

# MPY-RS Pyroelectric Detector

## Description

MPY-RS is a fast and compact pyroelectric detector for sensitive radiation measurements from the UV to the Far-IR range. Due to its extended electronic bandwidth it can be used without a chopper for sources with repetition rates of a few kHz.



## Physical Properties

|                                   |                                          |
|-----------------------------------|------------------------------------------|
| <b>Detection principle</b>        | pyroelectric                             |
| <b>Detector material</b>          | black coated LiTaO <sub>3</sub>          |
| <b>Weight</b>                     | 80 g                                     |
| <b>Operating temperature</b>      | -20°C to +50°C                           |
| <b>Dimensions (HxWxD)</b>         | 71.5 mm x 45.3 mm x 25.5 mm              |
| <b>Detector window dimensions</b> | (5.0 x 5.0) mm <sup>2</sup>              |
| <b>Active detector area</b>       | (3.0 x 3.0) mm <sup>2</sup>              |
| <b>Thread of detector cap</b>     | SM05 (compatible to Thorlabs components) |

## Electrical Properties

|                            |                                                        |
|----------------------------|--------------------------------------------------------|
| <b>Power supply</b>        | ± 12 V linear low noise power supply (Thorlabs LDS12B) |
| <b>Power socket</b>        | 3-pole M8                                              |
| <b>Output socket</b>       | SMA (Adapter to BNC included)                          |
| <b>Output signal</b>       | analog                                                 |
| <b>Output signal level</b> | -8 V to +8 V                                           |

## Measuring Properties

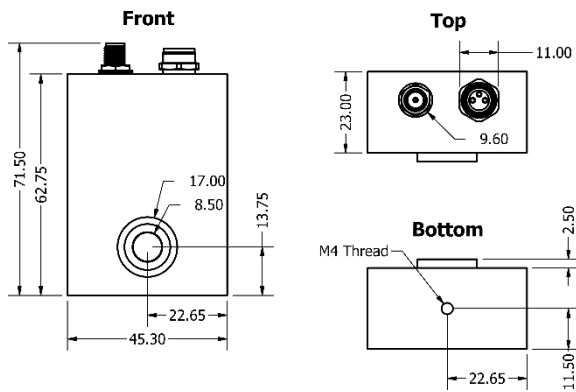
|                                                   |                                                       |
|---------------------------------------------------|-------------------------------------------------------|
| <b>Responsivity</b>                               | 13 kV/W *                                             |
| <b>Response time (0-100%)</b>                     | typ. 200 ms (corresponds to thermal time constant)    |
| <b>Bandwidth (-3 dB)</b>                          | typ. 3 kHz                                            |
| <b>Frequency range (-20 dB)</b>                   | 1 Hz to 20 kHz **                                     |
| <b>Noise equivalent power (NEP)</b>               | 1400 pW/√Hz *                                         |
| <b>Noise density</b>                              | 18 μV/√Hz                                             |
| <b>Detectivity @ 10 Hz</b>                        | 2.0 x 10 <sup>8</sup> cm√Hz/W *                       |
| <b>Detectivity @ 1 kHz</b>                        | 1.1 x 10 <sup>8</sup> cm√Hz/W *                       |
| <b>Maximum measurable power</b>                   | 500 μW (f = 500 Hz, Si window)                        |
| <b>Damage threshold</b> (max. avg. power density) | 60 mW/cm <sup>2</sup>                                 |
| <b>Spectral bandwidth</b>                         | UV to THz (real bandwidth depends on the window used) |
| • <b>KBr window</b>                               | λ = 200 nm – 30 μm                                    |
| • <b>Si window</b>                                | λ > 1.2 μm                                            |
| • <b>PTFE window</b>                              | λ = 20 μm – 40 μm & λ > 60 μm                         |
| • <b>HDPE window</b>                              | λ > 40 μm                                             |
| • <b>Diamond window</b>                           | λ > 225 μm                                            |
| • <b>without window</b>                           | λ = 10 nm – 1000 μm                                   |

*Further window materials on request.*

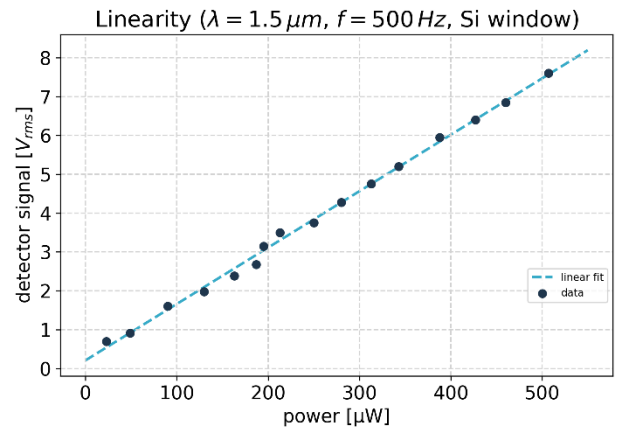
\* Measured with broadband black body source at 150°C, central wavelength λ = 6.8 μm and KBr window

\*\* Detector only sees signal changes – a chopper is required for CW applications!

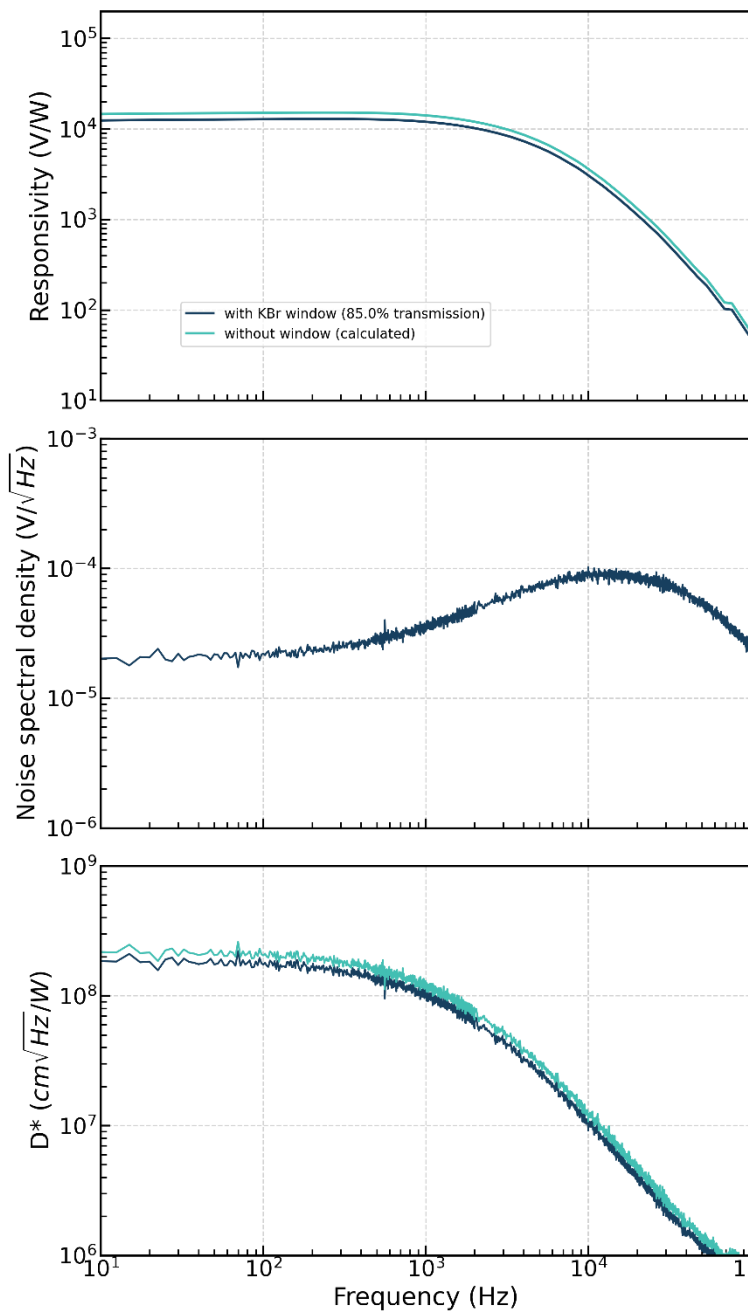
## Geometric Dimensions



## Linearity



## Typical Performance



The responsivity and  $D^*$  values are measured with a  $150^\circ\text{C}$  blackbody emitter with  $6.8 \mu\text{m}$  peak emission and with a detector with KBr window. The values can change for other wavelengths.