

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



## TPS 1T 0134 ,TPS 1T 0136 L5.5, TPS 1T 0136 IRA Thermopile Sensor (TPMI® Family)

### Target Applications

- General purpose temperature monitoring

### Features and Benefits

- Internal signal processing
- Factory calibrated
- Optics available
- Ambient temperature compensation

### Product Description

The TPS family, as a recent upgrade to our original and popular TPMI® thermopiles, senses the thermal radiation emitted by objects and converts this to an analog voltage. It is fully factory-calibrated for accurate signal output over a specific temperature range. Further, customers may program the unit individually via the serial interface. 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. With the integration of thermopile and electronic circuits in compact TO-39 housing, the TPS is robust and insensitive to environmental influences like leakage currents on the parent PCB, relative humidity or electromagnetic interference.

The TPMI® sensor family 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.

For requirements of defined spot sizes, we offer sensors with defined field of view obtained by apertures, internal lenses or integrated mirrors.

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 to achieve an output signal which is closely linear with object temperature. Adding these signals will result 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 within the TPS can be used to allow the sensor to function as a temperature-dependent switch. Threshold temperatures and the amount of hysteresis for both comparators are freely programmable.

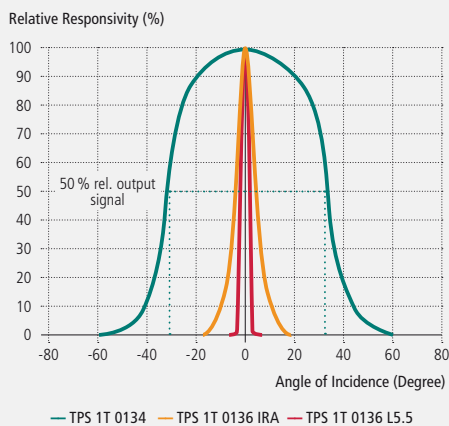
For the various object temperature ranges we offer the following pre-calibrated sensors:

- -20 ... 60° C: TPS 1T 0134 OAA060
- -20 ... 60° C: TPS 1T 0236 IRA OAA060
- -20 ... 120° C: TPS 1T 0136 L5.5 OAA060
- -20 ... 120° C: TPS 1T 0134 OAA120
- -20 ... 250° C: TPS 1T 0136 IRA OAA250

IRA = internal reflector. L5.5 = 5.5 mm focal length lens.

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.

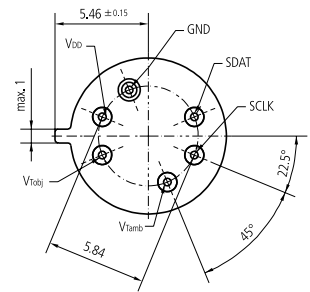
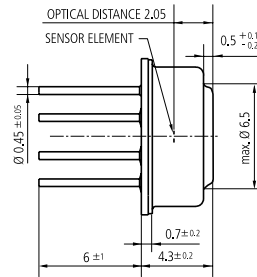
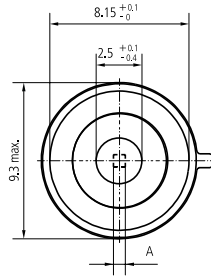
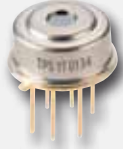
### Field of View



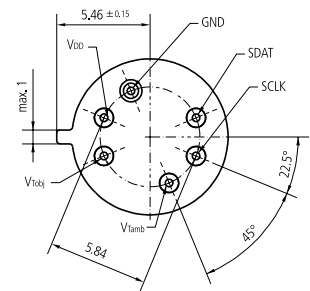
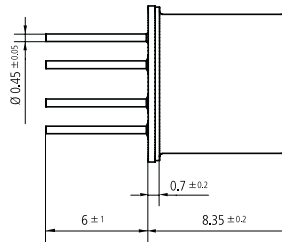
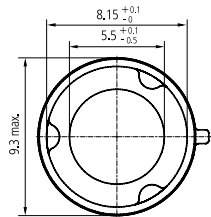
### Filter



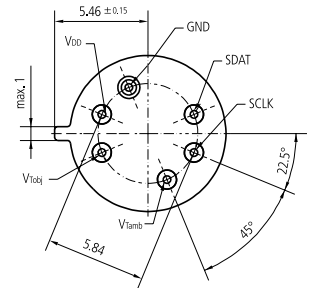
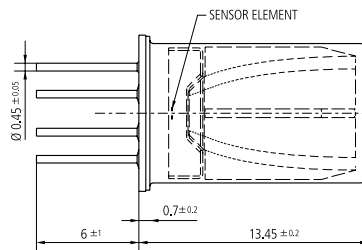
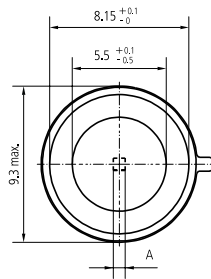
TPS 1T 0134



TPS 1T 0136 L5.5



TPS 1T 0136 IRA



TPS 1T 0134 ,TPS 1T 0136 L5.5, TPS 1T 0136 IRA Thermopile Sensor (TPMI® Family)

Parameter	Symbol	TPS 1T 0134	TPS 1T 0136 L5.5	TPS 1T 0136 IRA	Unit	Remark
Output voltage swing	V <sub>O</sub>	0.25 ... (V <sub>DD</sub> - 0.25)	0.25 ... (V <sub>DD</sub> - 0.25)	0.25 ... (V <sub>DD</sub> - 0.25)	V	
Resistive output load	R <sub>L</sub>	50	50	50	kΩ	min.
Object temp. accuracy		1.5	1.5	1.5	K	+/-
Response time	t <sub>resp</sub>	100	100	100	ms	typ.
Sensitive area	A	∅ 0.5	∅ 0.5	∅ 0.5	mm	TPS 1T 01
Field of view	FoV	67	4.5	11	°	TPS 1T 01
Distance to spot size ratio		-	11:1	-		TPS 1T 01
Sensitive area	A	0.7 x 0.7	0.7 x 0.7	0.7 x 0.7	mm <sup>2</sup>	TPS 1T 02
Field of view	FoV	70	7	15	°	TPS 1T 02
Distance to spot size ratio		-	8:1	-		TPS 1T 02
Supply voltage	V <sub>DD</sub>	4.5 ... 5.5	4.5 ... 5.5	4.5 ... 5.5	V	
Supply current	I <sub>DD</sub>	1.5	1.5	1.5	mA	typ. ; R <sub>L</sub> > 1 MΩ
Operating temp. range		-25 ... +100	-25 ... +100	-25 ... +100	°C	
Storage temp. range		-40 ... +100	-40 ... +100	-40 ... +100	°C	
ESD tolerance		2.5	2.5	2.5	kV	Human body model
Soldering temp.		300	300	300	°C	max, 10 s