TC72, TC74, TC77, TCN75 and MCP9800/1/2/3
Serial Output Temperature Sensor Family

Product Summary:

The **TC74, TCN75** and **MCP9800/1/2/3** are temperature sensors with an on-board thermal diode and an industry standard 2-wire serial interface. The **TC72** and **TC77** are temperature sensors with an on-board thermal diode and an SPI™ compatible interface.

Microchip's serial (digital) output temperature sensors offer excellent temperature accuracy (±0.5°C typical) with a very low operating current of less than 250 µA. Communication with the devices is accomplished via an industry standard I^{2}C™/SMBus or SPI compatible interface protocol. A Standby mode is also available for further reducing the total current. All devices are offered in space-saving packages and feature very fast temperature conversion times. Temperature resolution for the entire family ranges from 0.0625°C to 1°C.

These temperature sensors are fully specified from 2.7V to 5.5V and allow temperature measurement over an extended -55°C to +125°C temperature range, (-40°C to +125°C for the TC74). Several features provided on select devices, address a broad application spectrum: interrupt output for thermal event alarm, external address pins for multi-drop capability, programmable trip-point for maximum flexibility, one-shot temperature measurement for further power reduction and small footprints for board space savings.

High accuracy, low-operating current, small size and ease-of-use make these devices ideal for implementing sophisticated thermal management schemes in a variety of systems.

Typical applications for these devices include:

- PCs, servers, datacom equipment, hard drives
- Set-top boxes, storage equipment, consumer electronics
- Power supplies, communication devices, office electronics and amplifiers
- General purpose temperature monitoring
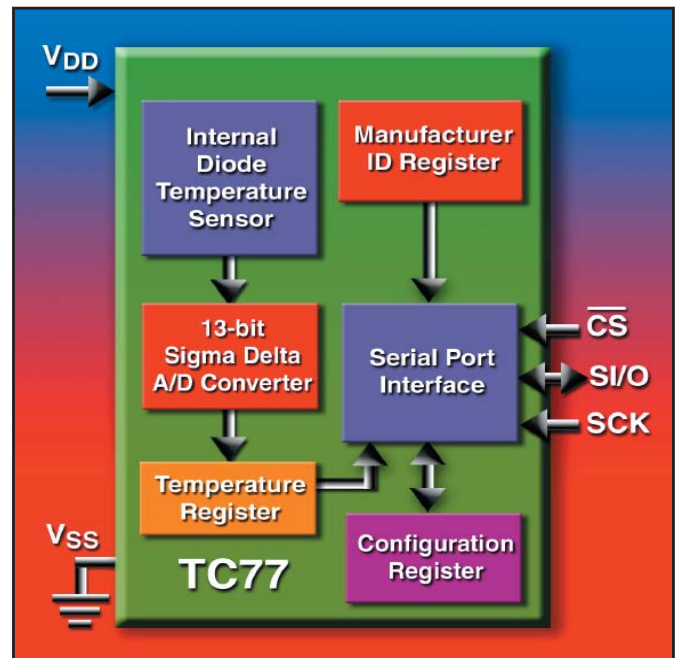
Features:

- Typical accuracy as high as ±0.5°C
- Operating current as low as 200 µA
- 2-wire I^{2}C/SMBus compatible interface
- 3-wire and 4-wire SPI compatible interfaces
- Standby mode for power savings, (as low as 0.1 µA)
- High temperature resolution (0.0625°C to 1°C)
- Fast temperature conversion times
- Multi-drop capability
- Small SOT-23, MSOP and DFN packages

Related Application Notes:

AN679	Temperature Sensing Technologies
AN871	Solving Thermal Measurement Problems Using the TC72 and TC77 Digital Silicon Temperature Sensors
AN913	Interfacing the TC77 Thermal Sensor to a PICmicro® Microcontroller
AN940	Interfacing the TC72 SPI™ Digital Temperature Sensor to a PICmicro® Microcontroller

MICROCHIP
Thermal Management

Additional Information:

- Microchip's web site: www.microchip.com
- *Product Selector Guide*, DS00148
- *Analog & Interface Families Data Book 2002*, DS00207
- *Stand-Alone Analog and Interface Solutions*, Brochure, DS21060
- *TC72 Data Sheet*, DS21743
- *TC74 Data Sheet*, DS21462
- *TC77 Data Sheet*, DS20092
- *TCN75 Data Sheet*, DS21490
- *MCP9800/1/2/3 Data Sheet*, DS21909

Development Tools Support

TC72DM-PICTL
Digital Temperature Sensor PICtail™ Demo Board

This Demo Board demonstrates how to interface the TC72 digital temperature sensor device to a microcontroller. This board can connect directly to the PICkit™ 1 Flash Starter Kit, providing a platform for code development and evaluation.

TC74DEMO
Evaluation and Demonstration Kit

This Demo Board is an evaluation and demonstration board specifically designed to support Microchip's TC74, a 2-wire serial temperature sensor. Communication with the TC74 is accomplished with a PC running the communication software.

TC77DM-PICTL
Thermal Sensor PICtail™ Demo Board

This Demo Board demonstrates how to interface the TC77 thermal sensor device to a microcontroller. This board can connect directly so the PICkit 1 Flash Starter Kit, providing a platform for code development and evaluation.

Serial Output Temperature Sensor Family

Product	Interface	Max Accuracy (+25°C to +65°C)	Temperature Range	V_{CC} Range	Typical I_Q	Typical I_{SHDN}	Resolution	Packages	Features
TC72	4-wire SPI™	±1.5°C	-55°C to 125°C	2.65V to 5.5V	250 µA	0.1 µA	0.25°C	8MS, 8MF	Leadless Package
TC74	2-wire I²C™/ SMBus	±2°C	-40°C to 125°C	2.7V to 5.5V	200 µA	5 µA	1°C	5AT, 5CT	Thru-hole Packaging
TC77	3-wire SPI	±1°C	-55°C to 125°C	2.7V to 5.5V	250 µA	0.1 µA	0.0625°C	8MS, 5CT	High Resolution
TCN75	2-wire I²C/ SMBus	±2°C	-55°C to 125°C	2.7V to 5.5V	500 µA	1 µA	0.5°C	8MS, 8SN	Multi-droppable, Interrupt Output
MCP9800	2-wire I²C/ SMBus	±1°C	-55°C to 125°C	2.7V to 5.5V	220 µA	0.1 µA	0.0625°C	5CT	Programmable Resolution
MCP9801	2-wire I²C/ SMBus	±1°C	-55°C to 125°C	2.7V to 5.5V	220 µA	0.1 µA	0.0625°C	8MS, 8SN	Programmable Resolution
MCP9802	2-wire I²C/ SMBus	±1°C	-55°C to 125°C	2.7V to 5.5V	220 µA	0.1 µA	0.0625°C	5CT	Programmable Resolution, SMBus Timeout
MCP9803	2-wire I²C/ SMBus	±1°C	-55°C to 125°C	2.7V to 5.5V	220 µA	0.1 µA	0.0625°C	8MS, 8SN	Programmable Resolution, SMBus Timeout

Package Key: **AT** = TO-220 **CT** = SOT-23 **MS** = MSOP **SN** = SOIC **MF** = DFN

Visit our web site at www.microchip.com for additional product information and your local sales office.

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