COOL EYE™ THERMOPILE ARRAY MODULES WITH INTEGRAL OPTICS FOR SAFETY AND SECURITY

TPL 08T 2146 L3.9, TPL 16T 3246 L3.9 G10 – Thermopile Line, TPA 16T 4146 L3.9 Thermopile Array "Cool Eye"

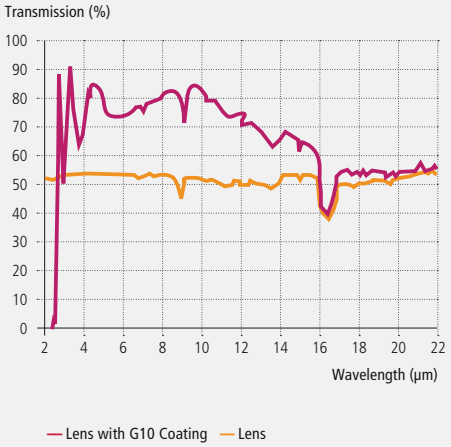
Target Applications

- Presence detection
- Non-contact temperature measurement
- Temperature dependent switch for alarm or thermostatic applications
- Household appliances like microwave oven, toaster, hair dryer

Features and Benefits

- Digital SMBus interface
- Factory calibration
- Temperature signal
- Ambient temperature output signal
- Programmable emissivity
- Noise reduction filter
- Module with connector
- E2PROM configuration and data storage
- Optics included, various viewing angles
- Can be adapted to your specific requirements

Filter



Product Description

With the Cool Eye™ family Excelitas offers thermopile arrays in various configurations. All are module types on a PCB with communication interface and a 4-pin connector. For line arrays, we offer 8 elements and 16 elements in two different lens configurations, with 3.9 mm focus and 5.5 mm focus. The spatial design provides for 4 x 4 elements and comes with recommended 3.9 mm or 5.5 mm focal length optics.

The thermopile line or array modules consist of a 1 x 8, 1 x 16 or 4 x 4 element thermopile chip connected to an integrated multiplexing and signal conditioning circuit, E2PROM and microcontroller with an integrated A/D converter for signal processing and interfacing. Lenses for different field of views are available on demand. The sensor is equipped with an internal reference temperature sensor for correct target temperature determination.

The temperature accuracy by digital signal processing in combination with the numeric ambient temperature compensation algorithm outperforms any discrete solution. The sensor module provides an output signal which is representing real temperature data for each pixel.

Customer specific modifications are possible.

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

L3.9 types

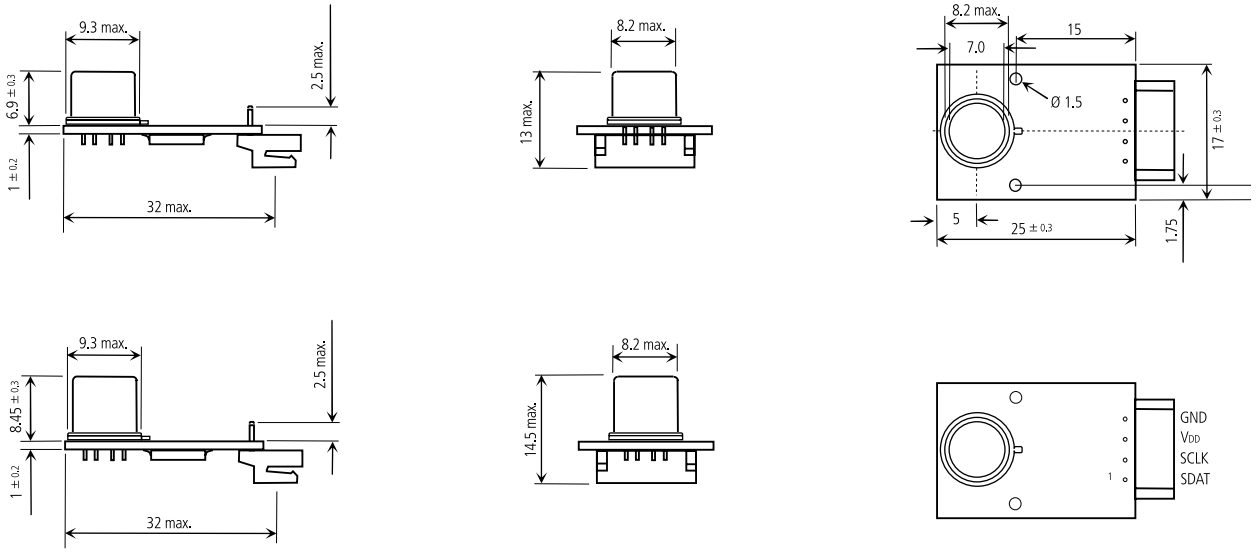
- 0 ... 60° C: TPL 08T 2146 L3.9 OAA060
- 0 ... 60° C: TPA 16T 4146 L3.9 OAA060
- 0 ... 60° C: TPL 16T 3246 L3.9 G10 OAA060

L5.5 types

- 0 ... 150° C: TPL 08T 2146 L5.5 OAA150
- 0 ... 60° C: TPA 16T 4146 L5.5 OAA060

Customization: As the modules are always calibrated to target temperature range customized versions are available.

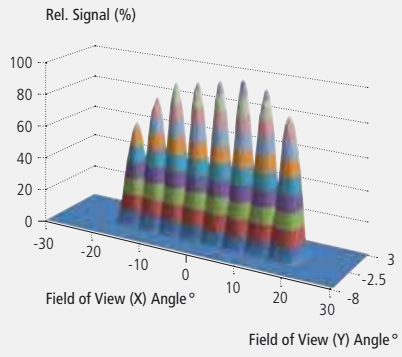
A temperature reference output is included. On request the modules can be supplied as an "OBA" version, which is calibrated but without internal temperature compensation. In this case the customer will do the temperature compensation externally with the use of the supplied reference output.



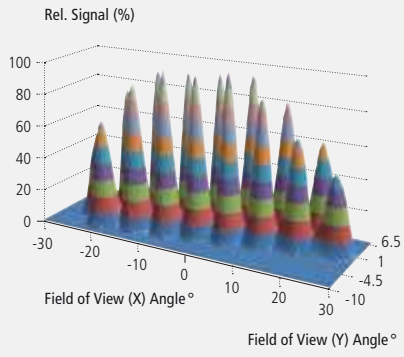
Dimensions TPX YY L5.5

Connection Information for all TPX Modules

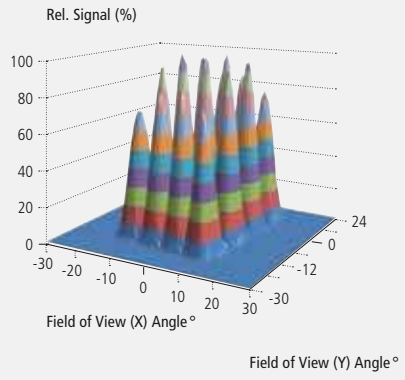
Field of View TPL 08

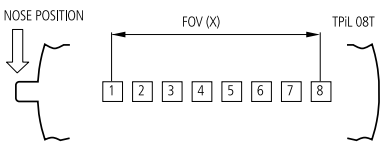


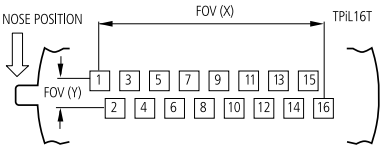
Field of View TPL 16T

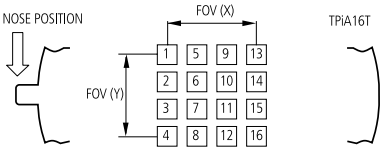


Field of View TPA 16T









TPL 08T 2146 L3.9, TPL 16T 3246 L3.9 G10 – Thermopile Line, TPA 16T 4146 L3.9 Thermopile Array "Cool Eye "

Parameter	Symbol	TPL 08 T	TPL 16 T	TPA 16 T	Unit	Remark
Storage temperature range			-40 … +100		°C	
Operating temperature range			-25 … +100		°C	
Supply voltage	V_{DD}		4.5 … 5.5		V	
Supply current	I_{DD}		5		mA	typ.
Field of view X / L3.9	FOV_X	50	49	30	°	Refer to FOV definitions
Field of view Y / L3.9	FOV_Y	NA	6	22	°	Refer to FOV definitions
Field of view X / L5.5	FOV_X	33	31	21	°	Refer to FOV definitions
Field of view Y / L5.5	FOV_Y	NA	3.5	14	°	Refer to FOV definitions
Digital interface type			SMBus			
Object temperature accuracy		± 1.5			K	For calibration conditions
Signal refresh time	t_{PXrefr}	250	400	400	ms	All pixels and ambient temperature

Handling and Precautions

Humidity

All our IR-detectors shall not increase noise or decrease responsivity when exposed to < = 95 % R.H. at 30° C. Operation below dew point (i.e. with condensation) might affect performance.

Hermetic seal

All our IR-detectors are sealed to pass a He-leakage test with maximum leak rate of 5×10^{-8} mbar.l.s^{-1}.

Quality

Excelitas is a QS 9000 certified manufacturer with established SPC and TQM. Detector outgoing inspections include the parameters Responsivity, Match, Offset, Noise, Gross leak (Mil Std 883 method 1014C1). Individual data are not stored, statistical details can be disclosed on request.

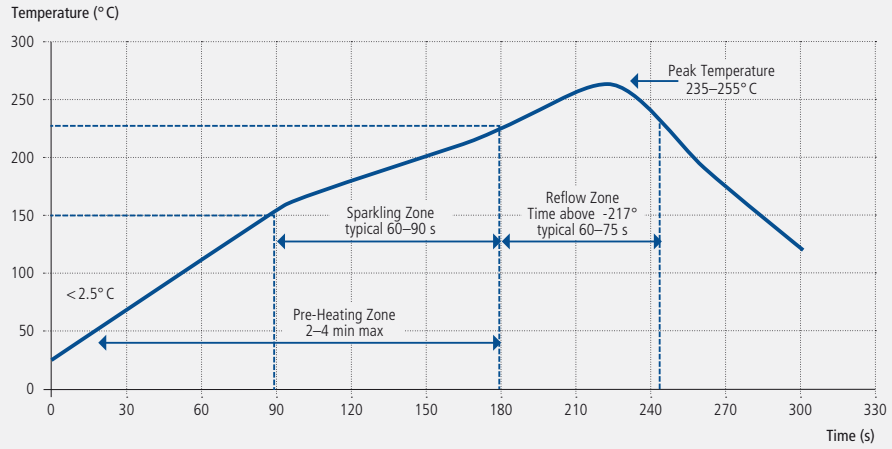
Handling

Electrostatic charges may destroy the detector. We recommend applying precautions necessary for ESD devices to avoid damages. Do not apply physical force to detector leads. Do not expose detector to aggressive detergents such as freon, trichloroethylene, etc.

Soldering conditions

Hand soldering and standard wave soldering process may be applied. Avoid heat exposure to the top and the window of the detector. Reflow soldering is not recommended for all TO-housing types. Our new SMD types are designed for reflow-soldering in accordance with general practices for SMD.

Typical Lead Free Reflow Profile



Reliability Standards

International Electrotechnical Commission (IEC) Standards	
IEC 60068-2-1	Environmental testing – Part 2: Tests. Tests A: Cold
IEC 60068-2-2	Environmental testing - Part 2: Tests. Tests B: Dry heat
IEC 60068-2-78	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state
IEC 60068-2-14	Environmental testing - Part 2: Tests. Test N: Change of temperature
Joint Electron Devices Engineering (JEDEC) Standards	
JESD-22	Series test methods
US Military (MIL) Standards	
MIL-STD-883	Test methods and procedures for microelectronics

Soldering of SMD Devices

The TPiD 1S 0121 and TPiS 1S series are lead-free components and fully comply 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 above graph. Specific reflow soldering parameters depend on the solder alloy used.
The device meets MSL3 at 245° C according to JEDEC standard.

Reliability Standards

Excelitas' continuous reliability qualification and monitoring program ensures that all outgoing products meet quality and reliability standards. Tests are performed according to approved semiconductor device standards, such as IEC, MIL, and JDEC (see table). For detailed information please contact Excelitas.