

## PYD 1378 • PYD 1388 • PYD 1398

### Dual-Element Pyrodetectors

This Dual-Element Detector family offers standard TO-5 housings with varying window sizes. Whereas PYD 1378 is designed for economy and features a small optical window, PYD 1388 offers standard window size and is regarded as the standard Dual-Element Pyrodetector which is well suited for all kind of motion detection applications.

PYD 1398 with its even larger window size provides superior protection against white light interferences. PYD 1388 and PYD 1398 further provide an added 1kOhm Drain Resistor, which improves resistance to electromagnetic interferences, that may be introduced into the unit power supply. This makes PYD 1398 ideally suited for intrusion alarm applications.

#### Features and Benefits

- TO-5 metal housing
- Different window sizes
- EMI protection
- Suited for alarms and light switch applications

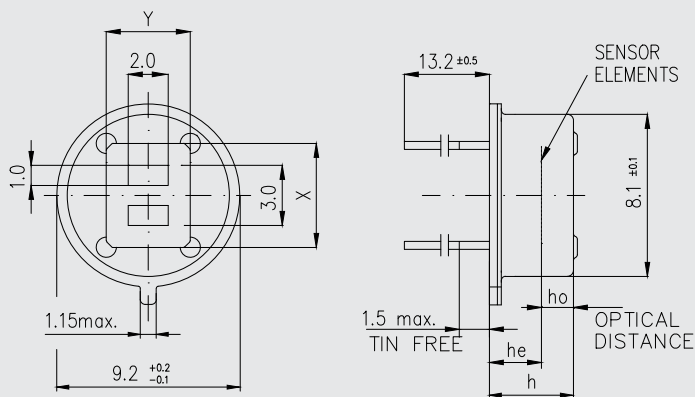
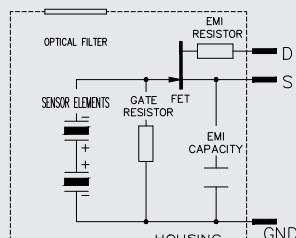


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#### PYD 1378 - PYD 1388 - PYD 1398

Parameter	Symbol	PYD 1378	PYD 1388	PYD 1398	Unit	Remarks
Responsivity, min.	R <sub>min</sub>	3.3	3.3	3.3	kV/W	f = 1 Hz
Responsivity, typ.	R	4.2	4.2	4.2	kV/W	f = 1 Hz
Match, max.	M <sub>max</sub>	10	10	10	%	
Noise, max.	N <sub>max</sub>	50	50	50	μV <sub>pp</sub>	0.4...10Hz/20°C
Noise, typ.	N	25	25	25	μV <sub>pp</sub>	0.4...10Hz/20°C
Source Voltage		0.2 ... 1.55	0.2 ... 1.55	0.2 ... 1.55	V	47 KΩ, 20°C, V <sub>DD</sub> =10V
Operating Voltage		2.0...10	2.0...10	2.0...10	V	47 KΩ, 20°C
Field of View, horizontal	FoV	71°	95°	100°		unobstructed
Field of View, vertical		71°	87°	100°		unobstructed
Filter Size	X/Y	4.0 / 3.0	4.6 / 3.4	5.2 / 4.2	mm	
Housing height	h	4.2	4.2	4.2	mm	
Optical Element Location	he/ho	3.2 / 0.75	3.2 / 0.75	2.6 / 0.95	mm	h0= optical

PYD 1384 • PYD 1394

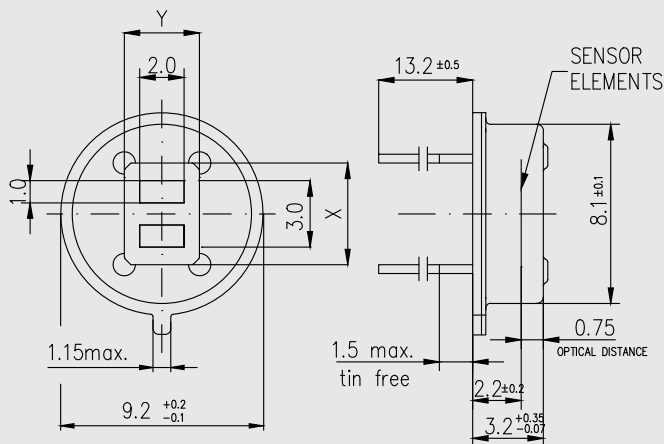
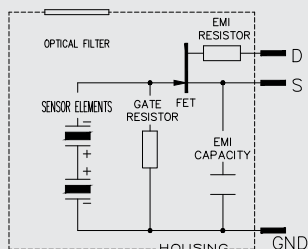
Dual-Element Pyrodetectors

This Dual-Element Detector series represents the low-profile, TO-39 housing version of the standard Pyro family and is available with two different window sizes. The PYD 1384 is designed for optimal economy in cost-sensitive applications while the PYD 1394 offers the standard window size for enhanced performance. The 1kOhm Drain Resistor included helps to reduce sensitivity against electromagnetic disturbances.

In both models, the low-profile TO-39 housing saves space and enables applications which require lens optics with small focal lengths. It is very suitable for placing two detectors at juxtaposed angles to one another other on a single PCB to provide wider fields of view such as 180°.

Features and Benefits

- TO-39 metal low-profile housing
- Different window sizes
- EMI protection
- Suited for motion detection



PYD 1384 - PYD 1394

Parameter	Symbol	PYD 1384	PYD 1394	Unit	Remarks
Responsivity, min.	R <sub>min</sub>	3.3	3.3	kV/W	f = 1 Hz
Responsivity, typ.	R	4.2	4.2	kV/W	f = 1 Hz
Match, max.	M <sub>max</sub>	10	10	%	
Noise, max.	N <sub>max</sub>	50	50	μV <sub>pp</sub>	0.4...10Hz/20°C
Noise, typ.	N	25	25	μV <sub>pp</sub>	0.4...10Hz/20°C
Source Voltage		0.2 ... 1.55	0.2 ... 1.55	V	47 KΩ, 20°C, V <sub>DD</sub> =10V
Operating Voltage		2.0...10	2.0...10	V	47 KΩ, 20°C
Field of View, horizontal	FoV	95°	110°		unobstructed
Field of View, vertical		87°	110°		unobstructed
Filter Size	X/Y	4.6 / 3.4	5.2 / 4.2	mm	
Optical Element Location	he/ho	2.2 / 0.75	2.2 / 0.75	mm	h0= optical

## Handling

Infrared Sensors are Optical devices and require careful handling in production. As to mechanical recommendations:

- Avoid dropping the devices on the production flow.
- Avoid physical force to detector leads, do not bend leads unless necessary.
- Ensure leads are not damaged when manipulating them.

Electrostatic discharges may destroy the detectors. It is recommended to apply the standard precautions for ESD sensitive devices to prevent potential damage.

The detector windows are optical filters with multi-layer coatings.

- Avoid touching the detector window. To clean windows, use only ethyl alcohol with a cotton swab.
- Do not expose Detectors to chemical fluids such as Freon, Trichloroethylene and other aggressive detergents.

## Environmental Conditions

With the construction of metal can and spectral window inserted into the can by a special durable epoxy, the detectors are sealed and tested for long-term enclosure. The detector will pass He-leakage test with maximum leakage rate specification of  $5 \times 10^{-8}$  mbar ls-1. Detectors shall not increase noise or change responsivity when exposed to maximum of 95% relative humidity at 30°C.

- Avoid long-term storage at high humidity with high temperatures.

As IR detectors are optical sensors, avoid condensation effects on the detector. Operation below dew points may affect the performance.

## 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 JEDEC (see table). For detailed information please contact Excelitas.

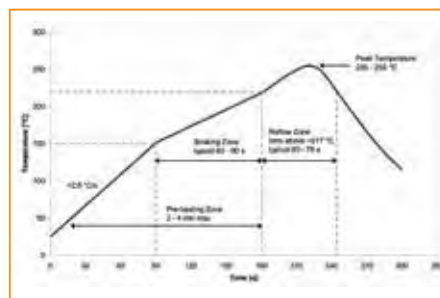
## Quality and Reliability Standards

Excelitas strives to meet applicable quality and reliability standards. We are certified ISO 9001:2015 and operate at established SPC and TQM. We are proud to operate under Environmental Management System according to ISO 14001:2015 and the Occupational Safety and Health Management System according to OHSAS 18001: 2007.

All devices employing PCB assemblies are manufactured according IPC-A-610 class 2 guidelines.

Excelitas Thermal Infrared Sensor product line is certified for ANSI/ESD S.20:2014.

In case of questions please feel free to contact us for the latest update on our current certificates and forms. Our continuous qualification and reliability program ensures that all products meet the specified performance criteria.



As to outgoing inspection, all devices have to pass 100% testing of major parameters and gross leak in acc. to MIL Std. 883 m 1014C1. Due to high-volume production individual data are not protocolled or stored, statistical data are kept for reference.

## Soldering of SMD Devices

The TPiD 1S 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 figure 4. Specific reflow soldering parameters depend on the solder alloy used.

The device meets MSL1 at 245 °C according to JEDEC standard.

## Soldering Conditions

For the soldering of the detectors within PCBs, the typically applied and recommended process is wave soldering. During the automatic wave solder process we strongly advise to restrict preheating to avoid heat exposure through the detector window, if necessary apply a protection cap. When the detector is directly exposed to the radiation of such heaters the detector shall be protected from that heat. Manual soldering is also possible when maintaining similar temperature profiles.

Reflow soldering is not possible for TO housing versions of our detectors. For our range of SMD housing detectors please reference the recommended solder profile.

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