

SENSYLINK Microelectronics Inc

(CT7432)

2-CH Remote and 1-CH Local Temperature Sensor

CT7432 is a 3-channels (2-channels Remote and 1-channel Local) Temperature Sensor with $\pm 1^{\circ}\text{C}$ Accuracy and SMBus Digital Interface.

It is ideally used in Temperature Sensing and Monitoring Systems, such as Computer, Server and Telecom Equipment System etc.

Description

The CT7432 is a 3-channel digital temperature sensor with $\pm 1^\circ\text{C}$ accuracy. Temperature data can be read out directly via SMBus interface by MCU or SOC chip.

CT7432 has three independent channels: 2 remote and 1 local. The remote channels could be connected to an external Diode, BJT transistor (diode-connected mode), or parasitic PNP BJT transistor inside the CPU, GPU, 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 re-calibration anymore for $\pm 1^\circ\text{C}$ accuracy.

It includes a band-gap circuit, an analog to digital converter(ADC), a calibration unit with non-volatile memory and a digital interface block.

It integrates a 12-bit ADC, which can offer 0.0625°C resolution. The maximum temperature readout range can be extended from -64°C to 191°C by setting configuration1 register.

It has 2 logic output pin(ALERT and THERM) with open drain structure, which are active low as default. Also ALERT pin can be configured as THERM2 pin.

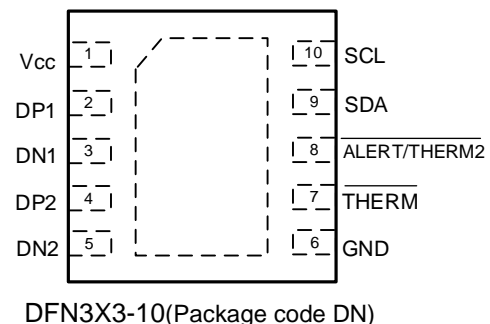
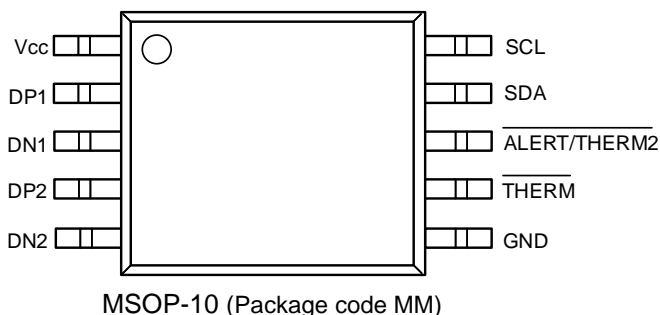
Features

- Operation Voltage: 2.7V to 5.5V
- Average Operating Current:16uA (Typ.)at 0.0625 Conv/s, Vcc = 3.3V
- Shutdown Current: 3.0uA (Typ.)
- Temperature Accuracy without calibration for each channel: $\pm 1^\circ\text{C}$ from 0°C to 100°C
- 12 bit ADC for 0.0625°C resolution
- Digital interface compatible with SMBus and I²C
- Temperature Range up to from -64°C to 191°C by setting RANGE bit as 1
- Programmable high/low-limit ALERT and THERM Temperature with Hysteresis
- Automatic beta compensation, Serial Resistance Cancellation, n-Factor correction and Thermal Diode Fault Detection for each remote channel
- Support SMBus ALERT Response Address (ARA)
- Multiple Slave address options
- CT7432A SMBus slave address is determined by the pull-up resistor on the THERM pin
- Temperature Range:
 - 40°C to 125°C for sensor chip,
 - 50°C to 150°C for remote diodes
- Available package:MSOP-10, DFN3x3-10

Applications

- Computer (Desktop & Notebook)
- Server
- Telecom Equipment, Embedded applications

PIN Configurations (Top View)



Typical Application

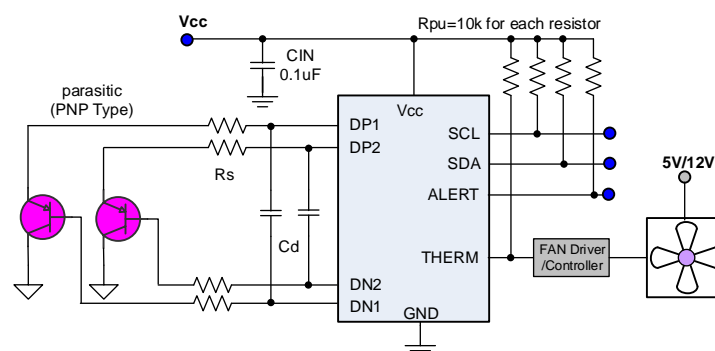


Figure 1. Typical Application of CT7432

Pin Description

PIN No.	PIN Name	Description
1	Vcc	Power supply input pin, using 0.1uF low ESR ceramic capacitor to ground
2	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 (Cd = 100pF) plus serial resistor (Rs =50 ohm) to remove noise between DP1 and DN1 pin.
3	DN1	Remote channel 1 negative input pin, it could be negative node of diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor (Cd = 100pF) plus serial resistor (Rs =50ohm) to remove noise between DP1 and DN1 pin.
4	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 (Cd = 100pF) plus serial resistor (Rs =50 ohm) to remove noise between DP2 and DN2 pin.
5	DN2	Remote channel 2 negative input pin, it could be negative node of diodes, or BJT transistor (diode-connected mode). It is recommended to use bypass capacitor (Cd = 100pF) plus serial resistor (Rs =50ohm) to remove noise between DP2 and DN2 pin.
6	GND	Ground pin.
7	THERM	Thermal output pin, open drain with active low. Need a pull-up resistor to Vcc. For CT7432A, the resistor value determinates slave address. If the measured temperature exceeds THERM-limit (programmable by user), this pin will be activated. This pin can be used to control fan on/off.
8	ALERT/THERM2	Alert output pin, open drain with active low. Need a pull-up resistor to Vcc. If the measured temperature drops below the low-limit or exceeds high-limit, this pin will be activated. Also this pin can be used as 2 nd THERM pin.
9	SDA	Digital interface data input and output pin, need a pull-up resistor to Vcc in application.
10	SCL	Digital interface clock input pin, need a pull-up resistor to Vcc in application.

Function Block

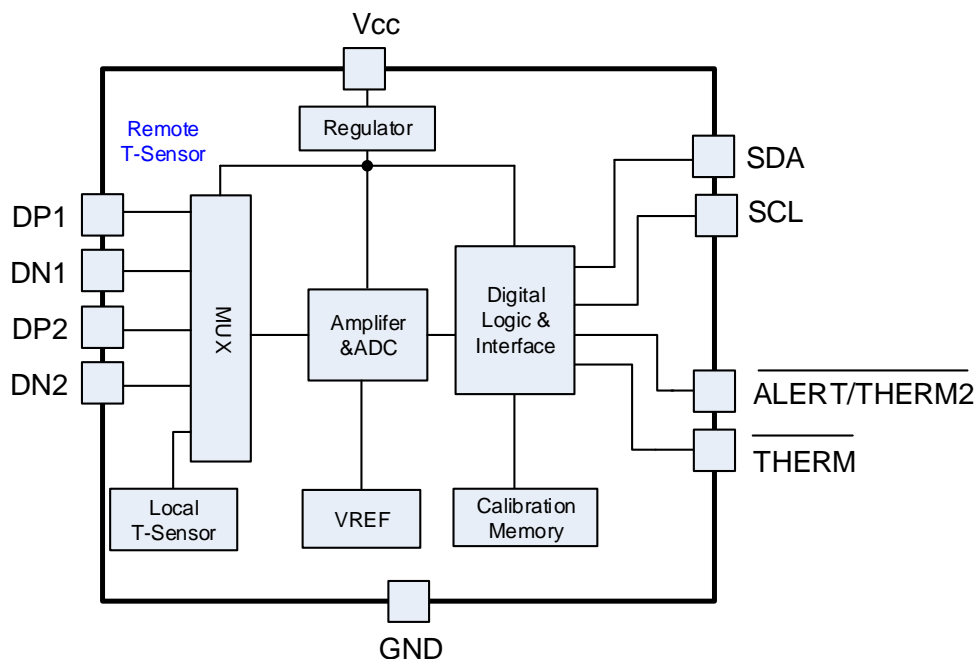
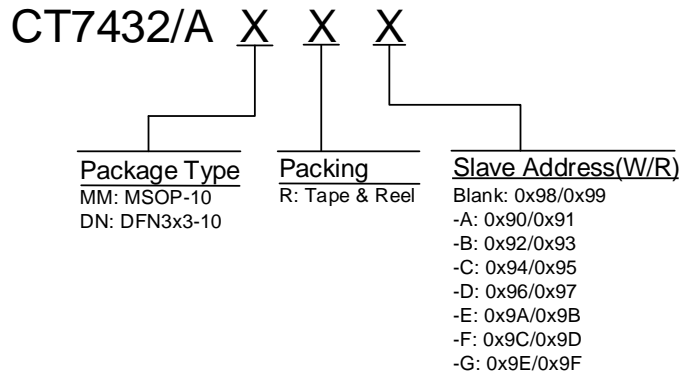


Figure 2. CT7432 Function Block

±1°C 3-CH (2-CH Remote and 1-CH Local) Digital Temperature Sensor with Automatic Beta Compensation
Ordering Information (Note 1)


Order PN	Slave Address(W/R) ³	Accuracy	Green ¹	Package	Marking ID ²	Packing	MPQ	Operation Temperature
CT7432MMR	0x98/0x99	±1°C	Halogen free	MSOP-10	7432 YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432MMR-A	0x90/0x91	±1°C	Halogen free	MSOP-10	SASA YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432MMR-B	0x92/0x93	±1°C	Halogen free	MSOP-10	SASB YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432MMR-C	0x94/0x95	±1°C	Halogen free	MSOP-10	SASC YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432MMR-D	0x96/0x97	±1°C	Halogen free	MSOP-10	SASD YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432MMR-E	0x9A/0x9B	±1°C	Halogen free	MSOP-10	SASE YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432MMR-F	0x9C/0x9D	±1°C	Halogen free	MSOP-10	SASF YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432MMR-G	0x9E/0x9F	±1°C	Halogen free	MSOP-10	SASG YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432AMMR	XXX1_100(w/r)	±1°C	Halogen free	MSOP-10	7432A YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432AMMR-A	XXX1_000(w/r)	±1°C	Halogen free	MSOP-10	SATA YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432AMMR-B	XXX1_001(w/r)	±1°C	Halogen free	MSOP-10	SATB YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432AMMR-C	XXX1_010(w/r)	±1°C	Halogen free	MSOP-10	SATC YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432AMMR-D	XXX1_011(w/r)	±1°C	Halogen free	MSOP-10	SATD YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432AMMR-E	XXX1_101(w/r)	±1°C	Halogen free	MSOP-10	SATE YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432AMMR-F	XXX1_110(w/r)	±1°C	Halogen free	MSOP-10	SATF YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432AMMR-G	XXX1_111(w/r)	±1°C	Halogen free	MSOP-10	SATG YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432DNR	0x98/0x99	±1°C	Halogen free	DFN3x3-10	7432 YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432DNR-A	0x90/0x91	±1°C	Halogen free	DFN3x3-10	SAUA YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432DNR-B	0x92/0x93	±1°C	Halogen free	DFN3x3-10	SAUB YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432DNR-C	0x94/0x95	±1°C	Halogen free	DFN3x3-10	SAUC YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432DNR-D	0x96/0x97	±1°C	Halogen free	DFN3x3-10	SAUD YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432DNR-E	0x9A/0x9B	±1°C	Halogen free	DFN3x3-10	SAUE YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432DNR-F	0x9C/0x9D	±1°C	Halogen free	DFN3x3-10	SAUF YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432DNR-G	0x9E/0x9F	±1°C	Halogen free	DFN3x3-10	SAUG YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432ADNR	XXX1_100(w/r)	±1°C	Halogen free	DFN3x3-10	7432A YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432ADNR-A	XXX1_000(w/r)	±1°C	Halogen free	DFN3x3-10	SAYA	Tape & Reel	3,000	-40°C~+125°C

±1°C 3-CH (2-CH Remote and 1-CH Local) Digital Temperature Sensor with Automatic Beta Compensation

					YWWAXX			
CT7432ADNR-B	XXX1_001(w/r)	±1°C	Halogen free	DFN3x3-10	SAYB YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432ADNR-C	XXX1_010(w/r)	±1°C	Halogen free	DFN3x3-10	SAYC YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432ADNR-D	XXX1_011(w/r)	±1°C	Halogen free	DFN3x3-10	SAYD YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432ADNR-E	XXX1_101(w/r)	±1°C	Halogen free	DFN3x3-10	SAYE YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432ADNR-F	XXX1_110(w/r)	±1°C	Halogen free	DFN3x3-10	SAYF YWWAXX	Tape & Reel	3,000	-40°C~+125°C
CT7432ADNR-G	XXX1_111(w/r)	±1°C	Halogen free	DFN3x3-10	SAYG YWWAXX	Tape & Reel	3,000	-40°C~+125°C

Note 1:

1. Sensylink can meet RoHS 2.0/REACH requirement. 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. For CT7432A, Slave Address high 3bit is XXX, which means that the address of I²C is determined by the external pull-up resistance of THERM pin. For specific I²C address, please refer to 1.6.1 Slave Address.



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