SENSYLINK Microelectronics

(CT7453)
3-CH Remote and 1-CH Local Temperature Sensor

CT7453 is a 4-channels (3-channels Remote and 1-channel Local) Temperature Sensor with ±1℃ Accuracy and SMBus Digital Interface.

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

±1°C 4-CH (3-CH Remote & 1-CH Local) Digital Temperature Sensor with Automatic β Compensation

1. Description

The CT7453 is a high accuracy, low cost, System Management Bus (SMBus) temperature sensor. Advanced features such as Beta Compensation (to support CPU diodes requiring the BJT/transistor model) and automatic diode type detection combine to provide a robust solution for complex environmental monitoring applications.

The CT7453 monitors four temperature channels (3-CH remote and one local), providing ±1°C accuracy for both remote and local diode temperatures.

Beta Compensation eliminates temperature errors caused by low, variable beta transistors common in today's fine geometry processors. The automatic beta detection feature monitors the remote diode/transistor and determines the optimum sensor settings for accurate temperature measurements, regardless of processor technology. This frees the user from providing unique sensor configurations for each temperature monitoring application. These advanced features, plus ±1°C measurement accuracy, provide a low-cost, highly flexible and accurate solution for critical temperature monitoring applications.

2. Features

- Programmable SMBus Address
- Support for Diodes requiring the BJT/Transistor: Supports advanced process substrate thermal diodes such as CPU, GPU and FPGACPU thermal diodes
- Digital Interface Compatible with SMBus and I2C
- Support SMBus Alert Response Address (ARA)
- Support Packet Error Checking (PEC)
- Pin Compatible with EMC1464
- Up to 3 Remote Temperature Monitors: ±1°C max accuracy (20°C < T_{DIODE} < 110°C)
- supports up to 2.2 nF diode filter capacitor
- Local Temperature Monitor: 0.0625°C resolution
- Programmable Temperature Limits for: $\overline{ALERT}$: 85°C default high limit and 0°C default low limit
  $\overline{THERM}$: 85°C default
- Lead-Free RoHS Compliant Packages
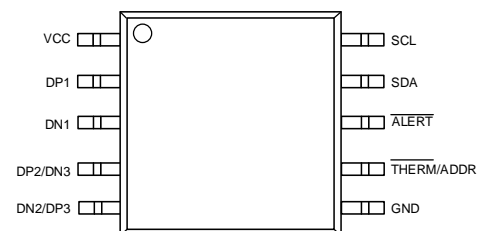- Available Package: DFN3x3-10, MSOP-10 package

3. Applications

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

4. Pin Configurations (Top View)
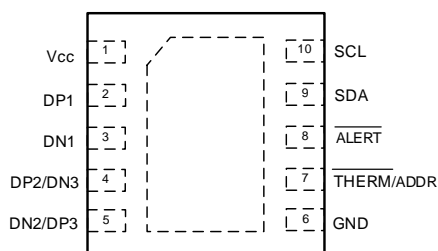
DFN3X3-10(Package code DN)

MSOP-10(Package Code MM)
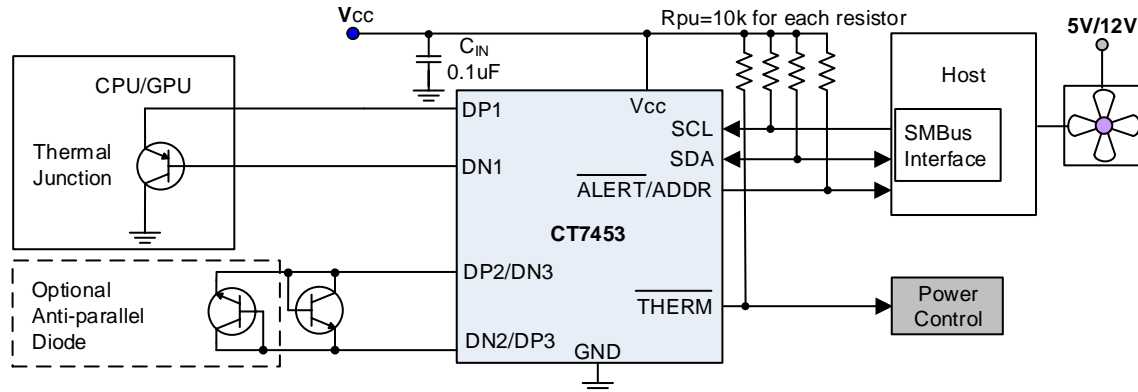
5. Typical Application

Figure 1 Typical Application of CT7453

6. Pin Descriptions

PIN No	PIN Name	Description
1	V_{CC}	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/DN3	Remote channel 2 positive input pin, it could be positive node of diodes (or Remote channel 3 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 =50 ohm) to remove noise between DP2 and DN2 pin.
5	DN2/DP3	Remote channel 2 negative input pin, it could be negative node of diodes (or 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 (Cd = 100pF) plus serial resistor (Rs =50ohm) to remove noise between DP2 and DN2 pin.
6	GND	Ground pin.
7	$\overline{\text{THERM}}$	Thermal output pin, open drain with active low. Need a pull-up resistor to Vcc. 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	$\overline{\text{ALERT}}$/ADDR	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.
		ADDR Selects SMBus address based on pull-up resistor.
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.
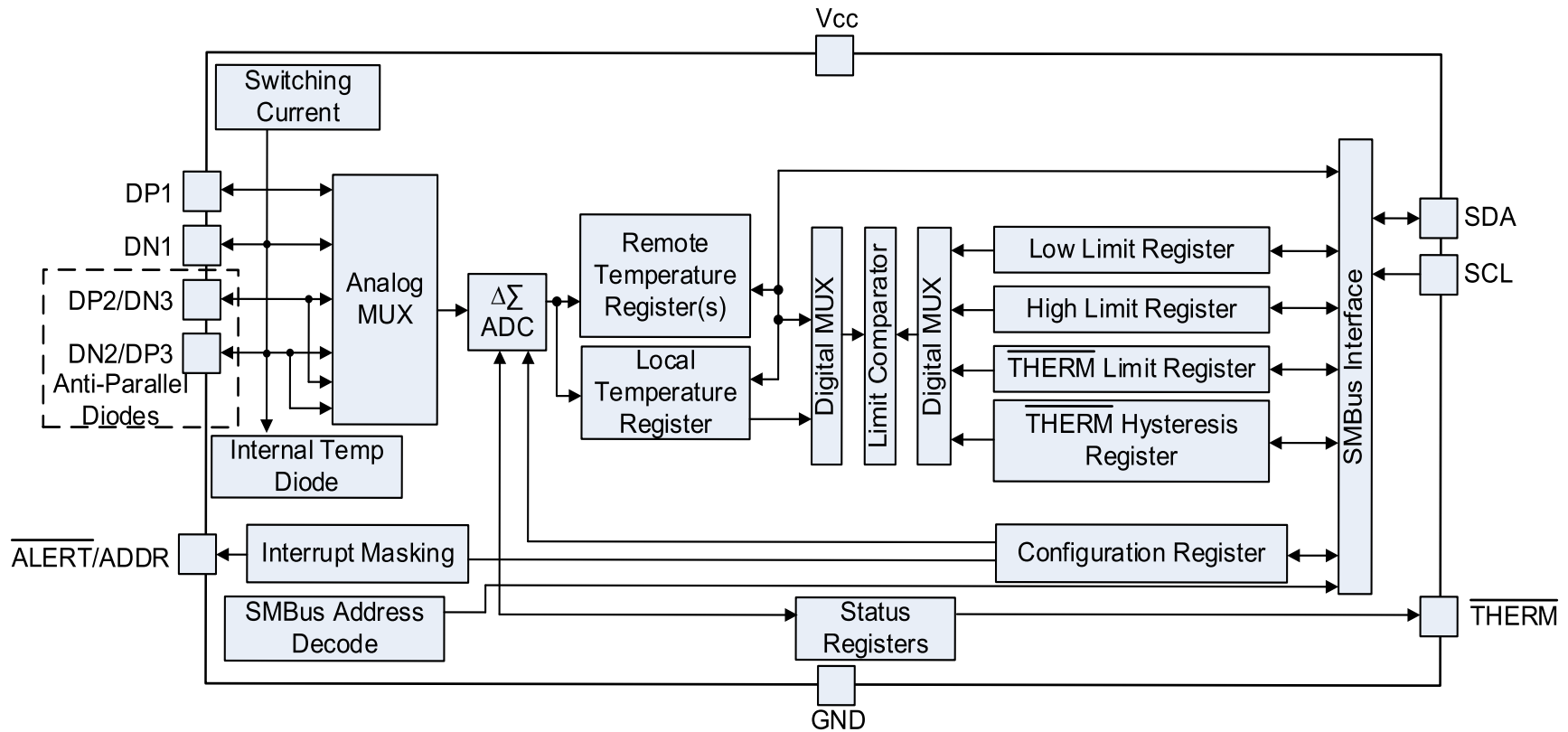
7. Function Block

Figure 2 CT7453 Functional Block

±1ºC 4-CH (3-CH Remote & 1-CH Local) Digital Temperature Sensor with Automatic β Compensation

8. Ordering Information

CT7453/A X X X

Package Type
DN: DFN3x3-10
MM: MSOP-10

Packing
R: Tape & Reel

Slave Address(W/R)
Blank: XXX1_100
- A:XXX1_000
- B:XXX1_001
- C:XXX1_010
- D:XXX1_011
- E:XXX1_101
- F:XXX1_110
- G:XXX1_111
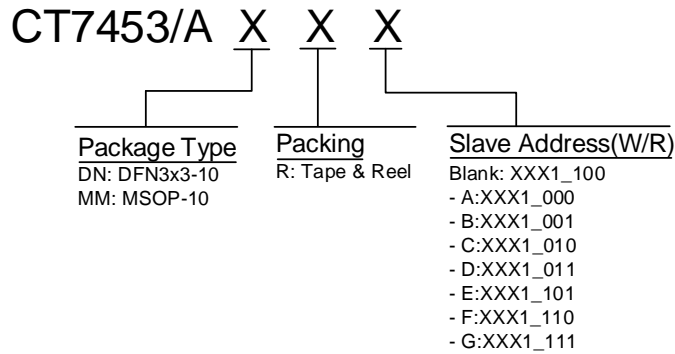
Order PN	Slave Address(W/R) [3]	Accuracy	Green[1]	Package	Marking ID[2]	Packing	MPQ	Operation Temperature
CT7453DNR	0x98/0x99	±1ºC	Halogen free	DFN3x3-10	SAEH YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453ADNR	XXX1_100	±1ºC	Halogen free	DFN3x3-10	SAES YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453ADNR-A	XXX1_000	±1ºC	Halogen free	DFN3x3-10	SAEA YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453ADNR-B	XXX1_001	±1ºC	Halogen free	DFN3x3-10	SAEB YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453ADNR-C	XXX1_010	±1ºC	Halogen free	DFN3x3-10	SAEC YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453ADNR-D	XXX1_011	±1ºC	Halogen free	DFN3x3-10	SAED YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453ADNR-E	XXX1_101	±1ºC	Halogen free	DFN3x3-10	SAEE YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453ADNR-F	XXX1_110	±1ºC	Halogen free	DFN3x3-10	SAEF YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453ADNR-G	XXX1_111	±1ºC	Halogen free	DFN3x3-10	SAEG YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453MMR	0x98/0x99	±1ºC	Halogen free	MSOP-10	SAFH YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453AMMR	XXX1_100	±1ºC	Halogen free	MSOP-10	SAFS YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453AMMR-A	XXX1_000	±1ºC	Halogen free	MSOP-10	SAFA YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453AMMR-B	XXX1_001	±1ºC	Halogen free	MSOP-10	SAFB YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453AMMR-C	XXX1_010	±1ºC	Halogen free	MSOP-10	SAFC YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453AMMR-D	XXX1_011	±1ºC	Halogen free	MSOP-10	SAFD YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453AMMR-E	XXX1_101	±1ºC	Halogen free	MSOP-10	SAFE YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453AMMR-F	XXX1_110	±1ºC	Halogen free	MSOP-10	SAFF YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC
CT7453AMMR-G	XXX1_111	±1ºC	Halogen free	MSOP-10	SAFG YWWAXX	Tape & Reel	3,000	-40ºC ~+125ºC

Note1:

[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].For CT7453A, Slave Address high 3bit is XXX, which means that the address of I2C is determined by the external pull-up resistance of ALERT /ADDR pin. For specific I2C address, please refer to 1.6 Slave Address.

SENSYLINK Microelectronics Inc.

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