

High-precision, Low-Power Digital Temperature Sensor Compatible with SMBus and I²C Interface

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1 Features

- Temperature accuracy:
 - < $\pm 0.10^{\circ}\text{C}$ ($-20^{\circ}\text{C} \sim +50^{\circ}\text{C}$)
 - < $\pm 0.15^{\circ}\text{C}$ ($-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$)
 - < $\pm 0.20^{\circ}\text{C}$ ($-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$)
 - < $\pm 0.25^{\circ}\text{C}$ ($-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$)
 - < $\pm 0.30^{\circ}\text{C}$ ($-55^{\circ}\text{C} \sim +150^{\circ}\text{C}$)
- Temperature range: $-55^{\circ}\text{C} \sim +150^{\circ}\text{C}$
- Low power consumption:
 - 3.5 μA (1Hz conversion cycle, no averaging output)
 - 18 μA (1Hz conversion cycle, 8-time averaging output)
 - 50-nA (shutdown current)
- Supply voltage: 1.7V to 5.5V
- High resolution: 16bits / $0.0078125^{\circ}\text{C}$ (1LSB)
- Programmable temperature alarm thresholds, averaging output count, and digital temperature offset calibration
- Digital output:
 - SMBus, I²C interface compatibility
- Package Information:

PART NUMBER	PACKAGE	BODY SIZE (mm ²)
GXT117D	DFN-6	2.00 × 2.00
GXT117W	WLCSP-6	1.42 × 0.78

2 Applications

- Digital thermometer
- Wearable temperature monitoring devices
- Cold chain temperature monitoring
- Temperature transmitters
- Alternative RTD components: PT100, PT500, PT1000

3 Description

The GXT117 is a high-precision, low-power digital temperature sensor that provides 16-bit temperature measurements ($0.0078125^{\circ}\text{C}/\text{LSB}$), achieving a measurement accuracy of $\pm 0.1^{\circ}\text{C}$ within the -20°C to $+50^{\circ}\text{C}$ range. Compatible with SMBus and I²C communication protocols, up to four GXT117 devices with different slave addresses can be connected on a single communication bus.

The GXT117's low power consumption minimizes self-heating effects on temperature measurement accuracy. It operates over a voltage range of 1.7V to 5.5V, with a typical power consumption of just 3.5 μA in continuous conversion mode at 1Hz and without output averaging.

The GXT117 can serve as a single-chip digital solution to replace platinum resistance thermometry. Its temperature accuracy matches that of AA-grade RTDs while significantly reducing power consumption. By eliminating complex components associated with RTD-based temperature sensing—such as precision reference sources, matched routing, sophisticated algorithms, and post-calibration procedures—the GXT117 greatly simplifies system design.

10 Ordering Information

Order Number	Chip Model	Package	SPQ	Note
GXT117D-T&R	GXT117D	DFN-6	4000	Tape & Reel
GXT117W-T&R	GXT117W	WLCSP-6	4000	Tape & Reel

Note: "D" denotes the DFN-6 package, and "W" denotes the WLCSP-6 package.