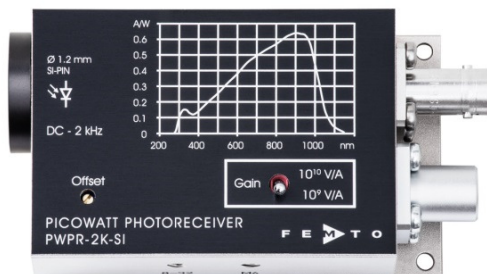


# Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode



The picture shows model PWPR-2K-SI-FS.

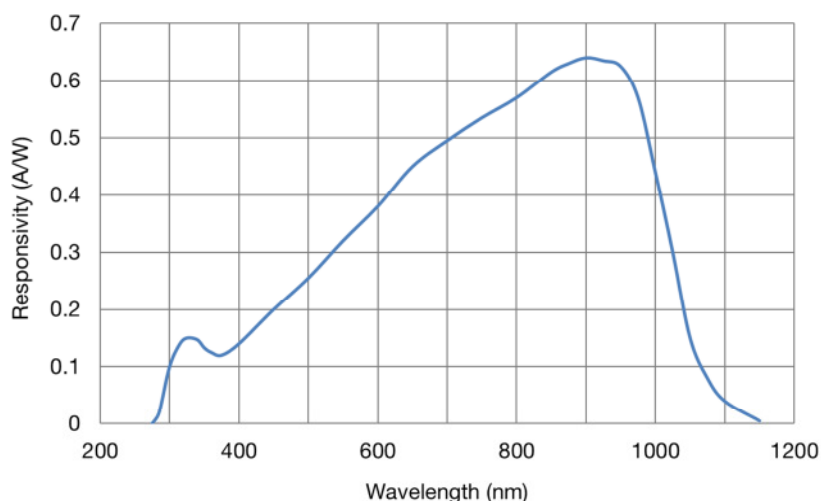
Features

- **Si-PIN detector, 1.2 mm active diameter**
- **Spectral range 320 - 1060 nm**
- **Ultra-low noise, NEP 9 fW/√Hz**
- **Bandwidth DC to 2 kHz**
- **Transimpedance gain switchable 1.0 x 10<sup>9</sup> V/A, 1.0 x 10<sup>10</sup> V/A**
- **Free-space input 1.035"-40 threaded, alternatively 25 mm diameter unthreaded**
- **Easily convertible to fiber optic input (FC and FSMA) with optionally available screw-on adapters**
- **UNC 8-32 and M4 tapped holes for mounting on standard posts with metric and imperial thread**

Applications

- **Spectroscopy, reflection and transmission measurements**
- **Highly sensitive optoelectronic measurements**
- **Applications utilizing optical chopper modulation**
- **Optical front-end for oscilloscopes, A/D converters and lock-in amplifiers**

Spectral Response



# Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

Available Versions

PWPR-2K-SI-FST

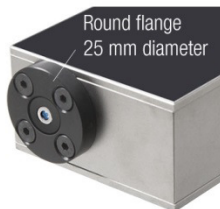


Internal threaded coupler ring with 30 mm outer diameter (included)

1.035"-40 threaded flange for free space applications, compatible with many optical standard accessories and for use with various types of fiber connector adapters

Optionally available:  
 Fiber adapters PRA-FC and PRA-FSMA  
 (Coupling efficiency will depend on fiber type.  
 With the relative large 1.2 mm dia. photodiode installed in the PWPR-2K-SI input coupling is not critical. However, standard SM or MM fibers (PC or APC) with low numerical aperture (NA) and core diameters not more than 400 μm are recommended for ensuring near 100% coupling efficiency.)

PWPR-2K-SI-FS



25 mm dia. unthreaded flange for free space applications, compatible with many optical standard accessories

PWPR-S

Customized versions available on request

Available Accessories

PRA-FSMA  
 PRA-FC



Fiber-adapter with external 1.035"-40 thread



PRA-PAP



Alternative mounting option:  
 Post adapter plate, easy to mount on FEMTO photoreceiver series OE, FWPR, PWPR, HCA-S and LCA-S



PS-15-25-L



Power supply  
 Input: 100 - 240 VAC  
 Output: ±15 VDC

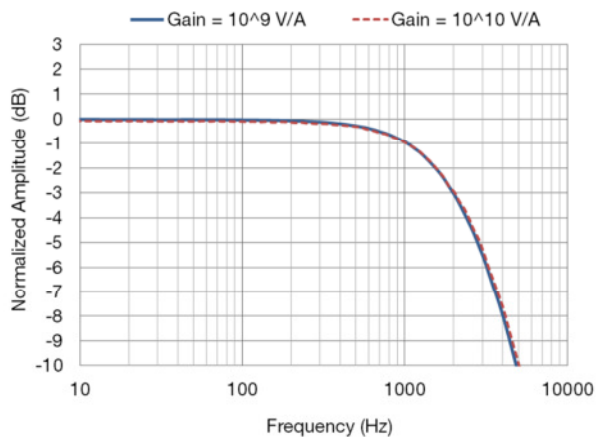
## Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

Specifications	<p>Test conditions <math>V_s = \pm 15\text{ V}</math>, <math>T_A = 25\text{ }^\circ\text{C}</math>, output load impedance <math>1\text{ M}\Omega</math>, warm-up 20 minutes (min. 10 minutes recommended)</p>
Gain	<p>Transimpedance gain <math>1.0 \times 10^9\text{ V/A}</math>, <math>1.0 \times 10^{10}\text{ V/A}</math> (switchable) (@ output load <math>\geq 100\text{ k}\Omega</math>)</p> <p>Gain accuracy <math>\pm 1\%</math> (electrical)</p> <p>Conversion gain <math>6.4 \times 10^8\text{ V/W}</math>, <math>6.4 \times 10^9\text{ V/W}</math> typ. (switchable) (@ <math>900\text{ nm}</math>, output load <math>\geq 100\text{ k}\Omega</math>)</p>
Frequency Response	<p>Lower cut-off frequency DC</p> <p>Upper cut-off frequency (<math>-3\text{ dB}</math>) <math>2\text{ kHz}</math></p> <p>Rise/fall time (<math>10\%</math> - <math>90\%</math>) <math>165\text{ }\mu\text{s}</math></p>
Detector	<p>Detector type Si-PIN photodiode</p> <p>Active area <math>\varnothing 1.2\text{ mm}</math></p> <p>Spectral range <math>320 - 1060\text{ nm}</math></p> <p>Max. sensitivity <math>0.64\text{ A/W}</math> @ <math>900\text{ nm}</math> typ.</p>
Input	<p>Input offset current (dark current) <math>0.6\text{ pA}</math> typ.</p> <p>Input offset current drift factor <math>2 / 10\text{ }^\circ\text{C}</math></p> <p>Input offset compensation range <math>\pm 120\text{ pA}</math> (adjustable by offset potentiometer)</p> <p>Optical saturation power <math>15.6\text{ nW}</math> (@ <math>10^9\text{ V/A}</math>, <math>900\text{ nm}</math>) <math>1.56\text{ nW}</math> (@ <math>10^{10}\text{ V/A}</math>, <math>900\text{ nm}</math>)</p> <p>NEP <math>9\text{ fW}/\sqrt{\text{Hz}}</math> (@ <math>900\text{ nm}</math>, <math>100\text{ Hz}</math>)</p>
Output	<p>Output voltage range <math>-1.2\text{ V} \dots +10\text{ V}</math> (@ <math>\geq 100\text{ k}\Omega</math> output load)</p> <p>Max. output current <math>30\text{ mA}</math> (short-circuit proof)</p> <p>Output impedance <math>50\text{ }\Omega</math> (terminate with <math>\geq 100\text{ k}\Omega</math>)</p> <p>Output noise <math>0.45\text{ mV}_{\text{RMS}}</math> (<math>3\text{ mV}_{\text{pp}}</math>) typ. @ <math>10^9\text{ V/A}</math>, no signal on detector</p>
Power Supply	<p>Supply voltage <math>\pm 15\text{ V}</math> (<math>\pm 14.5 \dots 16.5\text{ V}</math>)</p> <p>Supply current <math>+32\text{ mA} / -25\text{ mA}</math> (depends on operating conditions, recommended power supply capability minimum <math>\pm 100\text{ mA}</math>)</p>
Case	<p>Weight <math>207\text{ g}</math> (<math>0.46\text{ lbs}</math>) PWPR-2K-SI-FS <math>220\text{ g}</math> (<math>0.49\text{ lbs}</math>) PWPR-2K-SI-FST incl. coupler ring</p> <p>Material AlMg4.5Mn, nickel-plated</p>
Temperature Range	<p>Storage temperature <math>-30\text{ }^\circ\text{C} \dots +85\text{ }^\circ\text{C}</math></p> <p>Operating temperature <math>0\text{ }^\circ\text{C} \dots +50\text{ }^\circ\text{C}</math></p>
Absolute Maximum Ratings	<p>Optical input power (CW) <math>10\text{ mW}</math></p> <p>Power supply voltage <math>\pm 20\text{ V}</math></p>

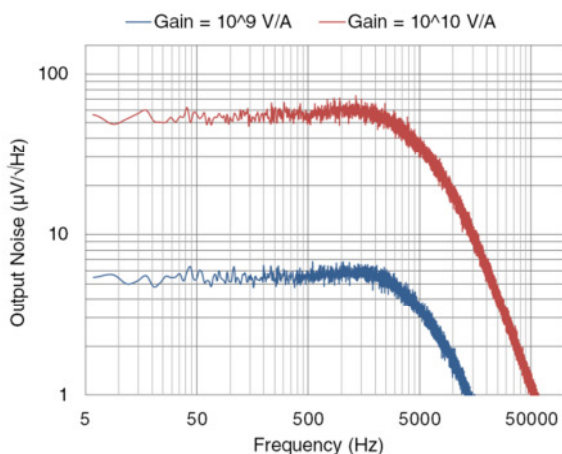
# Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

Typical Performance Characteristics

Frequency Response



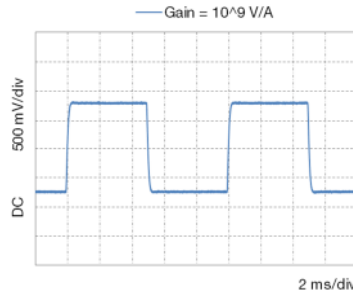
Output Noise



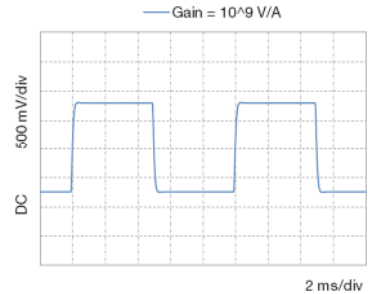
# Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

Typical Performance Characteristics (continued)

Step Signal Response @ 2500 pW (p-p, 850 nm)

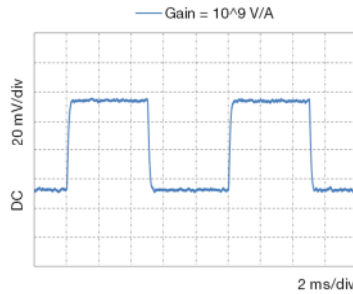


acquisition without averaging

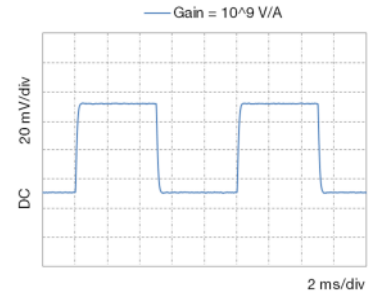


acquisition with 64x averaging

Step Signal Response @ 100 pW (p-p, 850 nm)

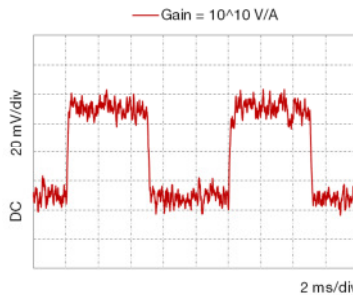


acquisition without averaging

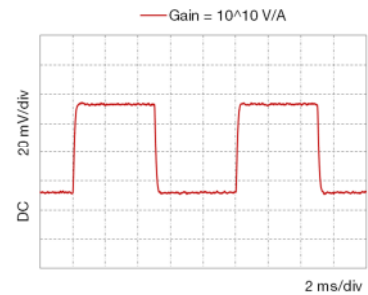


acquisition with 64x averaging

Step Signal Response @ 10 pW (p-p, 850 nm)



acquisition without averaging



acquisition with 64x averaging

## Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

Connectors

Input

PWPR-2K-SI-FS      25 mm dia. unthreaded flange for free space applications

PWPR-2K-SI-FST      1.035"-40 threaded flange for free space applications and for use with fiber connector adapters PRA-FC and PRA-FSMA

fixed fiber optic input      available as customized unit

Output

BNC jack (female)

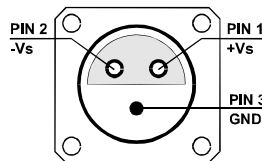
Power supply

Lemo® series 1S, 3-pin fixed socket  
(mating plug type: FFA.1S.303.CLAC52)

Pin 1:            +15 V

Pin 2:            -15 V

Pin 3:            GND



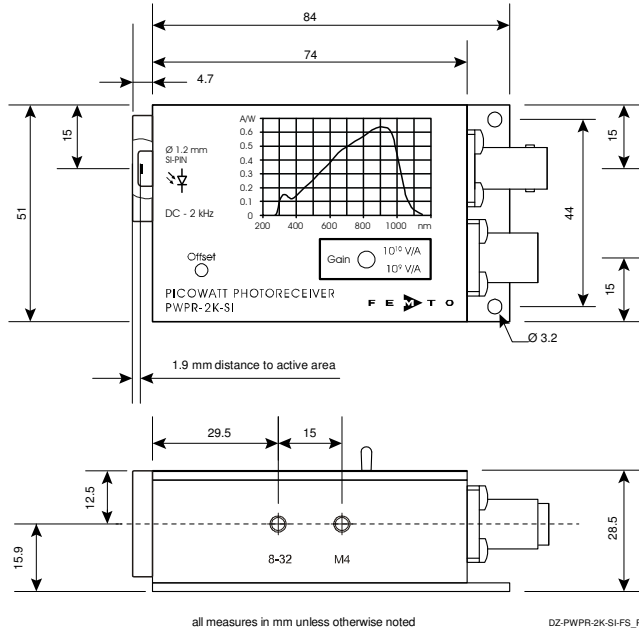
Scope of Delivery

PWPR-2K-SI, internally threaded coupler ring ("FST" version only), Lemo® 3-pin connector, datasheet, transport package

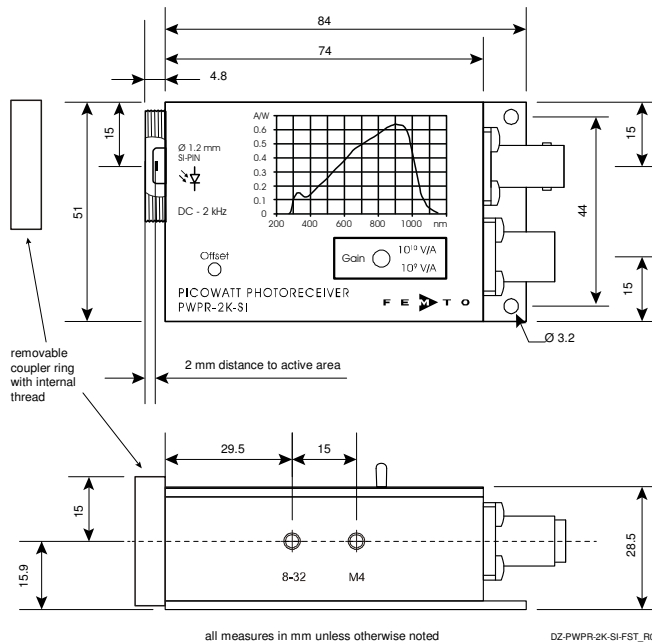
# Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

Dimensions

PWPR-2K-SI-FS (25 mm dia. unthreaded free space input)



PWPR-2K-SI-FST (1.035" -40 threaded free space input)



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