

Description

The TMP100 and TMP101 are two high-precision, low-power digital temperature sensors that can replace NTC/PTC thermistors and can be used for temperature measurement in communications, computers, consumer electronics, environment, industry, and instrumentation applications.

The TMP100 and TMP101 can provide temperature accuracy of $\leq \pm 0.5^{\circ}\text{C}$ within the normal operating range of -40°C to $+125^{\circ}\text{C}$, and have good temperature linearity.

The rated operating voltage range of the TMP100 and TMP101 is 2.7~5.5V, and the quiescent operating current during temperature conversion is less than 40 μA . The 12-bit ADC integrated inside the chip has a resolution as low as 0.0625 $^{\circ}\text{C}$.

The TMP100 and TMP101 are available in the 2.9mm $\times$ 1.6mm SOT-23(6) package compatible with SMBus and I²C interfaces, and have the SMBus alarm function.

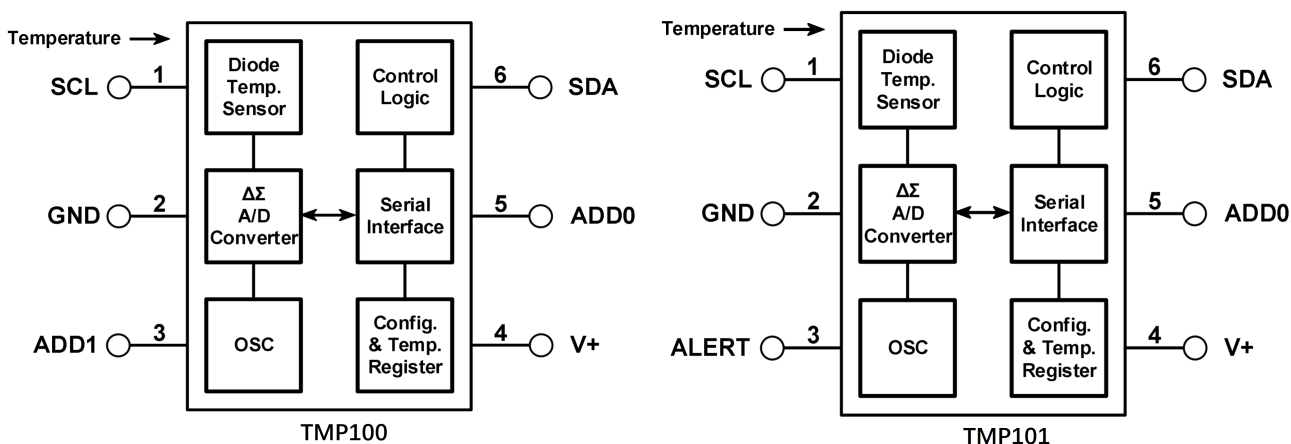
Features

- Product number: TMP100, TMP101
- Temperature range: $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Temperature accuracy: $\pm 0.5^{\circ}\text{C}$ ($-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$)
- Package form: 6-Pin SOT-23
- Package size: 2.90 mm $\times$ 1.60 mm
- Power supply voltage: 2.7V $\sim$ 5.5V
- Low quiescent current
Temperature conversion: $\leq 40\mu\text{A}$
Shutdown mode: $\leq 0.5\mu\text{A}$
- Resolution: 12bits, 0.0625 $^{\circ}\text{C}$
- Digital output: compatible with SMBus™ and I²C interface

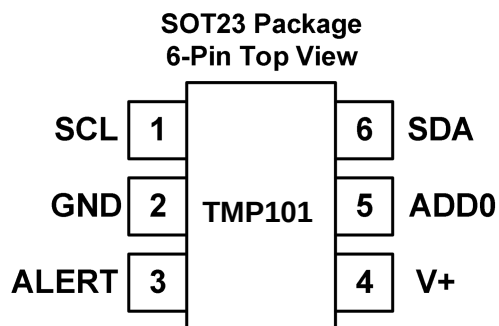
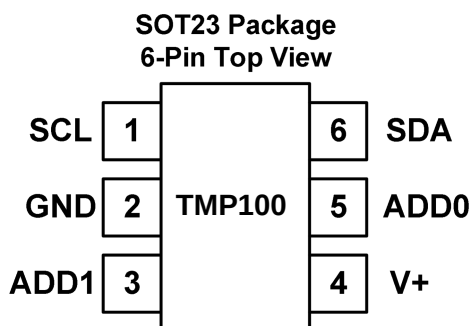
Applications

- Power supply temperature monitoring
- laptop
- Battery management
- Thermostatic control

Figure 1 the Diagram of the Internal Module



High-precision, Low-power Digital Temperature Sensor



Pin Functions

PIN			DESCRIPTION
NAME	NO.		
	TMP100	TMP101	
SCL	1	1	Serial clock. Open-drain output; requires pull-up resistor.
GND	2	2	Ground.
ALERT	—	3	Over-temperature alarm. Open-drain output; requires pull-up resistor.
ADD1	3	—	Address selects. Connected to V+, GND, or left floating.
V+	4	4	Supply voltage, 2.7V~5.5V.
ADD0	5	5	Address selects. Connected to V+, GND, or left floating.
SDA	6	6	Serial data. Open-drain output; requires pull-up resistor.

Specifications

Absolute Maximum Ratings

	MIN	MAX	UNIT
Power Supply Voltage V+		6	V
SCL, SDA and ADD0 Pin Voltage	- 0.5	6	V
ALERT Pin Voltage	- 0.5	((V +) + 0.3) and ≤ 5.5	V
Operating Conditions	- 55	125	°C
Junction Temperature		150	°C
Storage Temperature	- 60	150	°C

Unless otherwise noted, the specifications in the above table apply within the atmospheric temperature range.

Stresses beyond the range may cause permanent damage to the device.

Electrostatic Protection

		Value	UNIT
Electrostatic Discharge Voltage	Human Body Mode (HBM), per ANSI/ESDA/JEDEC JS-001	± 5000	V
	Machine Mode (MM), per JEDEC-STD Classification	300	V

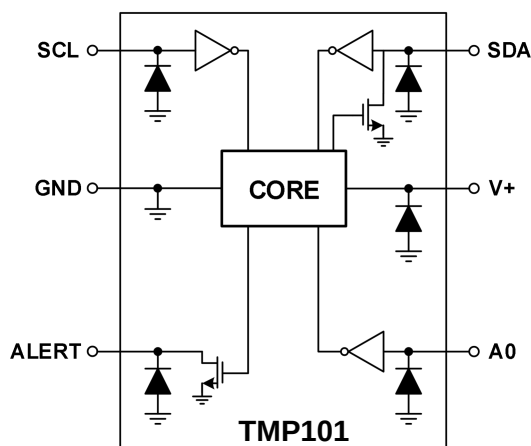


Figure 2 TMP101 Internal ESD Equivalent Circuit

Recommended Operating Conditions

	MIN	NOM	MAX	UNIT
Supply Voltage V+	2.7	3.3	5.5	V
Operating Temperature T _A	-50		125	°C

Unless otherwise noted, the specifications in the above table apply within the atmospheric temperature range.

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Electrical Characteristics

Unless otherwise specified, the following data are the characteristics of the chip at + 25°C and the power supply voltage is in the range of 2.7 V~ 5.5 V .

PARAMETER	TEST CONDITONS	MIN	TYP	MAX	UNIT
Operating Temperature		- 40		125	°C
Accuracy (Temperature Error)	+25°C, V+ = 3.3V		±0.1	±0.5	°C
	0°C to +65°C, V+ = 3.3V		±0.25	±0.5	°C
	-40°C to +125°C		±0.5	±1	°C
Power Supply Sensitivity	-40°C to +125°C		0.0625	±0.25	°C/V
Resolution			0.0625		°C
			12		bits
Conversion Time			2.6	3.5	ms
Temperature Measurement Resolution	R1 = 0, R0 = 0 (default)		9		bits
	R1 = 0, R0 = 1		10		
	R1 = 1, R0 = 0		11		
	R1 = 1, R0 = 1		12		
Temperature Refresh Interval	R1 = 0, R0 = 0 (default)		40		ms
	R1 = 0, R0 = 1		80		
	R1 = 1, R0 = 0		160		
	R1 = 1, R0 = 1		320		
Timeout Time			30	40	ms
Bus Communication Frequency	Quick mode	0.001		0.4	MHz
	High speed mode	0.001		2.5	
Power Supply Voltage		2.7	3.3	5.5	V
Conversion Current	bus free		40	75	Aμ
	Bus occupancy, SCL		70		
	Bus occupancy, SCL		150		
Shutdown Current	bus free		0.3	3	Aμ
	Bus occupancy, SCL		20		
	Bus occupancy, SCL		100		

SOT23-6

High-precision, Low-power Digital Temperature Sensor

Ordering information

Order code	Package	Baseqty	Deliverymode	Marking
UMW TMP100NA	SOT23-6	3000	Tape and reel	T100 UMW
UMW TMP101NA	SOT23-6	3000	Tape and reel	T101 UMW

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[TMP119AIYBGR](#) [TMP1826NGRR](#) [TMP103AYFFR\(UMW\)](#) [GZT263](#) [DS18B20\(XBLW\)](#) [HX18B20-T](#) [THD-R-T](#) [CHT20MEMS](#) [GXHT30C](#)
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