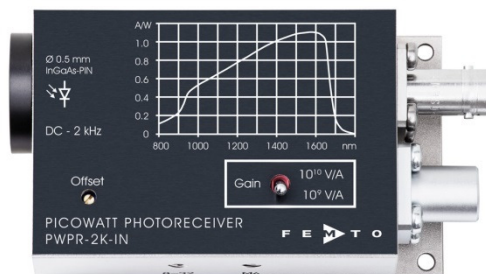


Ultra-Low Noise 2 kHz Photoreceiver with InGaAs-PIN Photodiode



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

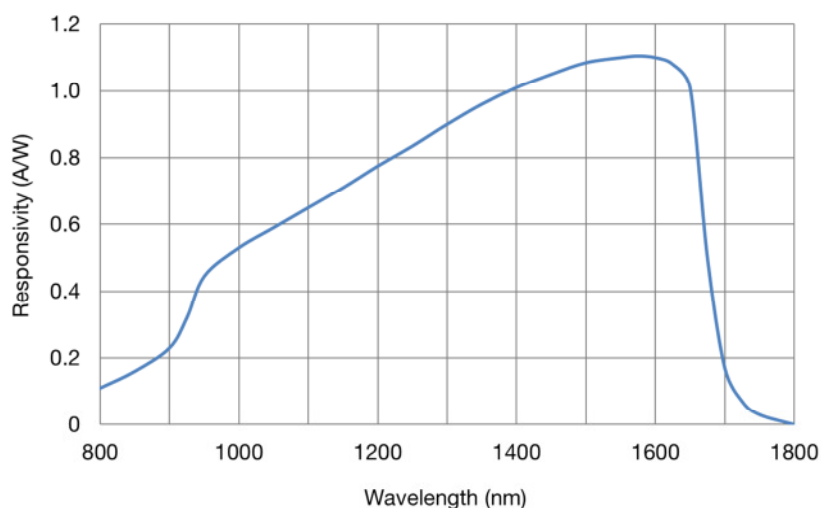
Features

- InGaAs-PIN detector, 0.5 mm active diameter
- Spectral range 900 - 1700 nm
- Ultra-low noise, NEP 10 fW/√Hz
- Bandwidth DC to 2 kHz
- Transimpedance gain switchable 1.0 x 10⁹ V/A, 1.0 x 10¹⁰ 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 InGaAs-PIN Photodiode

Available Versions

PWPR-2K-IN-FST

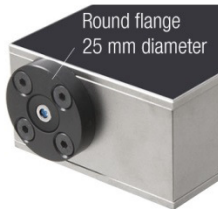


Internal threaded coupler ring with 30 mm outer diameter (included)

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 0.5 mm dia. photodiode installed in the PWPR-2K-IN input coupling is not critical. However, standard SM 9/125 fibers (PC or APC) with low numerical aperture (NA) are recommended for ensuring near 100% coupling efficiency.)

PWPR-2K-IN-FS



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

PWPR-S

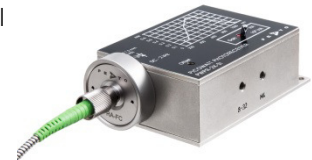
Customized versions available on request

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

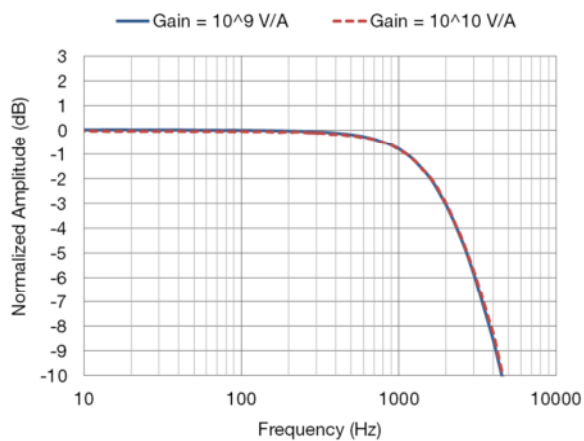
Ultra-Low Noise 2 kHz Photoreceiver with InGaAs-PIN Photodiode

Specifications	<p>Test conditions $V_s = \pm 15\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, output load impedance $1\text{ M}\Omega$, warm-up 20 minutes (min. 10 minutes recommended)</p>
Gain	<p>Transimpedance gain $1.0 \times 10^9\text{ V/A}$, $1.0 \times 10^{10}\text{ V/A}$ (switchable) (@ output load $\geq 100\text{ k}\Omega$)</p> <p>Gain accuracy $\pm 1\%$ (electrical)</p> <p>Conversion gain $1.1 \times 10^9\text{ V/W}$, $1.1 \times 10^{10}\text{ V/W}$ typ. (switchable) (@ 1580 nm, output load $\geq 100\text{ k}\Omega$)</p>
Frequency Response	<p>Lower cut-off frequency DC</p> <p>Upper cut-off frequency (-3 dB) 2 kHz</p> <p>Rise/fall time (10% - 90%) 165 μs</p>
Detector	<p>Detector type InGaAs-PIN photodiode</p> <p>Active area $\varnothing 0.5\text{ mm}$</p> <p>Spectral range 900 - 1700 nm</p> <p>Max. sensitivity 1.1 A/W @ 1580 nm typ.</p>
Input	<p>Input offset current (dark current) 0.6 pA typ.</p> <p>Input offset current drift factor 2 / $10\text{ }^\circ\text{C}$</p> <p>Input offset compensation range $\pm 120\text{ pA}$ (adjustable by offset potentiometer)</p> <p>Optical saturation power 9.1 nW (@ 10^9 V/A, 1580 nm)</p> <p style="margin-left: 20px;">0.91 nW (@ 10^{10} V/A, 1580 nm)</p> <p>NEP $10\text{ fW}/\sqrt{\text{Hz}}$ (@ 1580 nm, 100 Hz)</p>
Output	<p>Output voltage range $-1.2\text{ V} \dots +10\text{ V}$ (@ $\geq 100\text{ k}\Omega$ output load)</p> <p>Max. output current 30 mA (short-circuit proof)</p> <p>Output impedance $50\ \Omega$ (terminate with $\geq 100\text{ k}\Omega$)</p> <p>Output noise $0.75\text{ mV}_{\text{RMS}}$ (5 mV_{PP}) typ. @ 10^9 V/A, no signal on detector</p>
Power Supply	<p>Supply voltage $\pm 15\text{ V}$ ($\pm 14.5 \dots 16.5\text{ V}$)</p> <p>Supply current $+32\text{ mA}$ / -25 mA</p> <p style="margin-left: 20px;">(depends on operating conditions, recommended power supply capability minimum $\pm 100\text{ mA}$)</p>
Case	<p>Weight 207 g (0.46 lbs) PWPR-2K-IN-FS</p> <p style="margin-left: 20px;">220 g (0.49 lbs) PWPR-2K-IN-FST incl. coupler ring</p> <p>Material AlMg4.5Mn, nickel-plated</p>
Temperature Range	<p>Storage temperature $-30\text{ }^\circ\text{C} \dots +85\text{ }^\circ\text{C}$</p> <p>Operating temperature $0\text{ }^\circ\text{C} \dots +50\text{ }^\circ\text{C}$</p>
Absolute Maximum Ratings	<p>Optical input power (CW) 10 mW</p> <p>Power supply voltage $\pm 20\text{ V}$</p>

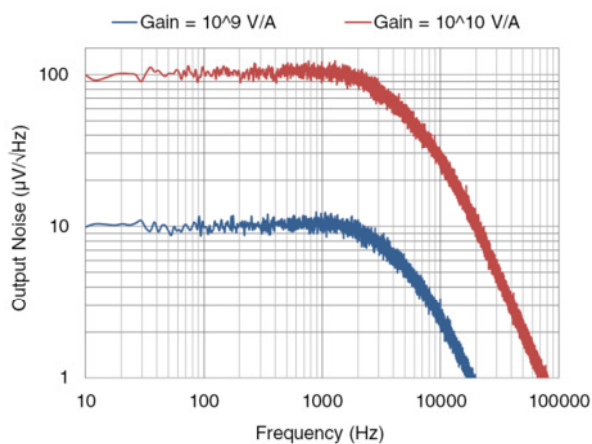
Ultra-Low Noise 2 kHz Photoreceiver with InGaAs-PIN Photodiode

Typical Performance Characteristics

Frequency Response



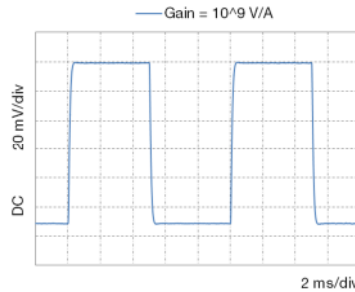
Output Noise



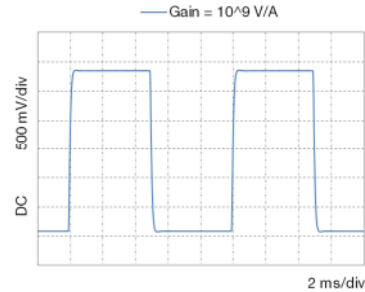
Ultra-Low Noise 2 kHz Photoreceiver with InGaAs-PIN Photodiode

Typical Performance Characteristics (continued)

Step Signal Response @ 2500 pW (p-p, 1550 nm)

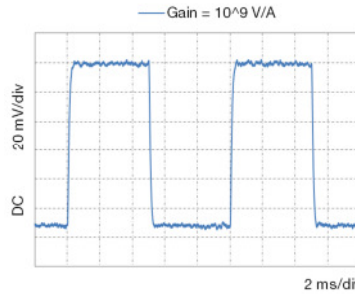


acquisition without averaging

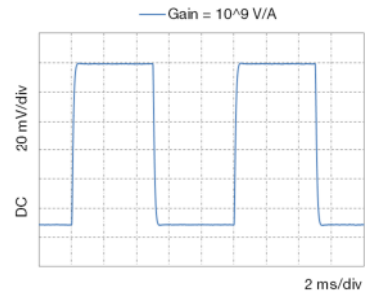


acquisition with 64x averaging

Step Signal Response @ 100 pW (p-p, 1550 nm)

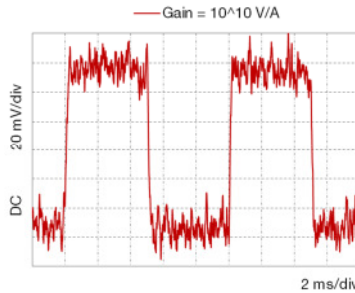


acquisition without averaging

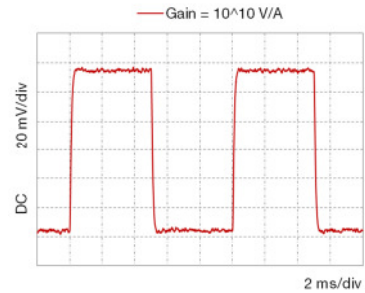


acquisition with 64x averaging

Step Signal Response @ 10 pW (p-p, 1550 nm)



acquisition without averaging



acquisition with 64x averaging

Ultra-Low Noise 2 kHz Photoreceiver with InGaAs-PIN Photodiode

Connectors

Input

PWPR-2K-IN-FS

25 mm dia. unthreaded flange for free space applications

PWPR-2K-IN-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)

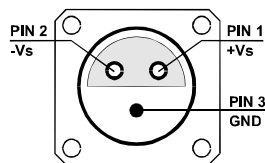
Power supply

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



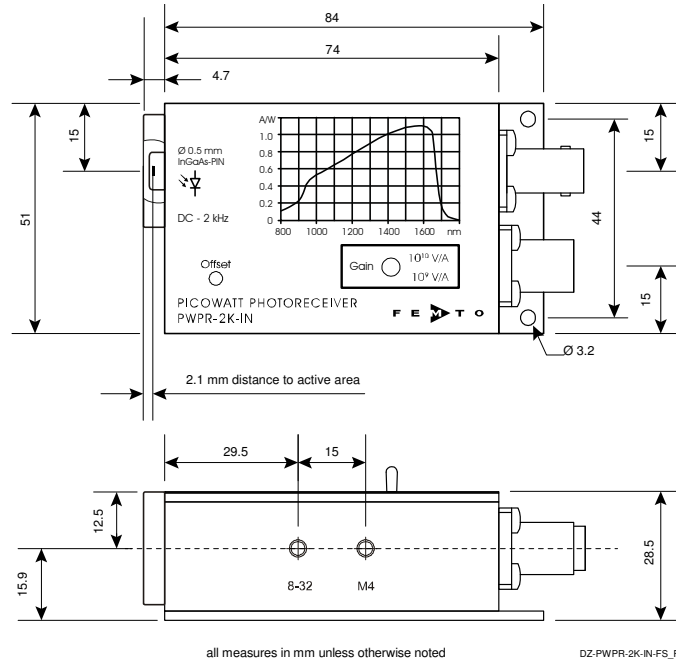
Scope of Delivery

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

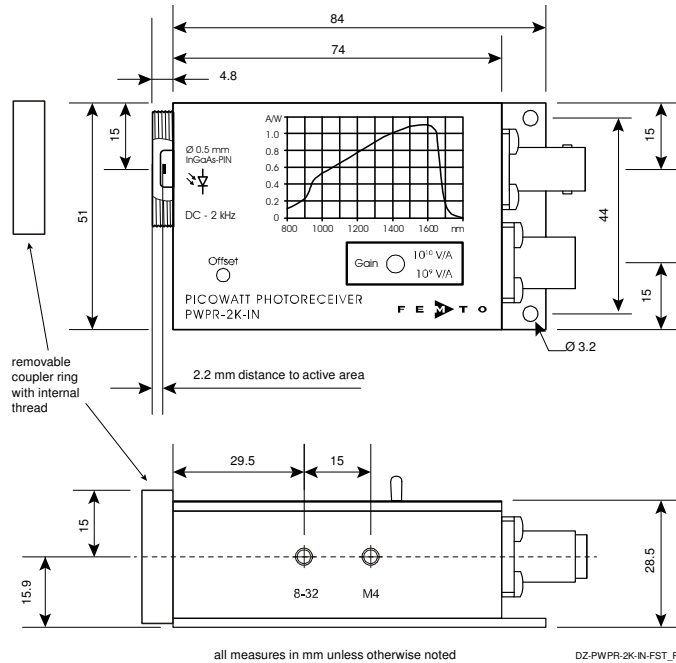
Ultra-Low Noise 2 kHz Photoreceiver with InGaAs-PIN Photodiode

Dimensions

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



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



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