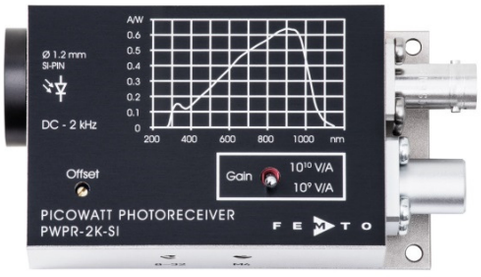
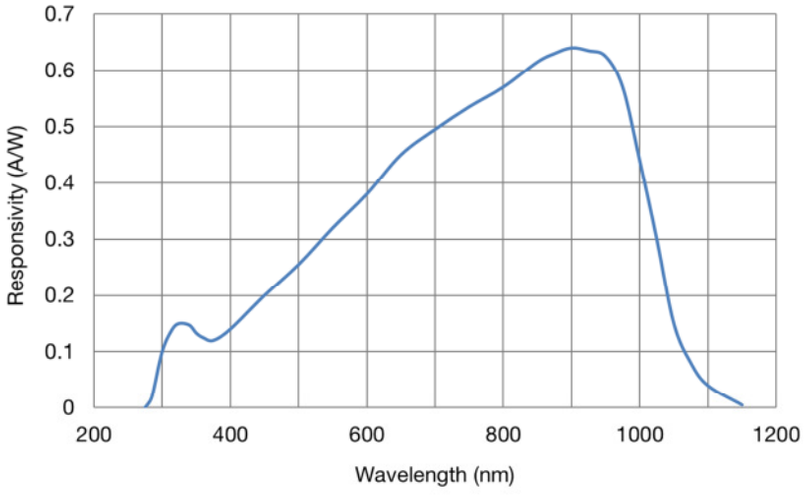
Datasheet PWPR-2K-SI

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 10^9 V/A, 1.0 x 10^{10} 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

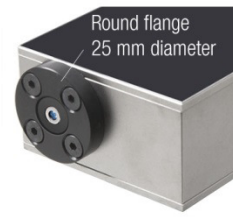
Available Versions

PWPR-2K-SI-FST

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

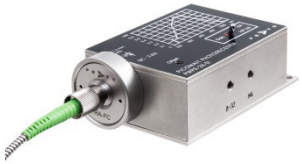
PWPR-S

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

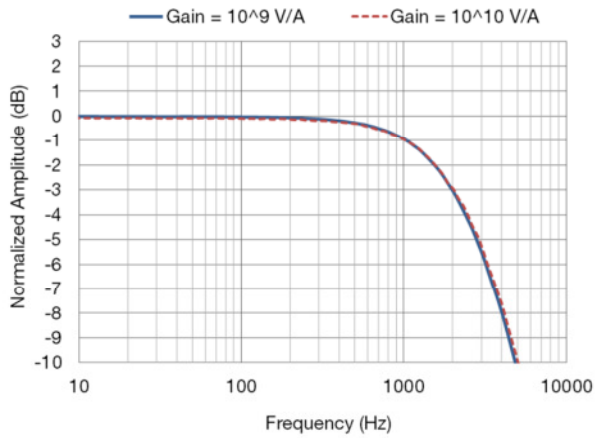
Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

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

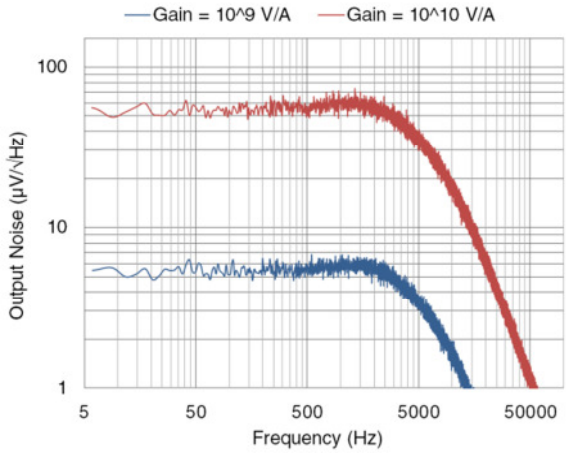
Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

Typical Performance Characteristics

Frequency Response



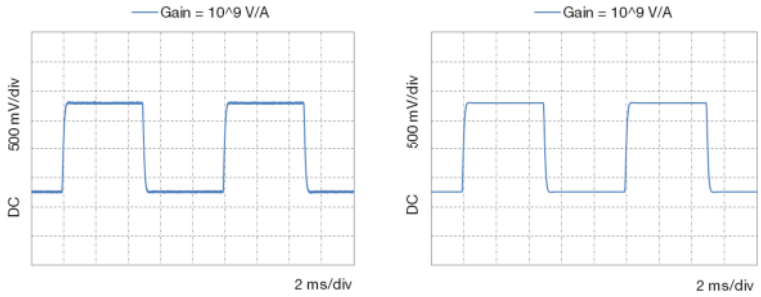
Output Noise



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

Typical Performance Characteristics (continued)

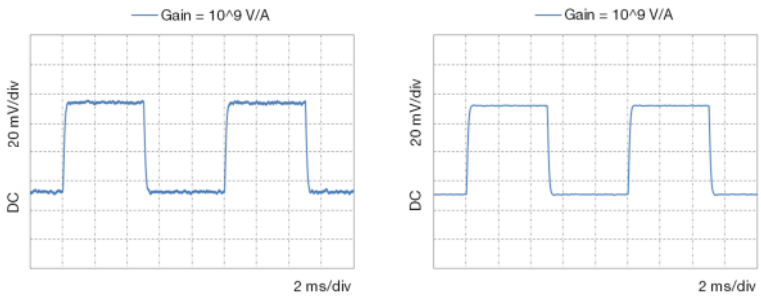
Step Signal Response @ 2500 pW (p-p, 850 nm)



acquisition without averaging

acquisition with 64x averaging

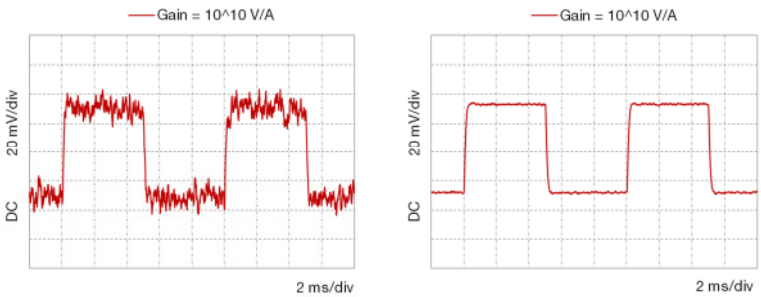
Step Signal Response @ 100 pW (p-p, 850 nm)



acquisition without averaging

acquisition with 64x averaging

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

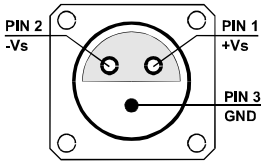


acquisition without averaging

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	



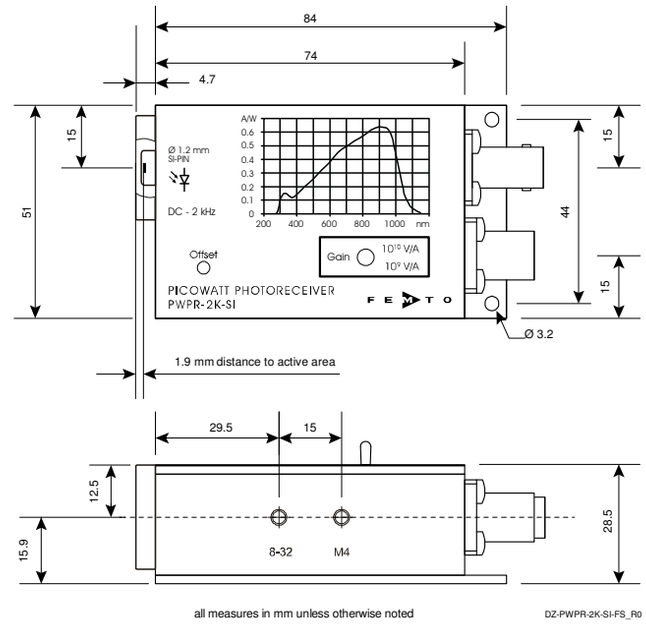
Scope of Delivery	PWPR-2K-SI, internally threaded coupler ring (“FST” version only), Lemo® 3-pin connector, datasheet, transport package

Datasheet PWPR-2K-SI

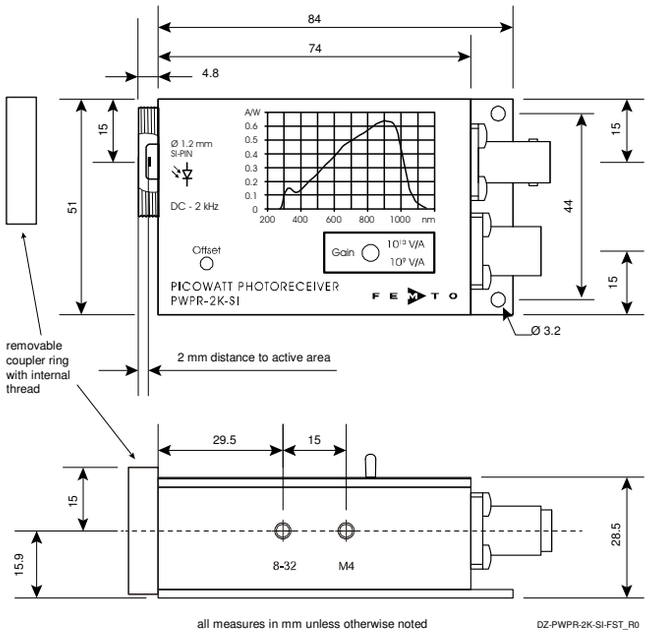
Ultra-Low Noise 2 kHz Photoreceiver with Si-PIN Photodiode

Dimensions

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



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



FEMTO Messtechnik GmbH
Klosterstr. 64
10179 Berlin · Germany
Phone: +49 30 280 4711-0
Fax: +49 30 280 4711-11
Email: info@femto.de
www.femto.de