

# ENGINEERING SAMPLES

## PYROELECTRIC IR-DETECTOR

CUSTOMER : Xian jiaotong university  
TYPE : PYS 3228 TC G5/G20  
PART-NO. : Engineering samples  
No. of samples : for information only

Thermally compensated two channel single element detector with lithium-tantalate crystal as sensing element, FET in source follower configuration.

This specification is provided by

**PerkinElmer Optoelectronics GmbH & Co. KG, Wiesbaden.**

It covers the complete technical data of a pyroelectric IR detector. All detectors have met the requirements of PerkinElmer test-specifications and passed outgoing inspection.

**We kindly ask for approval with the return of a signed copy.**

Checked:

Date: 10.01.06

Customer approval:

Date:

**Electrical Configuration:**

Two single sensing elements and two compensating elements are connected to built-in FET in source follower circuit, connections "Drain-Source-Ground". It is recommended to use a load resistor of 47 kΩ.

**Electrical data:**

Unless specified differently, all data refer to 25°C:

**Responsivity:**            **min.: 2,2 kV/W**                            **typ.: 3,5 kV/W**

Responsivity is measured within spectral range 7 - 14 μm as per fig. 3 at 1Hz.  
Temperature coefficient of responsivity typ.: -0.1 %/K.

**Noise:**                            **max.: 50 μV<sub>pp</sub>**                            **typ.: 15 μV<sub>pp</sub>**

After a 10 minute settling time, noise is monitored for the duration of 1500 sec. at a temperature of 25°C, shut from infrared energy, electrical bandwidth of 0.4 to 10Hz.

**Operating voltage:**             $V_{DD} = 2-12 V$

**Source voltage:**                     $V_S = 0.2-1.5 V$

**Drain-source voltage:**             $V_{DS} = \text{min } 0.5 V$

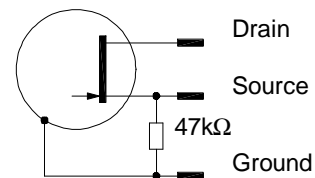


Fig.1: Test circuit

**Typical Responsivity vs. Frequency**

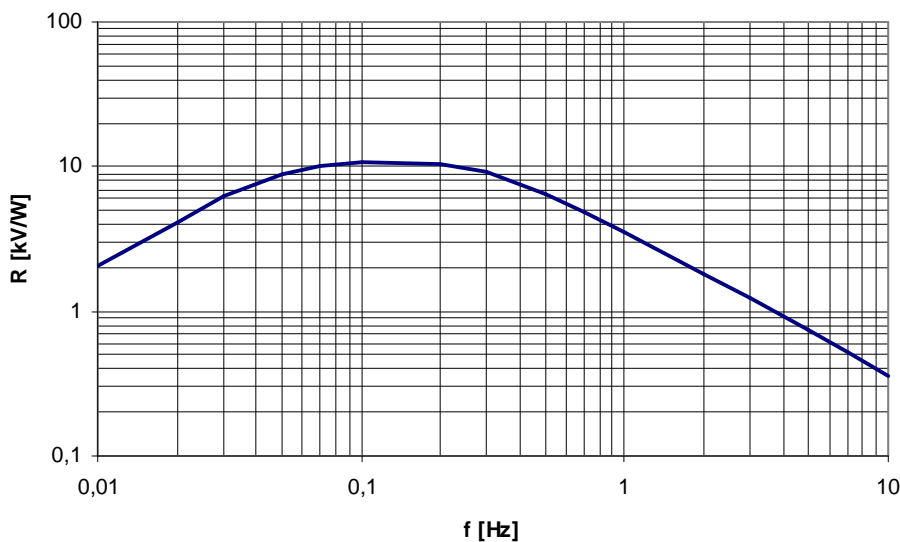
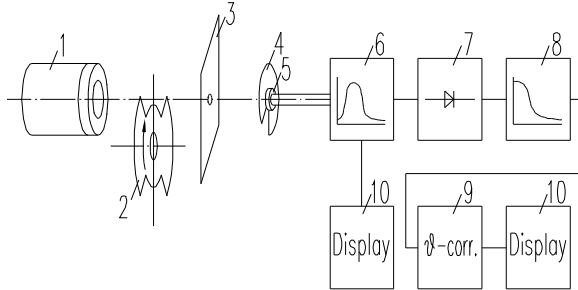


Fig.2: Frequency response

**Test Set up**



- 1: Black Body Radiator 373K = 100°C
- 2: 1 Hz Chopper
- 3: Aperture
- 4: Cover plate
- 5: Detector
- 6: Bandpass filter 1 Hz
- 7: Rectifier
- 8: Lowpass filter
- 9: Temperature compensation
- 10: Display

Fig.3: Test Set – up

**Spectral range:**

The spectral range of the detector is determined by filter built in (window).

**Substrate:** Silicon, multilayer coated

Filter (A;B)	Application	Centre wave length (µm)	Half power bandwidth (µm)
G20	Reference	4.00 ± 0.08	0.09 ± 0.02
G5	HC	3.40 ± 0.07	0.18 ± 0.02

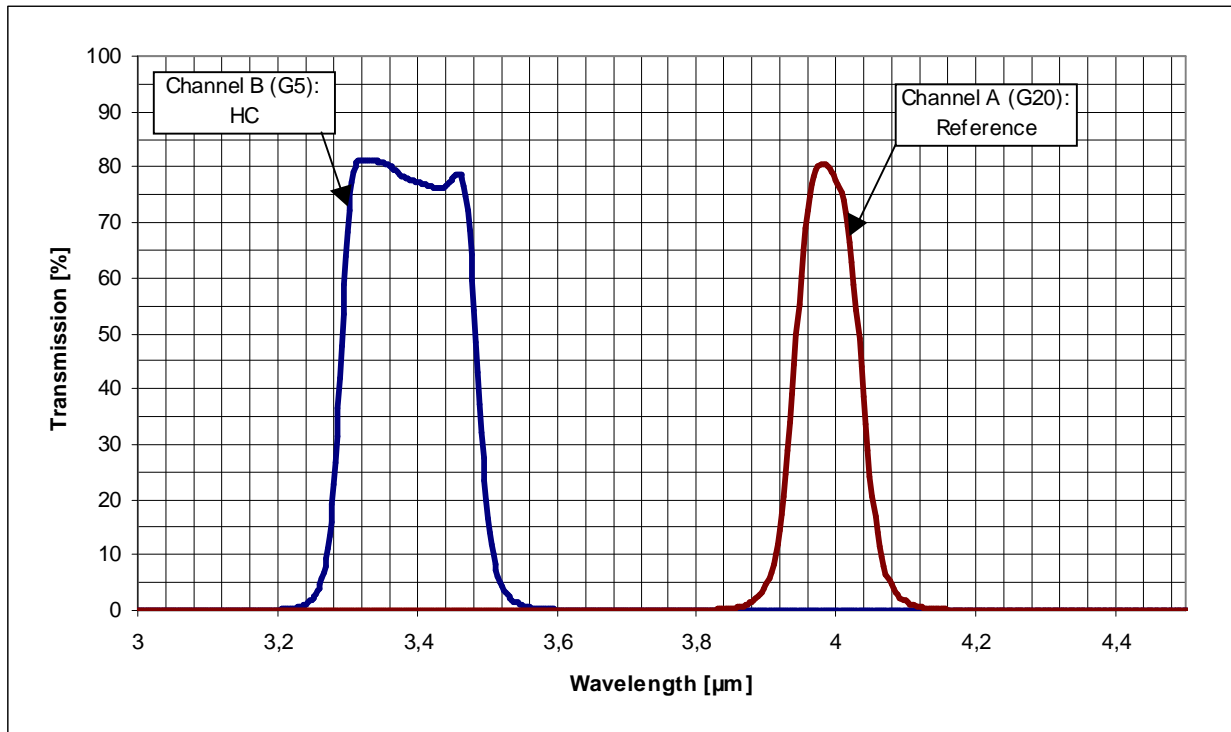


Fig.4: Filter Transmission

### **Configuration:**

**Housing:** TO- 5 metal housing with infrared transparent window  
**Element size:** 1.5 x 1.5 mm<sup>2</sup>, see also drawing: 2/71321  
**Connections:** Refer to drawing: 2/71321

### **Field of View**

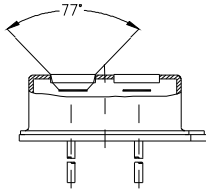


Fig.5: Field of View

### **Operating temperature:** -40°C to +85°C

The electrical parameters may vary from specified values accordance with their temperature dependence.

### **Storage temperature:** -40°C to +85°C

Avoid storage under high humid environment.

### **Humidity:**

The IR-detector shall not increase noise or decrease responsivity when exposed to 95% r.H. at 30°C. Operation below dew point might effect performance.

### **Hermetic seal:**

This IR-detector is sealed to pass a He-leakage test with maximum leak rate of 10<sup>-8</sup> mbar·l·s<sup>-1</sup>.

### **Quality:**

**PerkinElmer** is a **QS 9000** certified manufacturer with established SPC and TQM. Detector out-going inspections include the parameters Responsivity, Match, Offset, Noise, Gross leak (Mil Std 883 method 1014C1) on 100%. Individual data are not stored, statistical details can be disclosed on request.

### **Handling:**

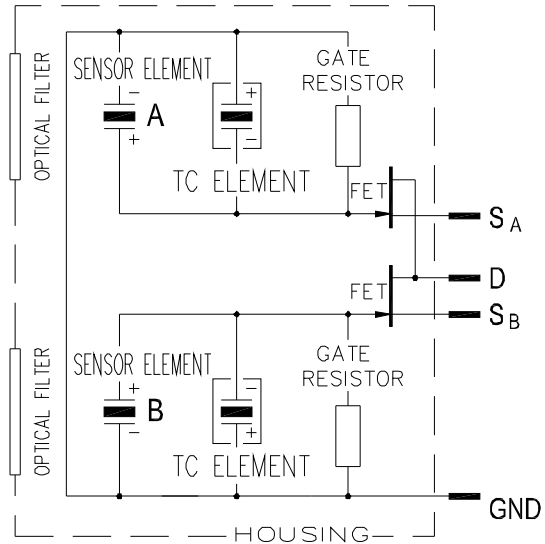
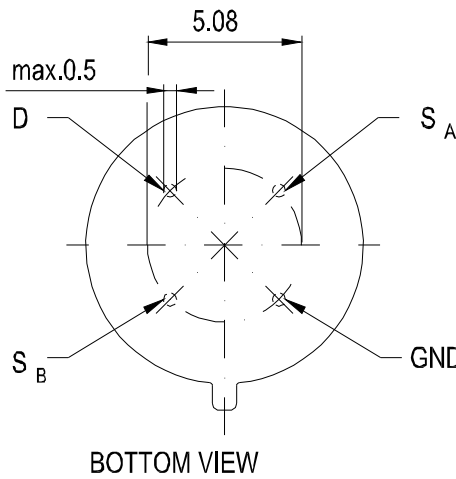
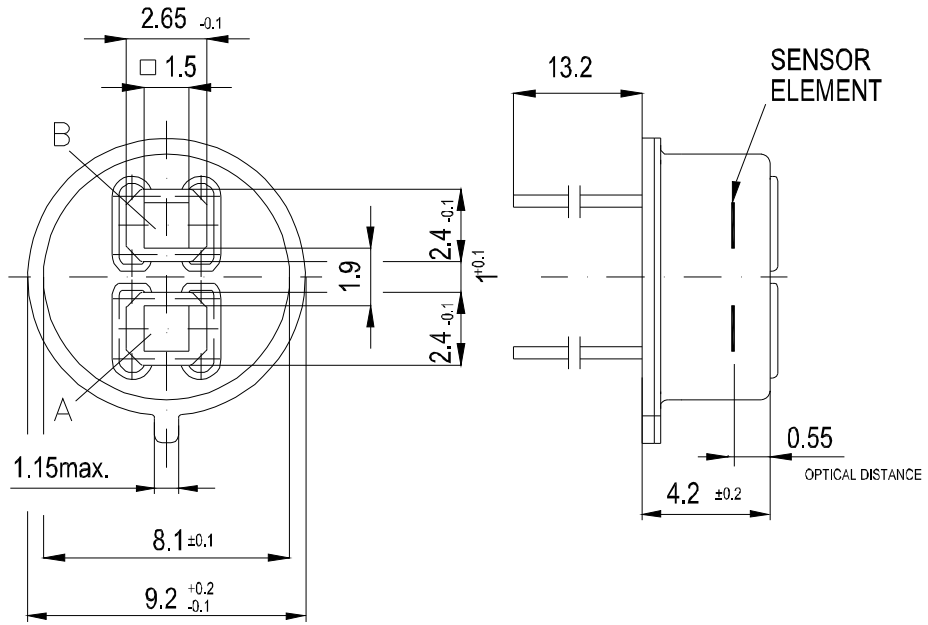
Electrostatic charges may destroy the detector. We recommend to apply precautions necessary for ESD devices to avoid damages. Do not apply physical force to detector leads. Do not expose detector to aggressive detergents such as freon, trichlorethylene, etc.


### **Solder 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.

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Allgemeintoleranzen GENERAL TOLERANCES				Werkstückarten/EDGES OF WORKING-PARTS ACC. DIN 6784		Form- u. Lagetoleranzen GEOMETRICAL TOLERANCES		
				Datum DATE	Name NAME	Werkstoff MATERIAL		
Gez. DRAWN BY				08.10.02	Tkocz			
Gepr. CHECKED BY								
Maßstab SCALE				Benennung/TITLE				Zeichnung Nr./DRAWING NO.
5:1				ELEMENTORIENTATION AND CONNECTIONS PYS 3228 TC		2/71321		
1				-	19.11.2003	Tkocz	Ersatz für/REPLACEMENT FOR	
Index NO.	Änderung REVISION	Datum DATE	Name NAME			Ersetzt durch/REPLACED BY		

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