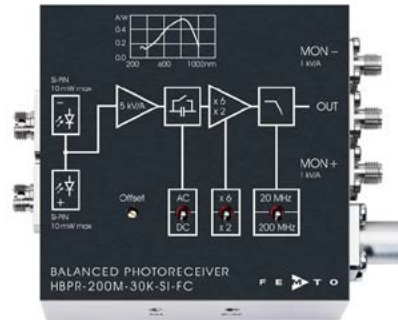


Datasheet

HBPR-200M-30K-SI-FC

High-Speed Balanced Photoreceiver



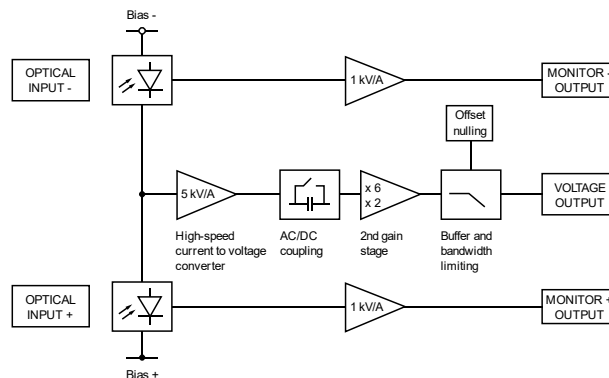
Features

- Bandwidth DC to 200 MHz
- Common-Mode Rejection Ratio (CMRR) 45 dB typ.
- Si-PIN photodiodes
- FC fiber optic inputs
- Spectral range 320 - 1000 nm
- Very low NEP, down to 7.8 pW/√Hz
- Transimpedance gain switchable 10 x 10³ V/A, 30 x 10³ V/A
- High dynamic input range up to 2 x 10 mW balanced optical power
- Fast monitor outputs with 10 MHz bandwidth and 1 x 10³ V/A gain
- Switchable low pass filter for minimizing wideband noise
- UNC 8-32 and M4 tapped holes for mounting on standard posts with metric and imperial thread

Applications

- Spectroscopy
- Heterodyne detection
- Optical coherence tomography (OCT)
- Optical delay measurement
- Differential optical front-end for oscilloscopes, spectrum analyzers, A/D converters and RF lock-in amplifiers

Block Diagram



SOPHISTICATED TOOLS FOR SIGNAL RECOVERY






HBPR-200M-30K-SI-FC_R2/TH/08APR2021

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HBPR-200M-30K-SI-FC

High-Speed Balanced Photoreceiver

<p>Available Input Version</p>	<p>HBPR-200M-30K-SI-FC</p>  <p>fix/permanent FC fiber connector for high coupling efficiency, excellent conversion gain accuracy and common mode rejection ratio (CMRR).</p>										
<p>Related Models</p>	<p>Various free space or fiber coupled HBPR models, with bandwidth up to 500 MHz, in the spectral range from 320 nm to 1700 nm are available.</p> <p>Example: FST input</p>  <p>1.035"-40 threaded flange for free space applications, compatible with many optical standard accessories.</p> <p>See further information and separate datasheets on www.femto.de</p>										
<p>Available Accessory</p>	<p>PS-15</p>  <p>power supply, input: 100 - 240 VAC, output: ± 15 VDC, +400/-250 mA</p>										
<p>Specifications</p>	<table border="0"> <tr> <td>Test conditions</td> <td>$V_s = \pm 15$ V, $T_a = 25$ °C, signal output terminated with 50 Ω, Monitor outputs terminated with 1 MΩ</td> </tr> <tr> <td>Gain</td> <td> <p>Transimpedance gain: 10 x 10³ V/A (2nd gain x2), 30 x 10³ V/A (2nd gain x6) switchable (@ 50 Ω load)</p> <p>Gain accuracy: ± 1 % electrical</p> <p>Conversion gain: 5.4 x 10³ V/W typ. (@ 2nd gain x2, 850 nm) 16.2 x 10³ V/W typ. (@ 2nd gain x6, 850 nm)</p> <p>Common mode rejection ratio (CMRR): 50 dB typ. (f \leq 100 MHz) 45 dB typ. (f \leq 200 MHz)</p> </td> </tr> <tr> <td>Frequency Response</td> <td> <p>Lower cut-off frequency: DC / 10 Hz, switchable</p> <p>Upper cut-off frequency: 200 MHz, switchable to 20 MHz</p> </td> </tr> <tr> <td>Time Response</td> <td>Rise/fall time (10 % - 90 %): 1.75 ns (@ 2nd gain x2); 1.85 ns (@ 2nd gain x6) 17.5 ns (low pass filter 20 MHz)</td> </tr> <tr> <td>Input</td> <td> <p>Noise equivalent power (NEP): minimum 7.8 pW/$\sqrt{\text{Hz}}$ (@ 850 nm) 8.8 pW/$\sqrt{\text{Hz}}$ (@ 850 nm, 20 MHz) 19.0 pW/$\sqrt{\text{Hz}}$ (@ 850 nm, 100 MHz) 33.0 pW/$\sqrt{\text{Hz}}$ (@ 850 nm, 200 MHz)</p> <p>Maximum differential CW power for linear amplification: 185 μW (@ 2nd gain x2, DC-coupled, 850 nm) 62 μW (@ 2nd gain x6, DC-coupled, 850 nm) 850 μW (@ AC-coupled, 850 nm)</p> <p>Max. optical CW balanced power (common mode power): 10 mW (on each photodiode, @ 850 nm)</p> <p>Monitor optical saturation power (limited by Maximum Rating): 12 mW (@ 850 nm)</p> </td> </tr> </table>	Test conditions	$V_s = \pm 15$ V, $T_a = 25$ °C, signal output terminated with 50 Ω , Monitor outputs terminated with 1 M Ω	Gain	<p>Transimpedance gain: 10 x 10³ V/A (2nd gain x2), 30 x 10³ V/A (2nd gain x6) switchable (@ 50 Ω load)</p> <p>Gain accuracy: ± 1 % electrical</p> <p>Conversion gain: 5.4 x 10³ V/W typ. (@ 2nd gain x2, 850 nm) 16.2 x 10³ V/W typ. (@ 2nd gain x6, 850 nm)</p> <p>Common mode rejection ratio (CMRR): 50 dB typ. (f \leq 100 MHz) 45 dB typ. (f \leq 200 MHz)</p>	Frequency Response	<p>Lower cut-off frequency: DC / 10 Hz, switchable</p> <p>Upper cut-off frequency: 200 MHz, switchable to 20 MHz</p>	Time Response	Rise/fall time (10 % - 90 %): 1.75 ns (@ 2 nd gain x2); 1.85 ns (@ 2 nd gain x6) 17.5 ns (low pass filter 20 MHz)	Input	<p>Noise equivalent power (NEP): minimum 7.8 pW/$\sqrt{\text{Hz}}$ (@ 850 nm) 8.8 pW/$\sqrt{\text{Hz}}$ (@ 850 nm, 20 MHz) 19.0 pW/$\sqrt{\text{Hz}}$ (@ 850 nm, 100 MHz) 33.0 pW/$\sqrt{\text{Hz}}$ (@ 850 nm, 200 MHz)</p> <p>Maximum differential CW power for linear amplification: 185 μW (@ 2nd gain x2, DC-coupled, 850 nm) 62 μW (@ 2nd gain x6, DC-coupled, 850 nm) 850 μW (@ AC-coupled, 850 nm)</p> <p>Max. optical CW balanced power (common mode power): 10 mW (on each photodiode, @ 850 nm)</p> <p>Monitor optical saturation power (limited by Maximum Rating): 12 mW (@ 850 nm)</p>
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SOPHISTICATED TOOLS FOR SIGNAL RECOVERY



Datasheet

HBPR-200M-30K-SI-FC

High-Speed Balanced Photoreceiver

Specifications (continued)

Detector	Detector	SI-PIN photodiode FC fiber connector	
	Active area	Ø 800 µm suitable for fibers up to 400 µm core diameter	
	Spectral range	320 - 1000 nm	
	Sensitivity	0.54 A/W typ. (@ 850 nm)	
Signal Output	Output voltage range	±1.0 V (@ 50 Ω load) for linear operation and low harmonic distortion	
	Max. output voltage	±2.0 V (@ 50 Ω load)	
	Offset voltage compensation	±100 mV typ., adjustable by offset potentiometer	
	Output impedance	50 Ω (terminate with 50 Ω load)	
	Slew rate	2800 V/µs	
	Max. output current	70 mA	
	Output return loss S22	-30 dB @ < 100 MHz -20 dB @ < 800 MHz	
	Output noise	2.2 mV _{RMS} (15 mV _{PP}) (@ 2 nd gain x2) 6.0 mV _{RMS} (40 mV _{PP}) (@ 2 nd gain x6) 0.3 mV _{RMS} (2.0 mV _{PP}) typ. (@ 2 nd gain x2, BW: 20 MHz) 0.8 mV _{RMS} (5.3 mV _{PP}) typ. (@ 2 nd gain x6, BW: 20 MHz) (@ 50 Ω load, no signal on detectors, measurement bandwidth 2 GHz)	
	Monitor Outputs	Monitor output gain	1 x 10 ³ V/A (@ ≥ 100 kΩ load)
		Monitor output voltage range	0 ... +10 V (@ ≥ 100 kΩ load)
Monitor output impedance		50 Ω (terminate with ≥ 100 kΩ load)	
Monitor output max. output current		30 mA typ.	
Monitor output bandwidth		DC ... 10 MHz	
Monitor output noise		0.6 mV _{RMS} (4 mV _{PP}) (@ 100 kΩ load, no signal on detectors, measurement bandwidth 200 MHz)	
Power Supply	Supply voltage	±15 V (±14.5 V ... ±16.5 V)	
	Supply current	-90 / +120 mA (depends on operating conditions, recommended power supply capability min. ±200 mA)	
Case	Weight	350 g (0.77 lbs)	
	Material	AlMg3Mn, nickel-plated	
Temperature Range	Storage temperature	-40 ... +85 °C	
	Operating temperature	0 ... +60 °C	
Absolute Maximum Ratings	Max. CW power (averaged)	12 mW (on each photodiode)	
	Power supply voltage	±20 V	

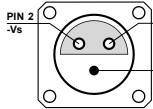
SOPHISTICATED TOOLS FOR SIGNAL RECOVERY



Datasheet

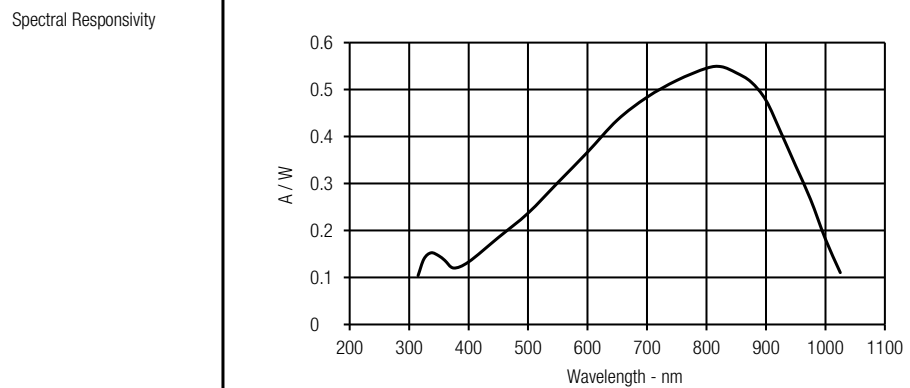
HBPR-200M-30K-SI-FC

High-Speed Balanced Photoreceiver

Connectors	Input	FC fiber optic connector (FC/PC and FC/APC compatible)					
	Output	SMA jack (female)					
Power supply		Lemo® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52)					
		 <table style="display: inline-table; vertical-align: middle;"> <tr> <td>Pin 1:</td> <td>+15 V</td> </tr> <tr> <td>Pin 2:</td> <td>-15 V</td> </tr> <tr> <td>Pin 3:</td> <td>GND</td> </tr> </table>	Pin 1:	+15 V	Pin 2:	-15 V	Pin 3:
Pin 1:	+15 V						
Pin 2:	-15 V						
Pin 3:	GND						

Scope of Delivery	HBPR-200M-30K-SI-FC, Lemo® 3-pin connector, 3 x adapter SMA (male) to BNC (female), datasheet	
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Ordering Information	HBPR-200M-30K-SI-FC	FC fiber optic connector (FC/PC and FC/APC compatible)
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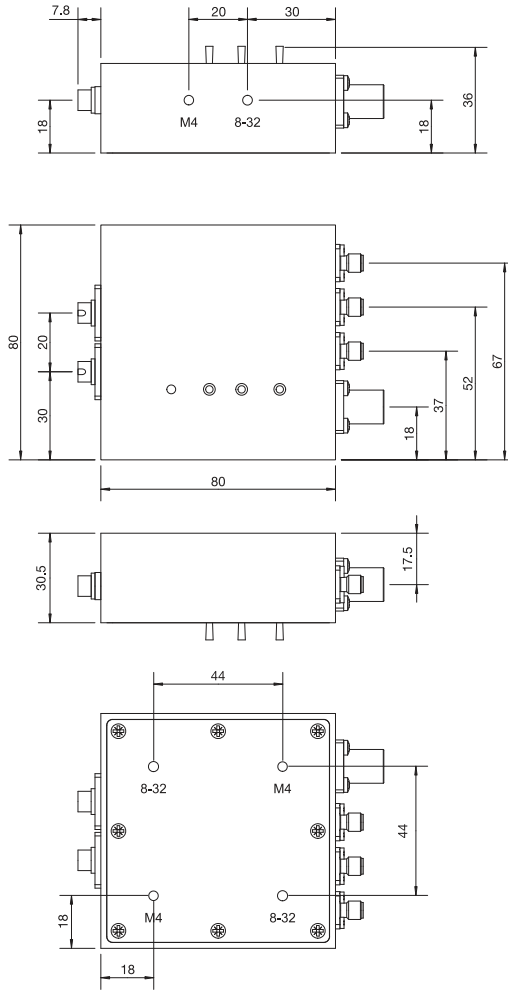
Datasheet

HBPR-200M-30K-SI-FC

High-Speed Balanced Photoreceiver

Dimensions

Case dimensions for HBPR-200M-30K-SI-FC:



All measures in mm unless otherwise noted.

The bottom plate may be rotated to match the appropriate mounting thread to the optical axis by unscrewing the 8 screws.

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