

Thermopile Sensor

TPiS 1T 1256 L5.5 / 5018

Revision - Date: 2014/11/05



Features and Benefits

- Digital Output Sensor
- 17 Bit Tobj Output “direct link”
- 14 Bit Tamb Output “direct link”
- Operating voltage down to 2.4V
- Low current consumption
- Lens optics
- Isothermal housing

Applications

- Non-contact temperature measurements
- Thermometry

Description	DigiPile Sensor in an isothermal TO5 package with lens optics
Referenced Document	-
Product Name:	Part Number:
TPiS 1T 1256 L5.5	96385018

1 General Characteristics

Table 1: Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit	Conditions
V _{DD}	Supply voltage	-0.3	3.6	V	
	Current into any pin	-100	100	mA	One pin at a time
T _A	Ambient Temperature Range	-20	70	°C	Operation
T _A	Ambient Temperature Range	-40	100	°C	Storage

2 Type Characteristics

2.1 Design Characteristics

The detector fully complies with the European RoHS environmental directives against the use of hazardous materials in electrical and electronic equipment.

Table 2: Design Characteristics

Parameter	Description
Leads	(2 isolated + 1 ground) pins
Optics	Lens optics with 5.5 mm focal length
Electrical output signal	1 pin digital output of object temperature and reference ambient temperature signal
Device marking	XL + Device number + 4 digits date code XYYY

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2.2 Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Remarks / Conditions
Operating Conditions						
Operating Voltage	V _{DD}	2.4	3.3	3.6	V	
Supply Current	I _{DD}	-	11	15	μA	V _{DD} = 3.3 V
Thermopile Characteristics						
Sensitive Area	A	-	0.26	-	mm ²	Absorber 0.51 x 0.51 mm ²
Sensitivity of TP	Δcounts / ΔT	-	67	-	counts/K	T _{obj} = 313K = 40°C, T _{amb} = 298K = 25°C
Sensitivity of TP	Δcounts / ΔT	-	85	-	counts/K	T _{obj} = 373K = 100°C, T _{amb} = 298K = 25°C
Noise of TP		-	8	-	counts	T _{obj} = 313K (=40°C), T _{amb} = 298K (=25°C)
Time Constant	τ	-	45	-	ms	
Ambient Temperature sensor Characteristics						
Sensitivity of T _{amb}		-	90	-	counts/K	Linear for T _{amb} from 0°C to 90°C
Linearity		-5	-	5	%	-20 to 90 °C
Count @ T _{amb} = 25°C		7000	8200	9400	counts	
Noise of ambient sensor		-	5	-	counts	
Electrical Characteristics						
ADC Resolution T _{obj}		-	17	-	Bits	Max Count = 2 ¹⁷
ADC Resolution T _{amb}		-	14	-	Bits	Max Count = 2 ¹⁴
ADC Sensitivity of T _{obj}		0.7	0.8	0.9	μV/count	
ADC Offset T _{obj}		64000	64500	65000	counts	
Input Low Voltage	V _{IL}	-	-	0.2 V _{DD}	V	
Input High Voltage	V _{IH}	0.8 V _{DD}	-	-	V	
Pull Down Current		-	200	-	μA	Direct link pin to V _{DD}
Pull Up / Down Current		-	130	-	μA	Direct link pin to V _{SS}
LPF Cut-Off Frequency		-	8	-	Hz	

Unless otherwise indicated, all limits specified for T_{amb} = 25°C, V_{DD} = 3.3 V

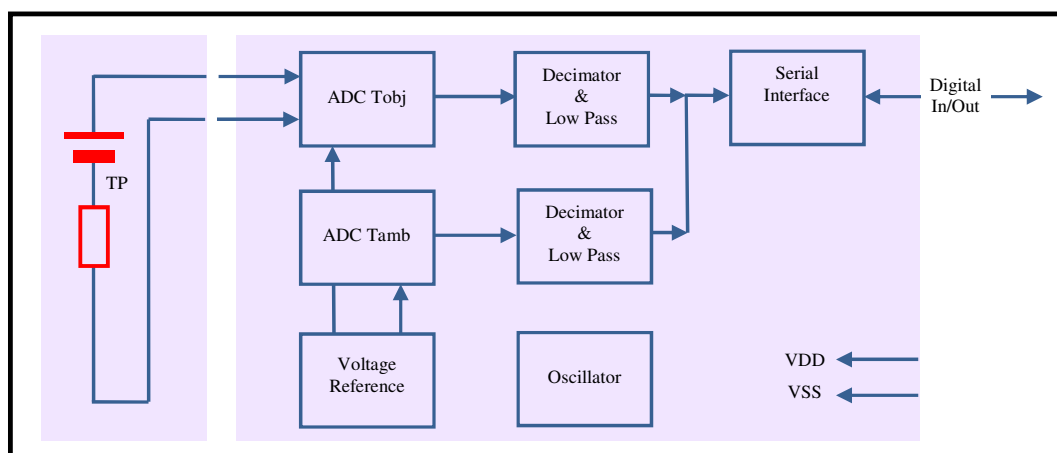


Figure 1 Detailed description

2.3 Optical Characteristics

Table 3: Optical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
FoV	Field of View		5		Degree	At 50% intensity points
	Optical Axis		0	+/- 2	Degree	

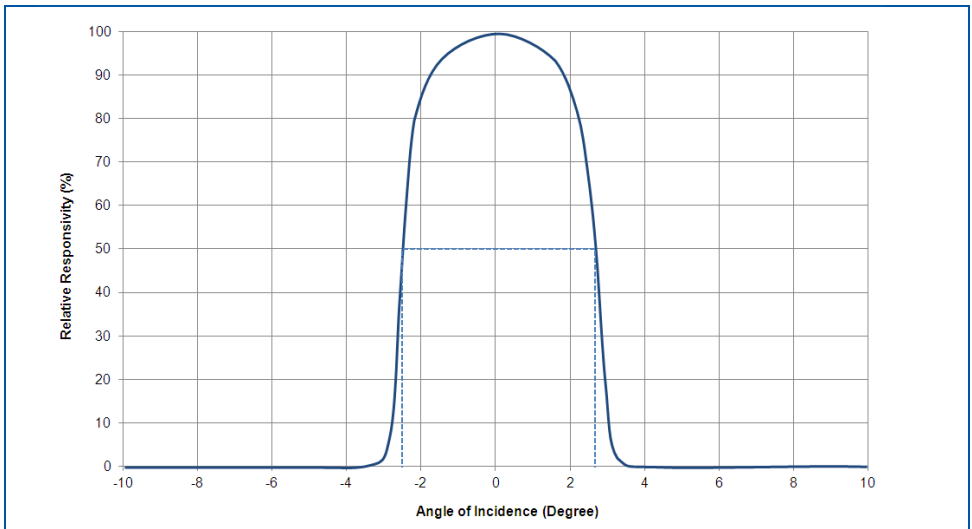


Figure 2 Typical Field of View Curve

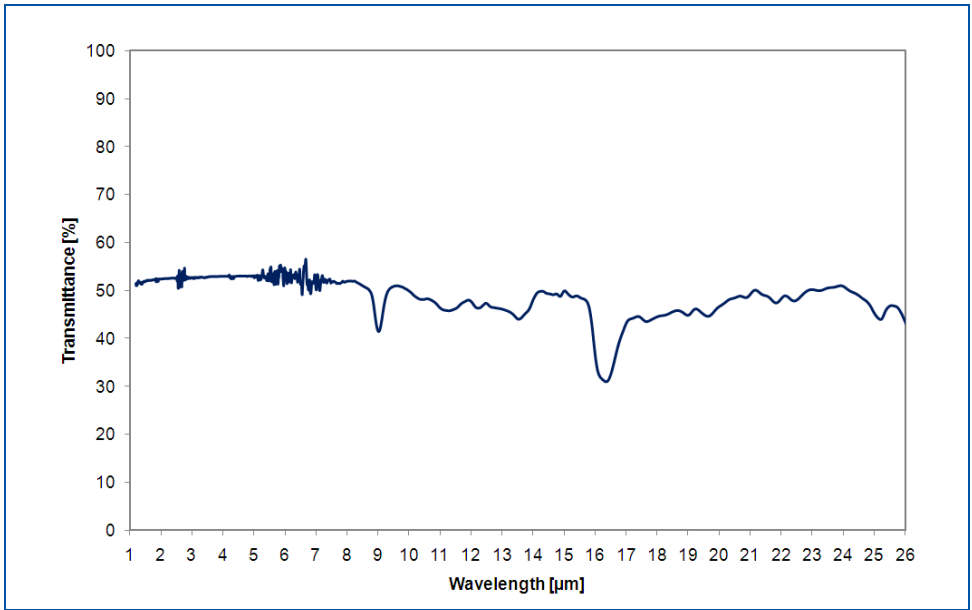


Figure 3 Typical filter transmission characteristics

2.4 Mechanical Drawing

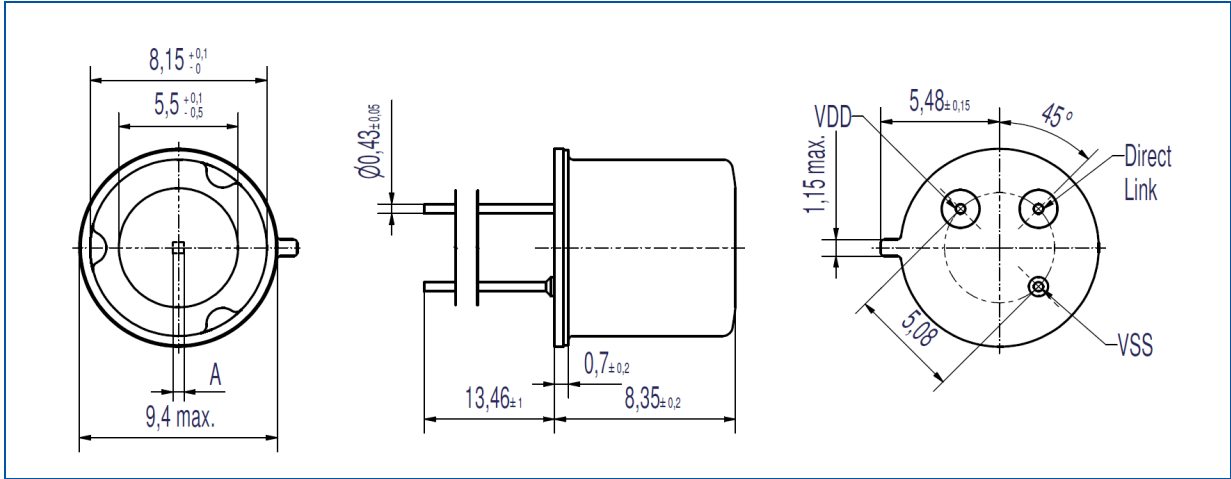


Figure 4 Mechanical drawing of detector TPiS 1T 1256 L5.5

2.5 Packing Arrangement

The packing for the delivery of mass production devices depends on the respective order quantity. Packing arrangement (typical for 200pcs-content box) is described as follow:

Packing box with 200 pcs. devices.

Devices are packed into anti-static foam (item 2). 100 pcs. / foam

Two foams / packing box (item 1). Box size: 480 x 121 x 52 mm

Label (item 6)

Each label contains the following information:

- Name of the manufacturer
- Product Group
- Product type
- Product number
- Quantity per box
- Date of packing

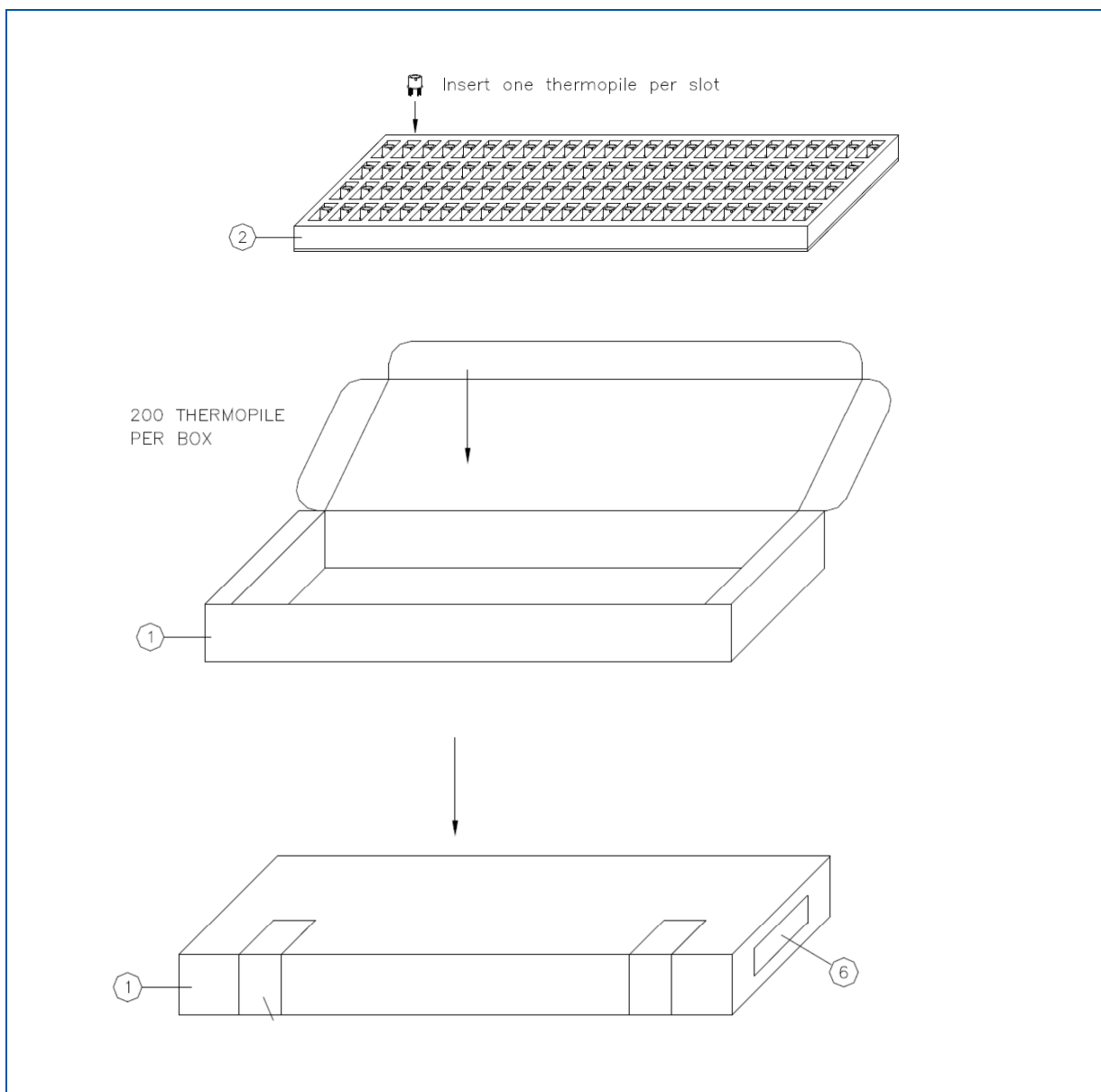


Figure 5 Packing Arrangement

2.6 Handling Requirements

Stresses above the absolute maximum ratings may cause damages to the device. Do not expose the detector to aggressive detergents such as Freon, Trichloroethylene, etc. Windows may be cleaned with alcohol and cotton swab. Hand soldering and wave soldering may be applied by a maximum temperature of 260°C for a dwell time less than 10 s. Avoid heat exposure to the top and the window of the detector. Reflow soldering is not recommended.

3 Quality Statement

Excelitas Technologies is an ISO 9001 certified manufacturer. All devices employing PCB assemblies are manufactured according to IPC-A-610 guidelines.

3.1 Liability Policy

The contents of this document are subject to change without notice and customers should consult with Excelitas Technologies sales representatives before ordering. Customers considering the use of Excelitas Technologies thermopile devices in applications where failure may cause personal injury or property damage, or where extremely high levels of reliability are demanded, are requested to discuss their concerns with Excelitas Technologies sales representatives before such use. The Company's responsibility for damages will be limited to the repair or replacement of defective product. As with any semiconductor device, thermopile sensors or modules have a certain inherent rate of failure. To protect against injury, damage or loss from such failures, customers are advised to incorporate appropriate safety design measures into their product.

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