pin, it could be positive node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP8 and DN pin.
16	DP7	Remote channel 7 positive input pin, it could be positive node of Diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor ($C_{DIFF} < 1000\text{pF}$) plus serial resistor ($R_S < 1.0\text{k ohm}$) to remove noise between DP7 and DN pin.

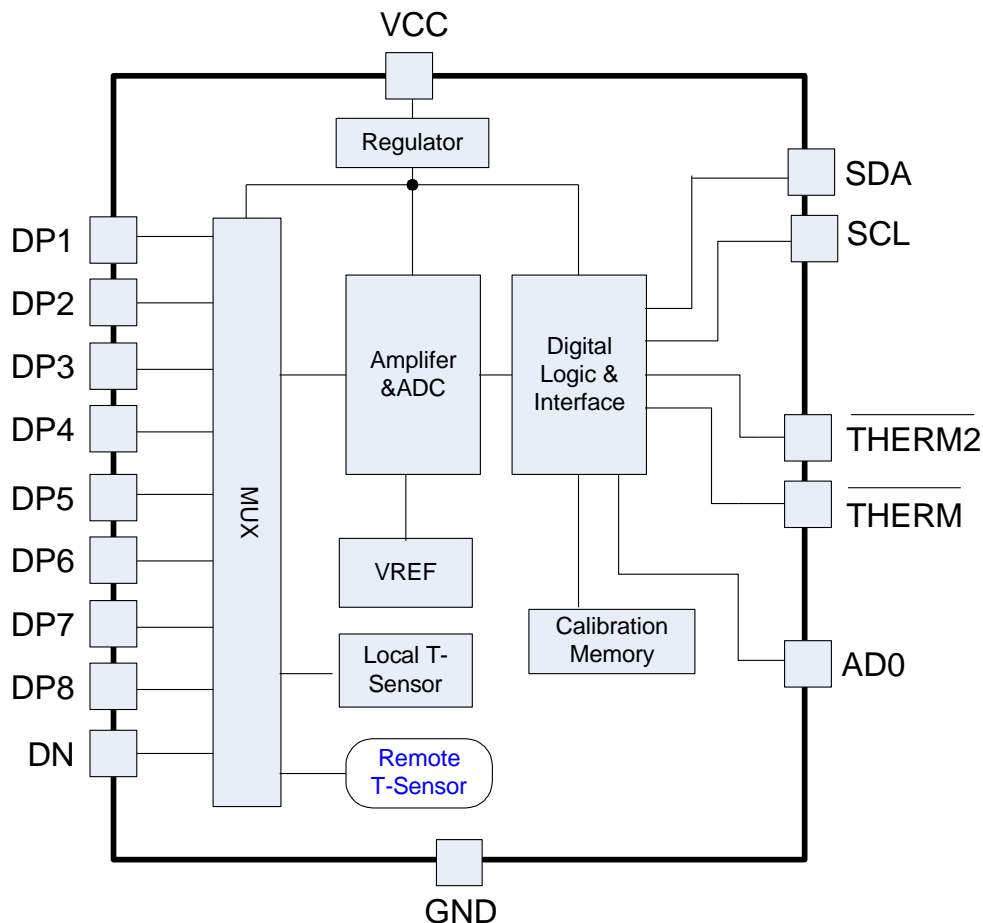
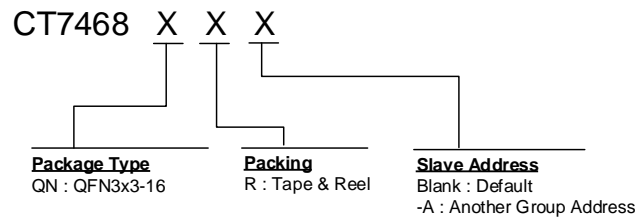
Function Block


Figure 2. CT7468 function block

Ordering Information (Note 1)


Order PN	Accuracy	Green ¹	Package	Marking ID ²	Packing	MPQ	Operation Temperature
CT7468QNR	±1°C	Halogen free	QFN3x3-16	7468 YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7468QNR-A	±1°C	Halogen free	QFN3x3-16	7468 YWWAXX	Tape & Reel	3,000	-40°C~+125°C

Note 1

1. Based on ROHS Y2012 spec, Halogen free covers lead free. So most package types Sensylink offers only states halogen free, instead of lead free.

2. Marking ID includes 2 rows of characters. In general, the 1st row of characters are part number, and the 2nd row of characters are date code plus production information.

3. Slave Address, See 1.5.1 Slave address Section for detail.



SENSYLINK Microelectronics Inc.

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