

# TMP107 $\pm 0.5^{\circ}\text{C}$ Temperature Sensor with SMART One-Wire Interface, EEPROM, and Alert Function

## 1 Features

- High Accuracy:  $\pm 0.5^{\circ}\text{C}$  (max) from  $0^{\circ}\text{C}$  to  $100^{\circ}\text{C}$
- Specified Accuracy for Cold Chain Logistics:
  - $2^{\circ}\text{C}$  to  $8^{\circ}\text{C}$ :  $\pm 0.1^{\circ}\text{C}$  (max)
  - $15^{\circ}\text{C}$  to  $25^{\circ}\text{C}$ :  $\pm 0.15^{\circ}\text{C}$  (max)
  - $2^{\circ}\text{C}$  to  $30^{\circ}\text{C}$ :  $\pm 0.25^{\circ}\text{C}$  (max)
- High Resolution: 14 Bits ( $0.015625^{\circ}\text{C}$ )
- SMART Wire Interface:
  - Allows up to 32 Daisy-Chain Devices
  - Compatible with Any Half-Duplex UART
- Two ALERT Pins with Programmable Trip Values
- 256-Bit EEPROM for Unique Addressing, Trip Value Programming, and General-Purpose Storage
- Shutdown Mode for Power Saving
- One-Shot Conversion for Custom Update Rates
- Operating Supply Range: 1.7 V to 5.5 V

## 2 Applications

- Cold-Chain Logistics
- Temperature Data Loggers
- Battery Packs
- Enterprise Computing Systems
- Telecommunication Equipment
- Building Automation and HVAC
- Environmental Chambers
- Agricultural Equipment
- Industrial Process Control
- Medical Equipment

## 3 Description

The TMP107 is a digital output temperature sensor with a bidirectional SMART wire interface and electrically erasable programmable read-only memory (EEPROM), available in an SOIC-8 package. The TMP107 is capable of reading temperatures with a resolution of  $0.015625^{\circ}\text{C}$  and is accurate to within  $\pm 0.5^{\circ}\text{C}$  in the range from  $0^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ . The TMP107 is useful for NTC and PTC thermistor replacement where accuracy is crucial.

The TMP107 can have up to 32 sensors daisy-chained on the same SMART wire bus, with each device having a unique 5-bit address stored in the EEPROM. The address is determined during the automated address assignment operation and is based on the position of each sensor relative to the SMART wire host. Two independent ALERT pins can provide interrupts or a stand-alone thermostat operation with programmable limits that are stored in the EEPROM as well. Multiple operation modes provide maximum flexibility in selecting between low power consumption for battery operation, and high update rates for real-time control applications.

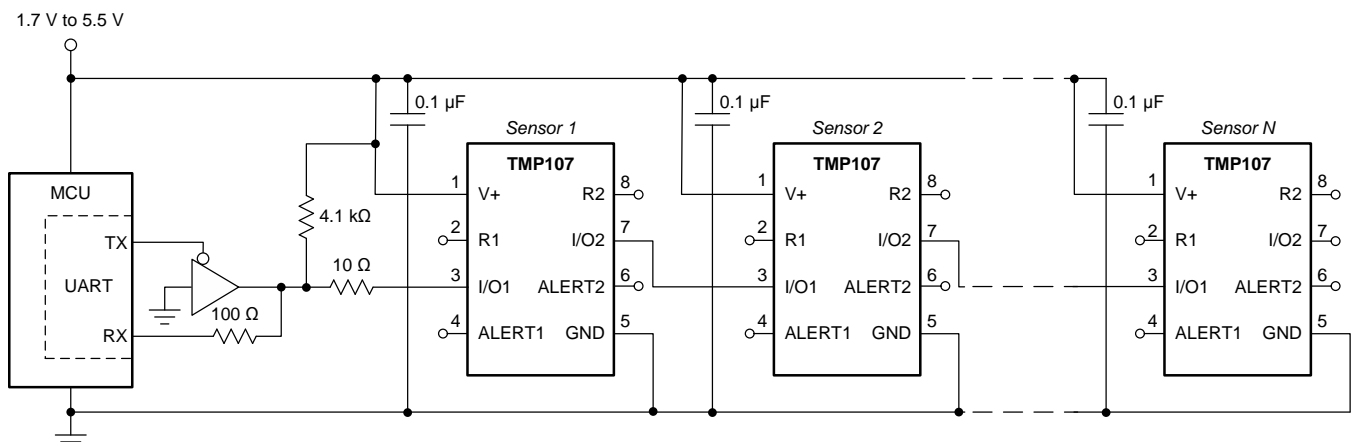
The TMP107 temperature sensor is designed for extended temperature measurement in a variety of industrial, instrumentation, communication, and environmental applications. The TMP107 is specified for operation from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

### Device Information<sup>(1)</sup>

DEVICE NAME	PACKAGE	BODY SIZE
TMP107	SOIC (8)	4.90 mm x 3.90 mm

(1) For all available packages, see the package option addendum at the end of the datasheet.

### Typical Application



## Table of Contents

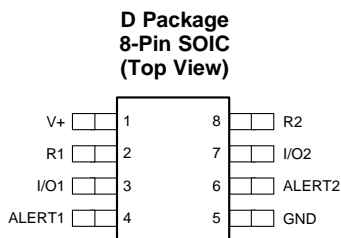
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## 4 Revision History

DATE	REVISION	NOTES
May 2015	*	Initial release.

**PRODUCT PREVIEW**

## 5 Pin Configuration and Functions



### Pin Functions

PIN		I/O	DESCRIPTION
NO.	NAME		
1	V+	I	Supply voltage, 1.7 V to 5.5 V
2	R1	I	Built-in pullup resistor for ALERT1; float or connect to V+
3	I/O1	I/O	SMAART wire input, output 1
4	ALERT1	O	Over- and undertemperature alert. Open-drain output; internally connected to pullup resistor R1.
5	GND	—	Ground
6	ALERT2	O	Over- and undertemperature alert. Open-drain output; internally connected to pullup resistor R2.
7	I/O2	I/O	SMAART wire input, output 2
8	R2	I	Built-in pullup resistor for ALERT2; float or connect to V+

**PRODUCT PREVIEW**

## 6 Device and Documentation Support

### 6.1 Community Resources

The following links connect to TI community resources. Linked contents are provided *AS IS* by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

**TI E2E™ Online Community** *TI's Engineer-to-Engineer (E2E) Community*. Created to foster collaboration among engineers. At [e2e.ti.com](http://e2e.ti.com), you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

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### 6.2 Trademarks

E2E is a trademark of Texas Instruments.  
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### 6.3 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

### 6.4 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## 7 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TMP107BID	PREVIEW	SOIC	D	8	75	TBD	Call TI	Call TI	-55 to 125		
TMP107BIDR	PREVIEW	SOIC	D	8	2500	TBD	Call TI	Call TI	-55 to 125		

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

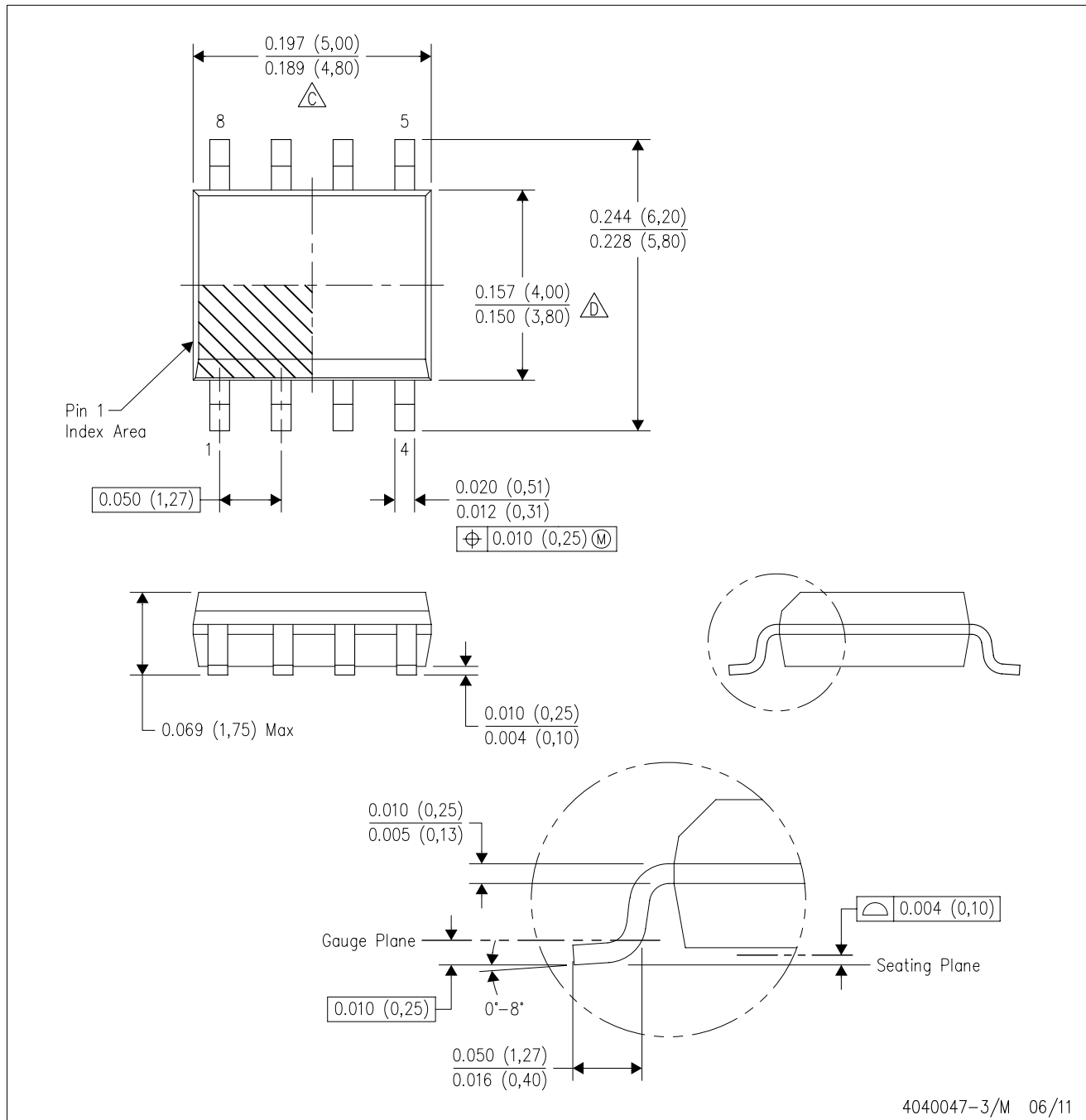
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D (R-PDSO-G8)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.  
 D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.  
 E. Reference JEDEC MS-012 variation AA.

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