

# Thermopile Detector

## TPiD 1S 0622 G20 / 7002

Preliminary Revision - Date: 2016/07/19



### Features and Benefits

- 3.8 x 3.8 mm SMD package
- Narrow bandpass filter
- Thermistor included

### Applications

- Gas sensing and monitoring

Preliminary

## 1 General Characteristics

**Table 1: Absolute Maximum Ratings**

Symbol	Parameter	Min	Typ	Max	Unit	Conditions
T <sub>A</sub>	Ambient Temperature Range	-20		100	°C	Operation
T <sub>A</sub>	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
Package	3.8 x 3.8 mm CLCC package
Filter	Si-based interference bandpass filter
Temperature reference	Thermistor 100 kΩ

## 2.2 Electrical Characteristics

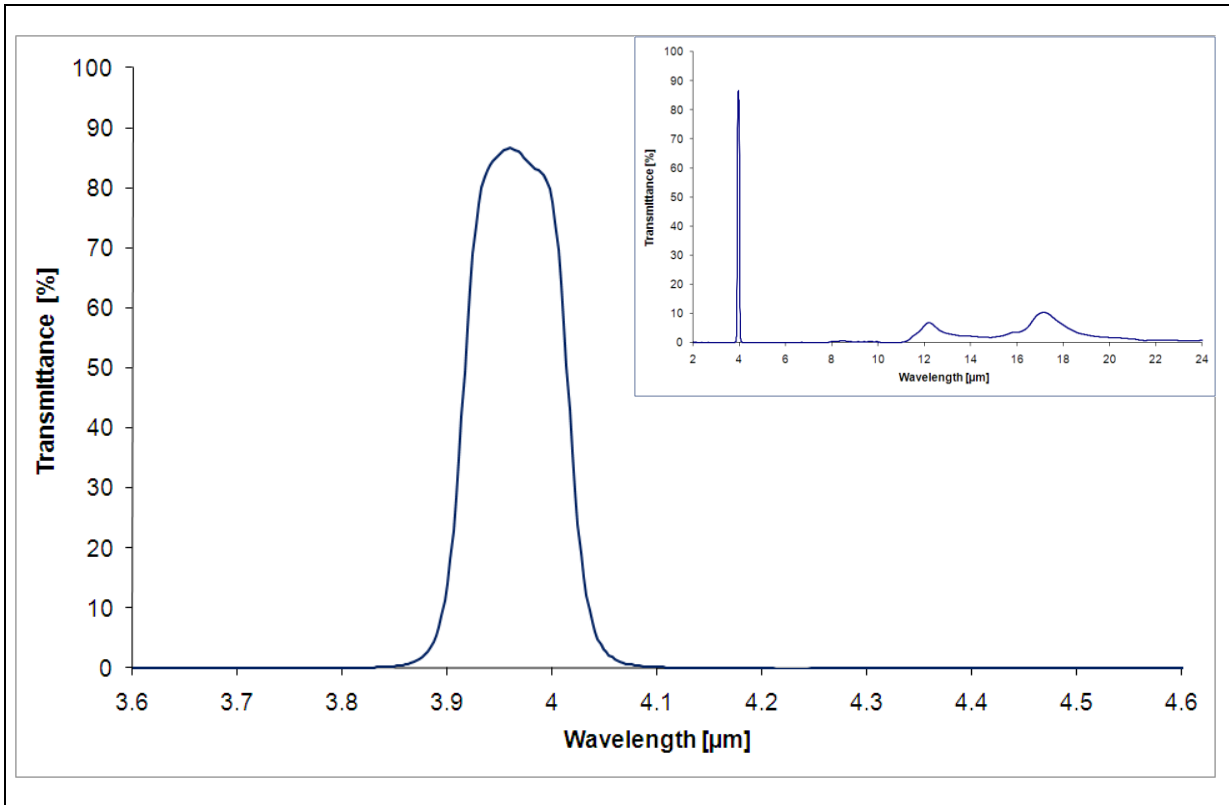
**Table 3: Thermopile Characteristics**

Symbol	Parameter	Value	Unit	Conditions
A	Sensitive Area	1.2 x 1.2	mm <sup>2</sup>	Absorber area
R <sub>TP</sub>	Thermopile Resistance	50...110	kΩ	25 °C
R	Responsivity	33	V/W	500 K, 1Hz, without filter
t	Time Constant	27	ms	
V <sub>N</sub>	Noise Voltage	36	nV/√Hz	25 °C
D*	Specific Detectivity	1.1	10 <sup>8</sup> cm√Hz/W	25 °C
TC <sub>RTP</sub>	Temperature Coefficient of Resistance	0.03	%/K	
TC <sub>R</sub>	Temperature Coefficient of Responsivity	-0.05	%/K	
FoV	Field of View	120	Degrees	At 50 % intensity points
R25	Thermistor Base Resistance	100 ± 5	kΩ	Tamb = 25°C
β	Thermistor BETA -Value	4092	K	Defined at 25°C / 100°C
β	Thermistor BETA -Value Tolerance	± 1	%	

## 2.3 Filter Characteristics

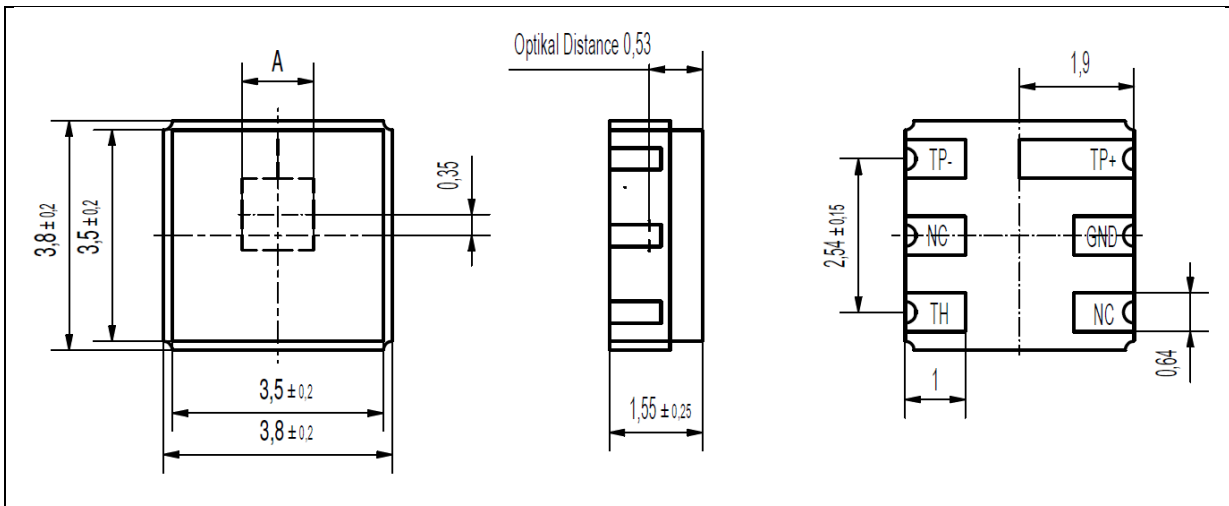
**Table 4: Filter Characteristics**

Filter Identifier	G20
Matched to gas	Reference filter
Center wavelength (CWL)	3.95 μm
CWL tolerance	± 40 nm
Half power bandwidth (HPB)	100 nm
HPB tolerance	± 10 nm
HPB / CWL	2.5%
Peak transmittance	> 76 %
Average transmittance from visual to bandpass region	< 0.1 %
Peak transmittance from bandpass region to 10 μm	< 1 %
Average transmittance from 10 μm to 12 μm	< 5 %
Substrate material	Silicon



**Figure 1** Typical filter transmission curve

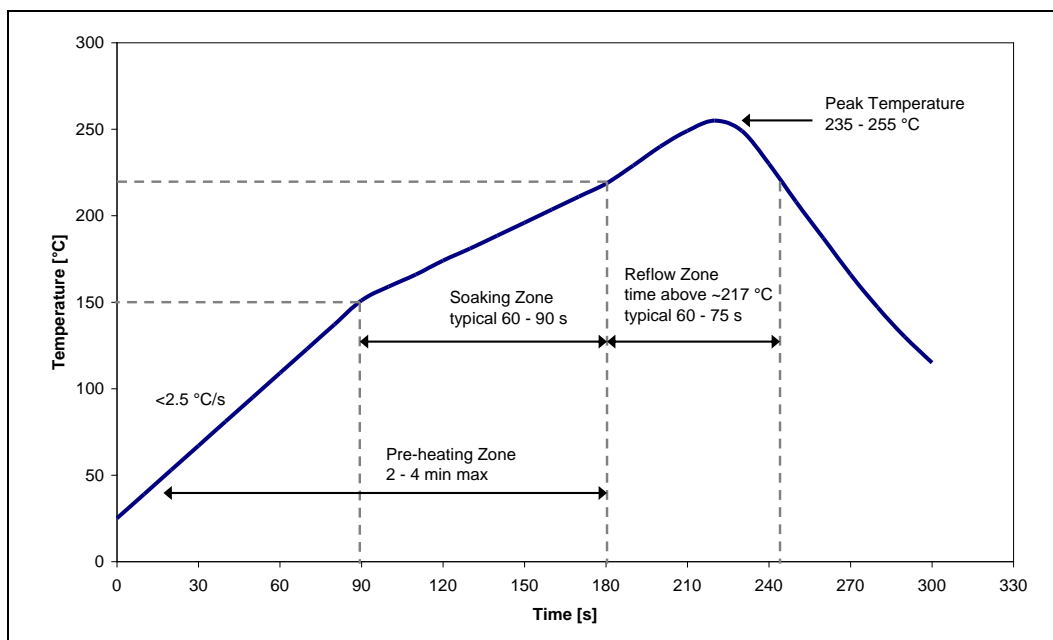
## 2.4 Mechanical Drawing



**Figure 2** Mechanical drawing of detector TPiD 1S 0622

## 2.5 Soldering

The detector TPiD 1S 0622 is a lead-free component and fully complies with the RoHS regulations, especially with existing roadmaps of lead-free soldering. Reflow soldering is recommended. A typical lead free reflow profile is shown in figure 3. Specific reflow soldering parameters depend on the solder alloy used.



**Figure 3 Typical Lead Free Reflow Profile**

## 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.

## 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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