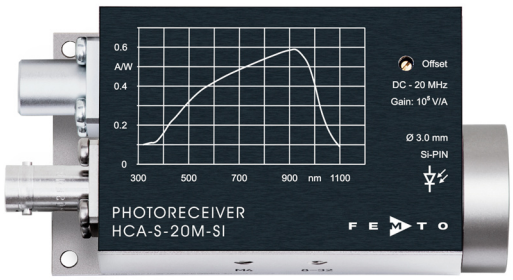
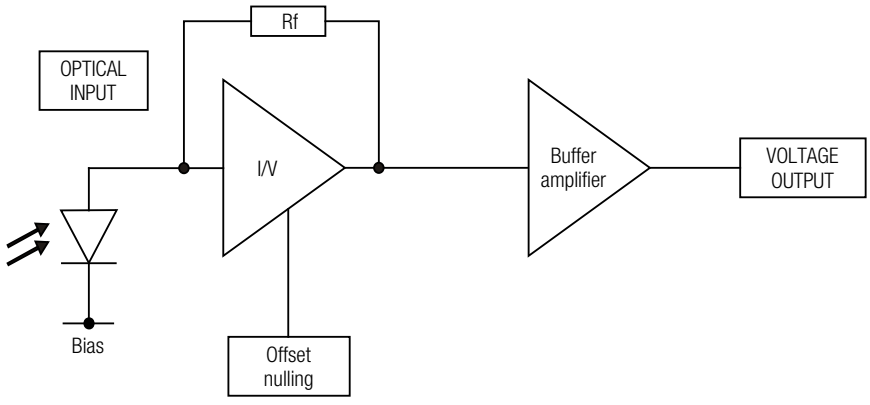
20 MHz Photoreceiver with Si-PIN Photodiode



Features	• **Si-PIN photodiode** • **Bandwidth DC – 20 MHz** • **Amplifier transimpedance gain 1.0 × 10^5 V/A** • **Max. conversion gain 5.9 × 10^4 V/W @ 920 nm** • **Spectral range 320 – 1060 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	• **Spectroscopy** • **Fast pulse and transient measurements** • **Optical triggering** • **Optical front-end for oscilloscopes, A/D converters and HF lock-in amplifiers**
Block Diagram	 BS01-HCA-S_R02
Intended Use	The HCA-S-20M-SI photoreceiver consists of an Si photodiode and a subsequent low-noise fixed gain transimpedance amplifier. It is designed for fast conversion of small optical signals 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.

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Available Versions	HCA-S-20M-SI-FST 	1.035"-40 threaded flange with internally threaded coupler ring (outer diameter 30 mm) for free space applications, compatible with many optical standard accessories Optionally available: Fiber adapters PRA-FC, PRA-FCA and PRA-FSMA, with the relative large 3.0 mm dia. photodiode installed in the HCA-S-20M-SI 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 Models	HCA-S-20M-BSI-FST	Black silicon photodiode, 1 × 1 mm, 200 – 1100 nm, free space input, 1.035"-40 threaded flange
	HCA-S-20M-IN-FST	InGaAs-PIN, ∅ 0.5 mm, 900 - 1700 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 (suitable for FST models only)
	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
	CAB-HF1 	Double shielded high performance cables, minimizes ground related noise, designed for precise measurement of small signals

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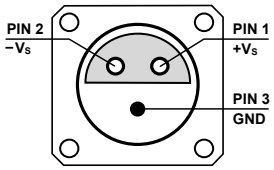
Specifications	Test conditions	$V_S = \pm 15$ V, $T_A = 25$ °C, output load impedance 50 Ω, warm-up 20 minutes (min. 10 minutes recommended)
Gain	Transimpedance gain	1.0×10^5 V/A (@ output load 50 Ω)
	Gain accuracy	±1 % (electrical)
	Conversion gain	5.9×10^4 V/W typ. (@ 920 nm, output load 50 Ω)
Frequency Response	Lower cut-off frequency	DC
	Upper cut-off frequency (–3 dB)	20 MHz (±15 %)
Time Response	Rise/fall time (10 % – 90 %)	19 ns (±15 %)
Input	Noise equivalent power (NEP)	4.5 pW/√Hz (@ 920 nm, 1 MHz)
	Optical saturation power	30 µW (for linear amplification, @ 920 nm)
	Input offset compensation range	±8.0 µA, adjustable by offset potentiometer
Detector	Detector	Si-PIN photodiode
	Active area	∅ 3 mm
	Spectral range	320 – 1060 nm
	Max. sensitivity	0.6 A/W typ. (@ 920 nm)
Output	Output voltage range	±1.5 V (@ 50 Ω output load) for linear operation and low harmonic distortion
	Max. output voltage range	±2 V (@ 50 Ω output load)
	Output impedance	50 Ω (terminate with 50 Ω load)
	Output noise	3.0 mV RMS (19.5 mV peak-peak) typ. (@ 50 Ω load, no signal on detector, measurement bandwidth 200 MHz)
Optical Input Connector	Material FST flange	1.4305 stainless steel, nickel-plated
	Material FST coupler ring	1.4305 stainless steel, glass bead blasted
Power Supply	Supply voltage	±15 V (±14.5 V ... ±16.5 V)
	Supply current	±50 mA (depends on operating conditions, recommended power supply capability min. ±150 mA)
Case	Weight	209 g (0.46 lbs) including coupler ring
	Material	AlMg4.5Mn, nickel-plated
Temperature Range	Storage temperature	–30 °C ... +85 °C
	Operating temperature	0 °C ... +60 °C
Absolute Maximum Ratings	Optical input power (CW)	6 mW
	Power supply voltage	±20 V
Connectors	Input	1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories
	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

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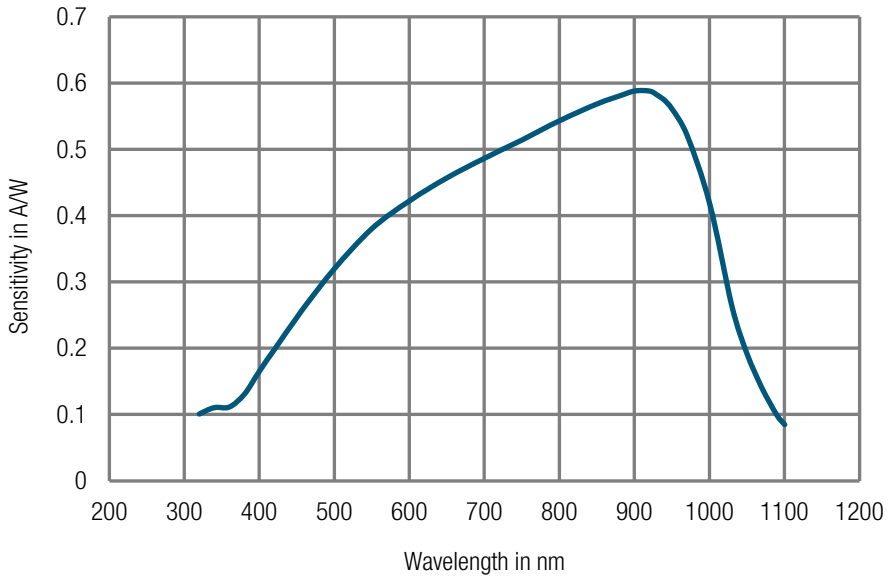
Scope of Delivery	HCA-S-20M-SI, internally threaded coupler ring, LEMO® 3-pin connector, datasheet, transport package
Spectral Response	

DB-Sens-HCA-S-20M-SI_R01

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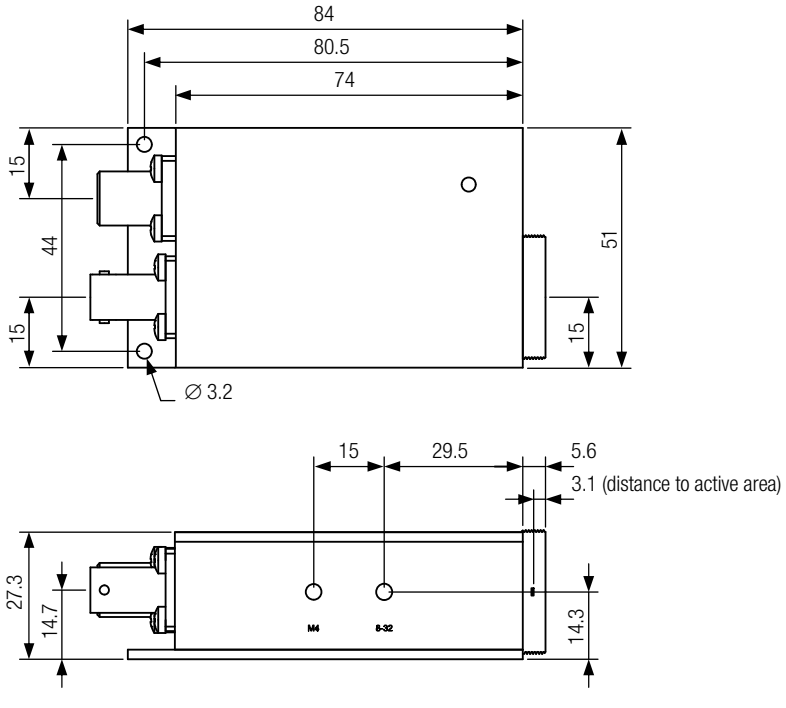
Dimensions

HCA-S-20M-SI-FST



all dimensions in mm unless otherwise noted

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