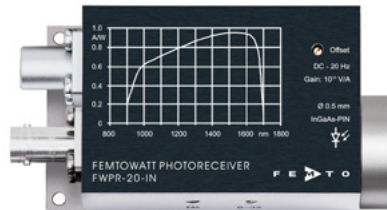
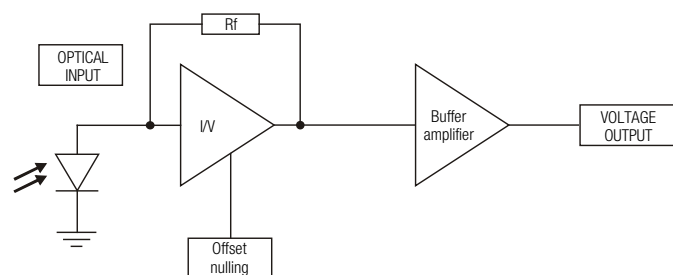


Datasheet
FWPR-20-IN
**Femtowatt Photoreceiver
with InGaAs-PIN Photodiode**

Features

- InGaAs-PIN photodiode, 0.5 mm active diameter
- Ultra low noise, NEP 7.5 fW/√Hz
- Amplifier transimpedance gain 1×10^{11} V/A
- Max. conversion gain 0.95×10^{11} V/W @ 1550 nm
- Spectral range 900 – 1700 nm
- Free-space input 1.035"-40 threaded, 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

- Fluorescence measurements
- NIR spectroscopy
- Electrophoresis
- Replacement for (liquid nitrogen) cooled Ge photodiodes and avalanche photodiodes (APDs)

Block Diagram


BS01-FWPR_R03

Intended Use

The FWPR-20-IN photoreceiver consists of an InGaAs photodiode and a subsequent low-noise fixed gain transimpedance amplifier. It is designed for conversion of optical signals in the range from fW to pW into equivalent output voltages. Operation is mostly self-explanatory. If in doubt, consult this document or contact support@femto.de.

For safe operation, please refer to the damage thresholds specified in the "Absolute Maximum Ratings", "Temperature Range" and "Power Supply" sections of this document.

The operating environment must be free of smoke, dust, grease, oil, condensing moisture, and other contaminants that could affect the operation or performance.

SOPHISTICATED TOOLS FOR SIGNAL RECOVERY
F E M T O

FWPR-20-IN_R7/TH_JMa/06MAY2024

Datasheet

FWPR-20-IN

Femtowatt Photoreceiver with InGaAs-PIN Photodiode

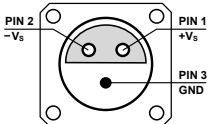
Available Version	FWPR-20-IN-FST	 Picture shows 1.035"-40 threaded flange with internally threaded coupler ring (outer diameter 30 mm) 1.035"-40 threaded flange for free space applications, compatible with many optical standard accessories and for use with various types of fiber connector adapters. Optionally available: Fiber adapters PRA-FC, PRA-FCA and PRA-FSMA. The coupling efficiency will depend on fiber type. With the relative large 0.5 mm dia. photodiode installed in the FWPR-20-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.
Related Model	FWPR-20-SI-FST	Si photodiode, $1.1 \times 1.1 \text{ mm}^2$, 320 - 1100 nm free space input, 1.035"-40 threaded flange
Available Accessories	PRA-FC PRA-FCA PRA-FSMA  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: $\pm 15 \text{ VDC}$	
Specifications	Test conditions $V_s = \pm 15 \text{ V}$, $T_A = 25^\circ \text{C}$, output load impedance $1 \text{ M}\Omega$, warm-up 20 minutes (min. 10 minutes recommended) Gain Transimpedance gain $1.0 \times 10^{11} \text{ V/A}$ (@ output load $\geq 100 \text{ k}\Omega$) Gain accuracy $\pm 1 \%$ (electrical) Conversion gain $0.95 \times 10^{11} \text{ V/W typ.}$ (@ 1550 nm, output load $\geq 100 \text{ k}\Omega$) Frequency Response Lower cut-off frequency DC Upper cut-off frequency (-3 dB) 20 Hz ($\pm 20 \%$) Time Response Rise/fall time (10 % – 90 %) 18 ms ($\pm 20 \%$) Input Noise equivalent power (NEP) $7.5 \text{ fW}/\sqrt{\text{Hz}}$ (@ 1550 nm, 1 Hz) Optical saturation power 110 pW (for linear amplification, @ 1550 nm) Detector Detector InGaAs-PIN photodiode Active area $\varnothing 0.5 \text{ mm}$ Spectral range 900 – 1700 nm Max. sensitivity 0.95 A/W typ. (@ 1550 nm)	

SOPHISTICATED TOOLS FOR SIGNAL RECOVERY

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FWPR-20-IN_R7/TH_JMa/06MAY2024

Datasheet
FWPR-20-IN
**Femtowatt Photoreceiver
with InGaAs-PIN Photodiode**

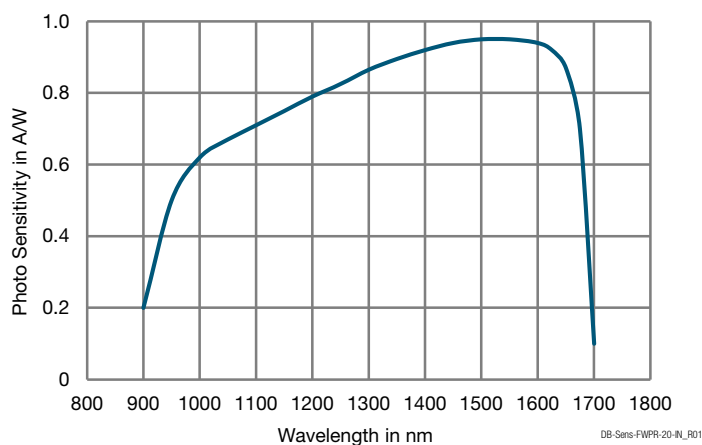
Specifications (continued)		
Output	Output voltage range Offset compensation range Output impedance Max. output current Output noise	–1.6 V ... +10 V (@ $\geq 100\text{ k}\Omega$ output load) $\pm 1.6\text{ V}$ typ. (adjustable by offset potentiometer) $50\ \Omega$ (terminate with $\geq 100\text{ k}\Omega$ load) 25 mA (short-circuit proof) 3 mV RMS (20 mV peak-peak) typ. (@ $\geq 100\text{ k}\Omega$ load, no signal on detector, measurement bandwidth 8 kHz)
Optical Input Connector	Material FST flange Material FST coupler ring	1.4305 stainless steel, nickel-plated 1.4305 stainless steel, glass bead blasted
Power Supply	Supply voltage Supply current	$\pm 15\text{ V}$ ($\pm 14.5\text{ V}$... $\pm 16.5\text{ V}$) $\pm 15\text{ mA}$ (depends on operating conditions, recommended power supply capability min. $\pm 50\text{ mA}$)
Case	Weight Material	203 g (0.45 lbs) incl. coupler ring AlMg3/4.5Mn, nickel-plated
Temperature Range	Storage temperature Operating temperature	$-30\text{ }^{\circ}\text{C}$... $+85\text{ }^{\circ}\text{C}$ $0\text{ }^{\circ}\text{C}$... $+60\text{ }^{\circ}\text{C}$
Absolute Maximum Ratings	Optical input power (CW) Power supply voltage	10 mW $\pm 20\text{ V}$
Connectors	Input Output Power supply	1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories BNC jack (female) 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	FWPR-20-IN-FST, internally threaded coupler ring, LEMO® 3-pin connector, datasheet, transport package	
Ordering Information	FWPR-20-IN-FST	1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories.

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FWPR-20-IN_R7/TH_JMa/06MAY2024

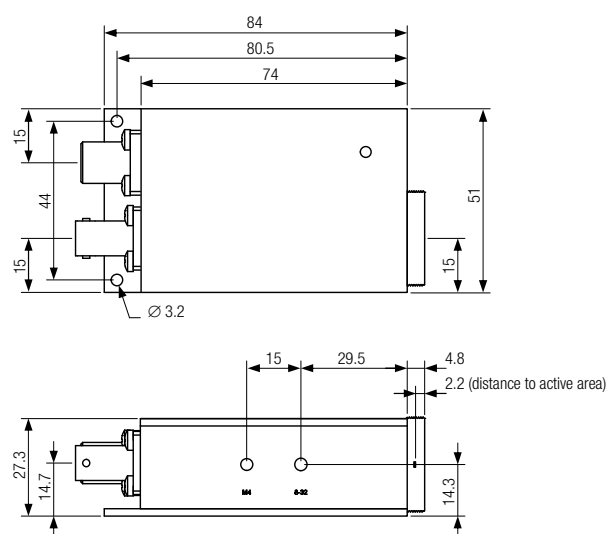
Datasheet
FWPR-20-IN
**Femtowatt Photoreceiver
with InGaAs-PIN Photodiode**

Spectral Response



Dimensions

FWPR-20-IN-FST (1.035"-40 threaded free space input)



all dimensions in mm unless otherwise noted

FWPR-20-IN-FST_R2

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