

DEVICE SPECIFICATION FOR PYRO-ELECTRIC IR-DETECTOR

Customer :
Type : PYS 3228 TC G7.4/G20
Part no. : 3830
No. of samples:

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 Technologies GmbH & Co. KG, Wiesbaden.

It covers the complete technical data of a pyro-electric 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: 09.11.10

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 k Ω .

Electrical data:

Unless specified differently, all data refer to 25°C and $V_{DD}= 11$ V:

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_{pp}** **typ.: 15 μV_{pp}**

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

Typical Responsivity vs. Frequency

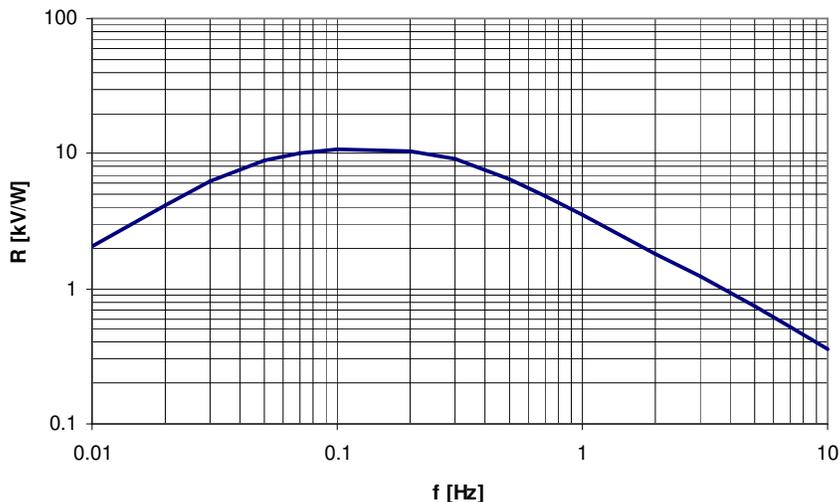
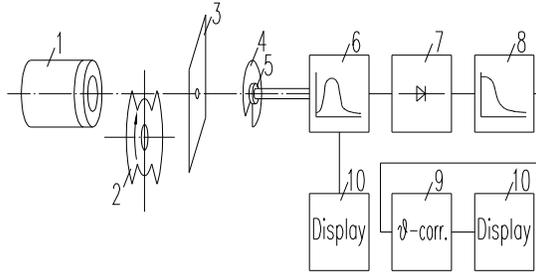


Fig.2: Frequency response

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 the built-in filter (window).

Substrate: Silicon, multilayer coated

| Filter (A;B) | Application | Centre wave length (µm) | Half power bandwidth (µm) |
|--------------|-------------|-------------------------|---------------------------|
| G20 | Reference | 3.95 ± 0.04 | 0.09 ± 0.02 |
| G7.4 | SF6 | 10.60 ± 0.06 | 0.24 ± 0.05 |

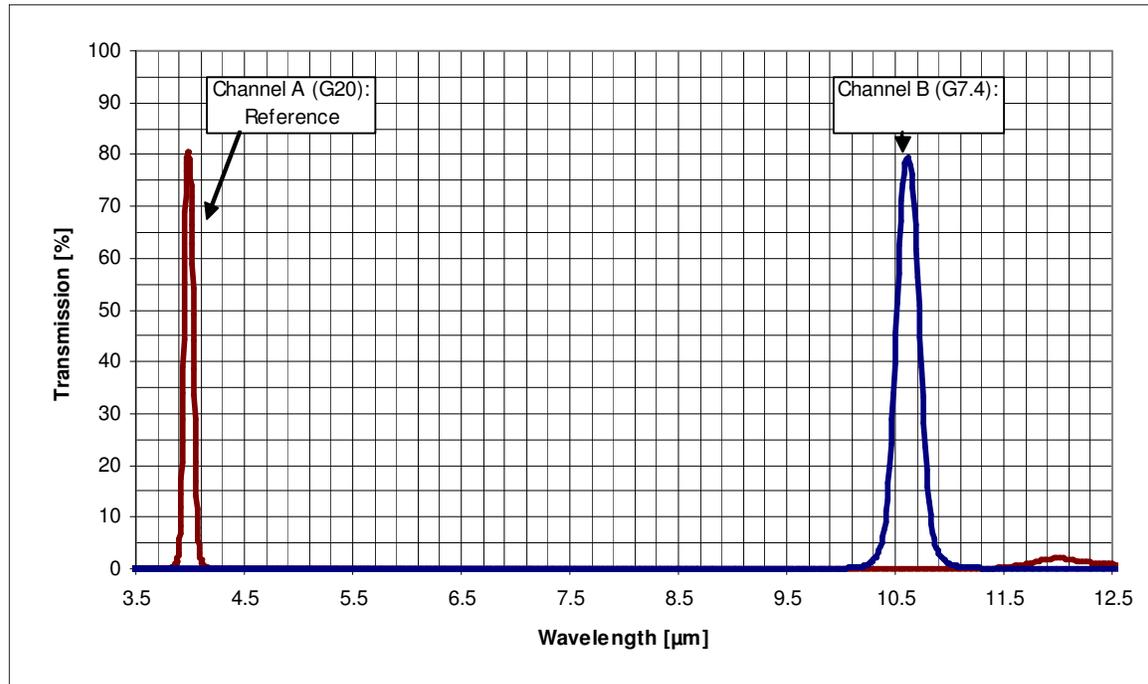


Fig.4: Filter Transmission

Physical Configuration:

Housing: TO- 5 metal housing with infrared transparent window

Element size: 1.5 x 1.5 mm², see also drawing: 2/71321

Connections: Refer to drawing: 2/71321

Field of View

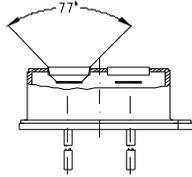


Fig.5: Field of View

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.

Microphonic noise: max: 30 μV_{rms} /g

PerkinElmer IR-detectors covered herein have passed qualification test for microphonic noise in x-y-z axis, exciting frequencies from 5Hz to 2kHz.

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 affect performance.

Hermetic seal:

This IR-detector is sealed to pass a He-leakage test with maximum leak rate of 10^{-8} mbar·l·s⁻¹.

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). Individual data are not stored, statistical details can be disclosed on request.

Handling:

Handle the detectors as ESD sensitive devices and protect them from electrostatic discharges. Working areas should be conductive and grounded. When handling detectors, operators shall be grounded. Avoid mechanical stress on the housing and especially on the leads. Be careful when cutting or bending leads to avoid damage. Do not bend leads less than 5 mm from their base. Do not drop detectors on the floor.

Avoid touching the detector window. To clean windows, only use ethyl alcohol with a cotton swab when necessary. Do not expose detector to aggressive detergents such as Freon, trichloroethylene, etc.

Soldering conditions:

For the soldering of the detectors within PCBs, the typically applied and recommended process is wave soldering. The soldering temperature should not exceed 285° C with a maximum exposure time of 5 seconds. During the automatic wave solder process we strongly advise to restrict preheating when the detector is directly exposed to the radiation of such heaters. In this case, the detector should be protected from the heat.

Manual soldering is also possible when maintaining similar temperature profiles. Reflow soldering is not possible due to the high temperature profiles of the process.

Product Safety & RoHS:

Modern high-tech materials are applied in the production of our pyro-electric detectors. Some of these materials are sensitive to high temperature exposure or to specific forms of stress. Our parts are compliant with environmental regulations as can be reviewed on the PerkinElmer website. We recommend to always check your local regulations. Disposal shall only be carried out in accordance with the latest legislation and directives. In Europe, WEEE directives must be followed.

The leads of these detectors have been pre-tinned with lead free tin process and may be applied through lead-free solder processes. As such the detectors will enable the design of RoHS compliant products.

Marking:

The marking of the detector includes the principal type plus a 4 digit number that represents the PerkinElmer storage and specification number (3XXX) and a date code, consisting of years and week detail. The marking is on the top or side of the detector.

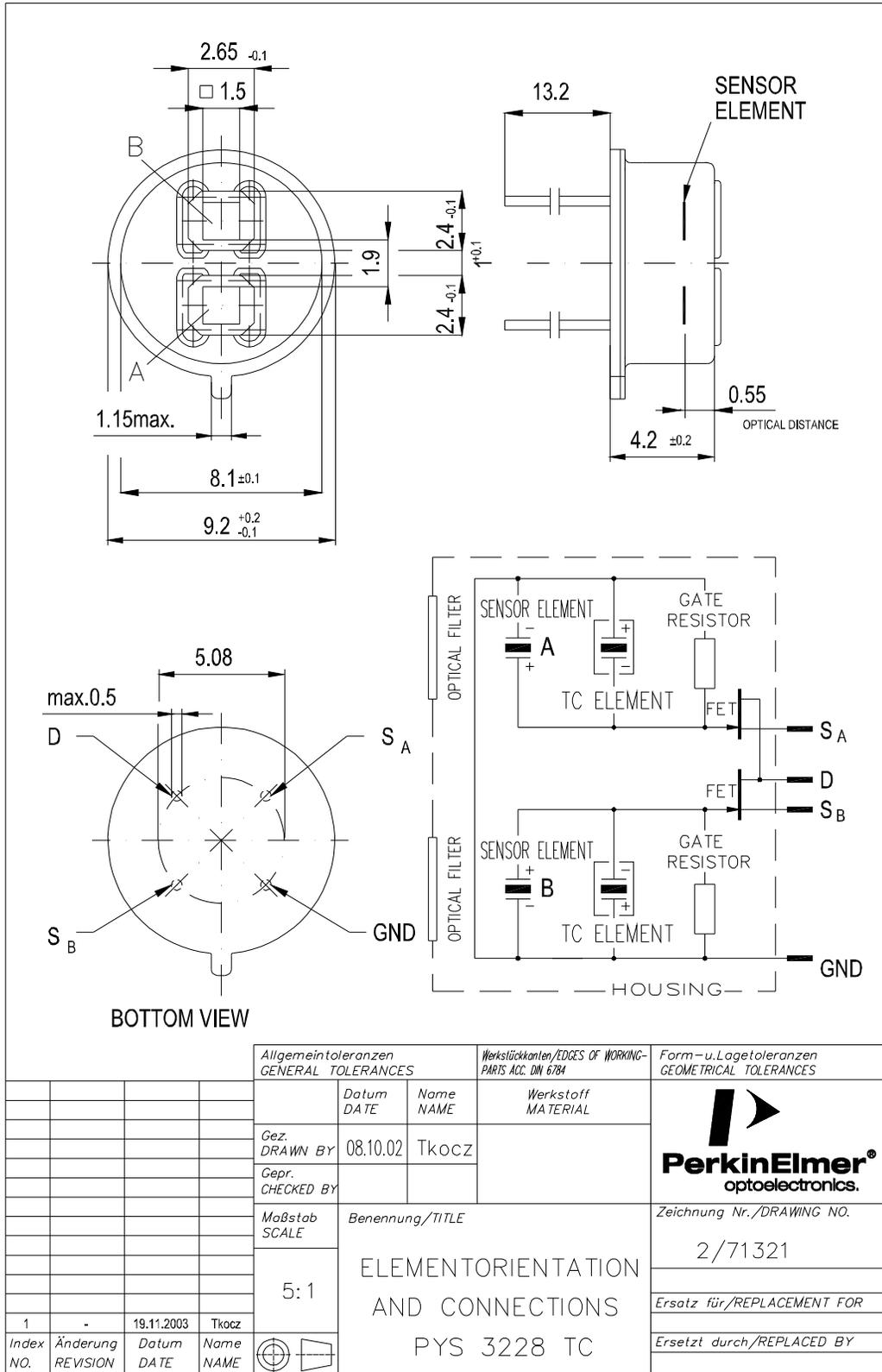
Performance Advice

Before taking a reading, during testing, and / or operation the unit has to become thermally stable due to its nature as a thermal detector and the high sensitivity of the device.

All data are specified at room temperature. When operating at other temperatures within the specified operating range, parameters may vary. The detectors might operate outside the quoted range but may have degraded performance.

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