

SMD THERMOPILE SENSOR WITH INTEGRATED PROCESSING FOR NON-CONTACT TEMPERATURE MEASUREMENT

THERMOPILE SENSORS AND MODULES ■

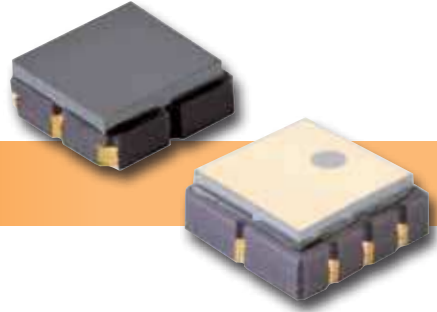
TPiS 1S 0133, TPiS 1S 0133 FM Thermopile Sensor

Target Applications

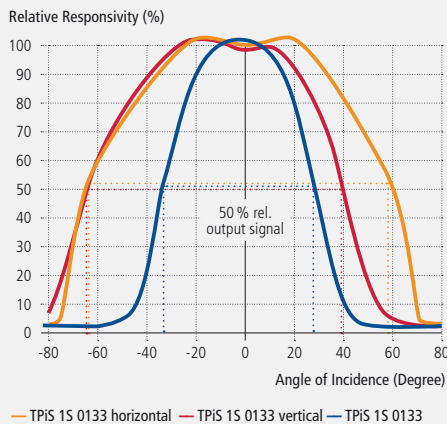
- General purpose temperature monitoring

Features and Benefits

- SMD housing
- Internal signal processing
- Factory calibrated
- Ambient temperature compensation



Field of View



Filter



Product Description

Excelitas uniquely brings an SMD housing to temperature sensors, in the form of the TPiS thermopile detector standard sensors. This SMD family also offers ISOthermal improvements due to their unique construction.

The SMD TPiS senses the thermal radiation emitted by objects and converts this to an analog voltage. It is fully factory-calibrated for an accurate signal output over a specific temperature range. The internal digital signal processing and 8 bit resolution of the control registers and the E2PROM technology allow for adjustment and changing of the configuration to customer requirements.

The temperature accuracy of the fully adjustable integrated circuit outperforms discrete solutions. By integrating the thermopile and electronic circuit into an industry standard SMD housing, the TPiS 1S 0133 enables full automatic pick and place and soldering process of the SMD technology. It is supplied in volume in tape & reel packaging.

The TPiS sensor includes the integrated ambient temperature compensation and the calibration to a certain temperature range. Customer specific modifications are possible. Thus, when ordering, the correct temperature range needs to be specified.

The standard configuration offers a wide field of view. For requirements of more narrow spot sizes, we offer the TPiS 1S 0133 FM version with reduced optical field of view defined by an optical aperture in the window.

For amplification of the highly sensitive thermopile signal a high resolution programmable low noise amplifier is provided. An adjustable high precision ambient temperature sensor followed by a signal processor offers accurate compensation signals with polynomial characteristics perfectly matching the thermopile output. Adding these signals results in an ambient independent object temperature signal over a large temperature range. This range can be adapted and scaled to customer requirements by means of the flexible offset and post gain adjustment.

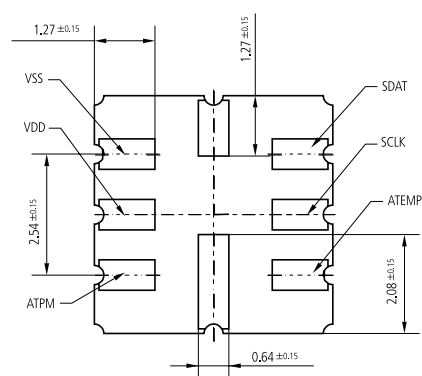
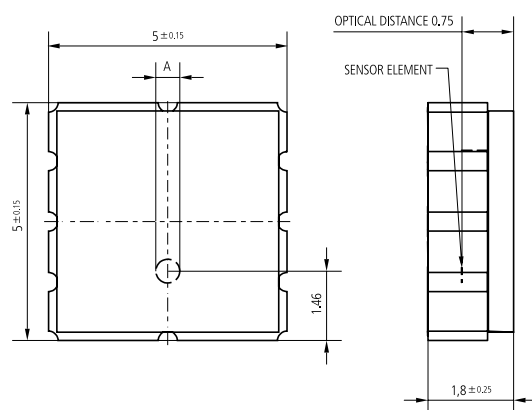
The two configurable comparators can be used to allow the TPiS 1S 0133 sensor to function as a temperature-dependent switch. Threshold temperatures and the hysteresis for both comparators are freely programmable.

For the various object temperature ranges we offer the following pre-calibrated sensors:

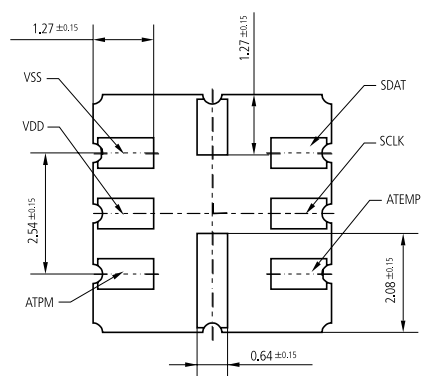
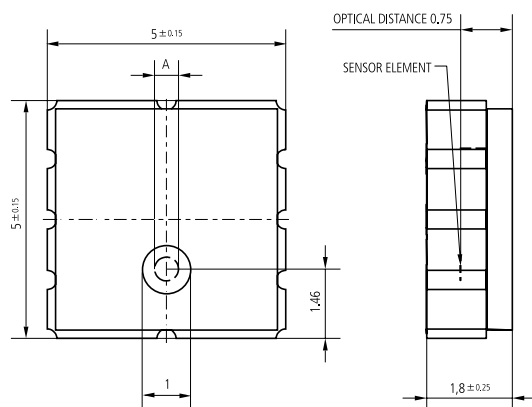
- -20 ... 60° C: TPiS 1S 0133 OAA060
- -20 ... 120° C: TPiS 1S 0133 OAA120
- -20 ... 60° C: TPiS 1S 0133 FM OAA060
- -20 ... 120° C: TPiS 1S 0133 FM OAA120

A temperature reference output is included. On request other object temperature ranges can be provided. The sensors can also be supplied as an "OBA" version without internal temperature compensation.

TPiS 1S 0133



TPiS 1S 0133 FM



TPiS 1S 0133, TPiS 1S 0133 FM Thermopile Sensor

Parameter	Symbol	TPiS 1S 0133	TPiS 1S 0133 FM	Unit	Remark
Output voltage swing	V_O	$0.25 \dots (V_{DD} - 0.25)$	$0.25 \dots (V_{DD} - 0.25)$	V	
Resistive output load	R_L	50	50	k Ω	min.
Object temp. accuracy		1.5	1.5	K	+ / -
Response time	t_{resp}	100	100	ms	typ.
Sensitive area	A	$\varnothing 0.5$	$\varnothing 0.5$	mm	
Field of view	FoV	120	60	°	TPiS 1S 01
Supply voltage	V_{DD}	4.5 ... 5.5	4.5 ... 5.5	V	
Supply current	I_{DD}	1.5	1.5	mA	typ. ; $R_L > 1M\Omega$
Operating temp. range		-25 ... +100	-25 ... +100	°C	
Storage temp. range		-40 ... +100	-40 ... +100	°C	
ESD tolerance		2.5	2.5	kV	Human body model
Soldering temp.					Please refer to page 44.