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TMP007 Infrared Thermopile Sensor with Integrated Math Engine

1 Features

- Thermopile and Local Die Temperture Sensor
  - NETD: 90 mK
  - Responsivity: 9 V/W
  - Sensor Noise: 300 nV
- Iintegrated Math Engine
  - 14-Bit (0.03125°C) Resolution
  - Alert Pin: Interrupt and Comparator Modes
  - Nonvolatile Memory
  - Programmable Conversion Rate
  - Transient Correction
- Low Quiescent Current: 270-µA Active, 2-µA Shutdown
- I²C™ and SMBus Compatible
- 8-Ball DSBGA, 1.9 mm × 1.9 mm × 0.625 mm package

2 Applications

- Temperature Measurement
  - Laptop and Tablet Cases
  - Batteries
  - Heat Sinks
  - Skin
  - Laser Printers

3 Description

The TMP007 is an infrared thermopile sensor that measures the temperature of an object without contacting the object. The integrated thermopile absorbs the infrared energy emitted from the object in the sensor field of view. The thermopile voltage is digitized and provided as an input to the integrated math engine, along with the die temperature (T_{DIE}). The math engine then computes the corresponding object temperature.

Default calibration and thermal transient coefficients are stored in the built-in nonvolatile EPROM memory. Application specific values can be stored for improved accuracy. An alert function is available, and can be programmed in either comparator or interrupt mode.

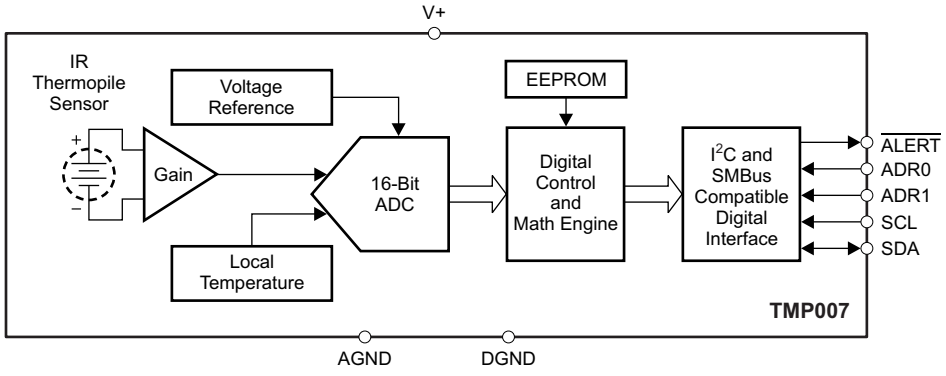
The TMP007 is compatible with I²C and SMBus interfaces, and allows up to eight devices on one bus. Low power consumption along with low operating voltage is ideal for battery-powered applications.

The TMP007 provides convenient, noncontact thermal solutions for measuring temperature with factory-supplied calibration. This device is also suitable for industrial and consumer applications with a user-customized system calibration.

Device Information

ORDER NUMBER	PACKAGE	BODY SIZE
TMP007YZF	DSBGA (8)	1.9 mm × 1.9 mm

PRODUCT PREVIEW



4 Device and Documentation Support

4.1 Trademarks

I^2C is a trademark of NXP Semiconductors.
All other trademarks are the property of their respective owners.

4.2 Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

4.3 Glossary

SLYZ022 — *TI Glossary*.

This glossary lists and explains terms, acronyms and definitions.

5 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.

PRODUCT PREVIEW

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
TMP007AIYZFR	PREVIEW	DSBGA	YZF	8	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-2-260C-1 YEAR	-40 to 125		
TMP007AIYZFT	PREVIEW	DSBGA	YZF	8	250	Green (RoHS & no Sb/Br)	SNAGCU	Level-2-260C-1 YEAR	-40 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.

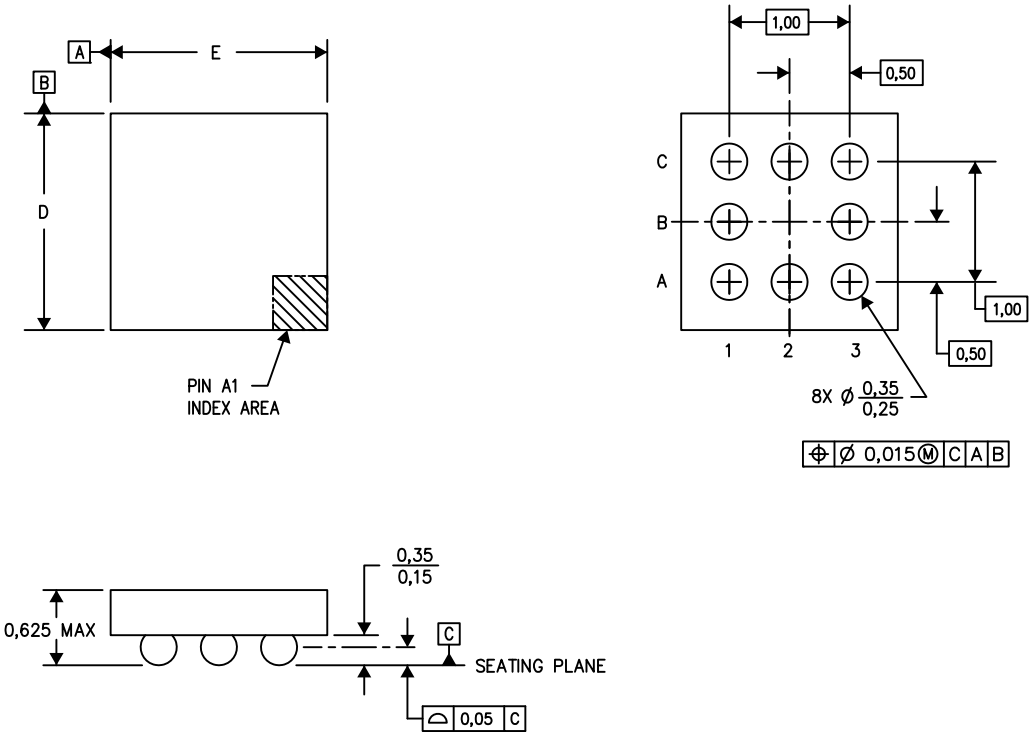
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(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.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

YZF (S–XBGA–N8) DIE–SIZE BALL GRID ARRAY



4205058–3/P 07/13

NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. NanoFree™ package configuration.

NanoFree is a trademark of Texas Instruments.

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