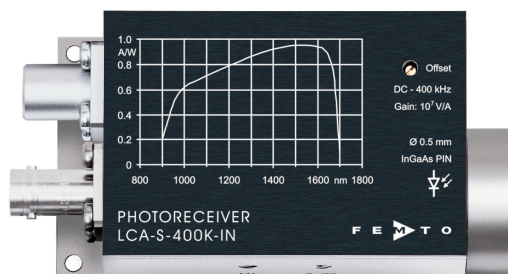


Low Noise 400 kHz Photoreceiver with InGaAs-PIN Photodiode



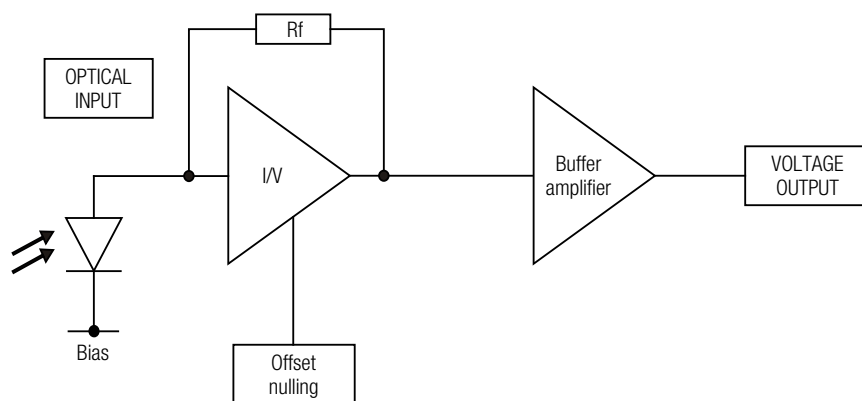
Features

- InGaAs-PIN photodiode, 0.5 mm active diameter
- Bandwidth DC – 400 kHz
- Amplifier transimpedance gain 1.0×10^7 V/A
- Max. conversion gain 9.5×10^6 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

- NIR Spectroscopy
- General purpose opto-electronic measurements
- Optical front-end for oscilloscopes, A/D converters and lock-in amplifiers

Block Diagram



BS01-LCA-S_R01





Intended Use

The LCA-S-400K-IN photoreceiver consists of an InGaAs-PIN 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.

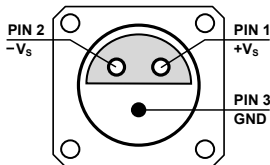
For safe operation, please refer to the damage thresholds specified in the "Absolute Maximum Ratings", "Temperature Range" and "Power Supply" sections of this document.

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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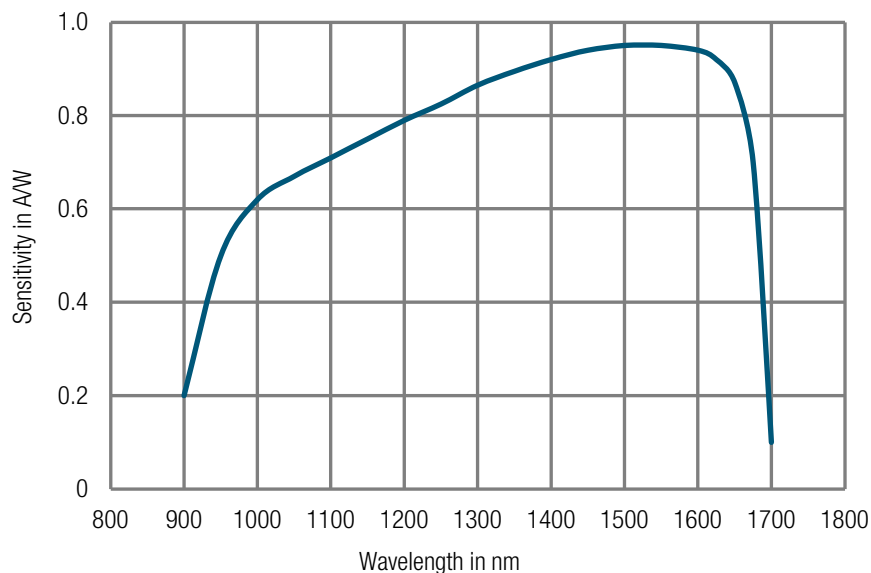
Available Version	<p>LCA-S-400K-IN-FST</p>  <p>1.035"-40 threaded flange with internally threaded coupler ring (outer diameter 30 mm) for free space applications, compatible with many optical standard accessories</p> <p>Optionally available: Fiber adapters PRA-FC, PRA-FCA and PRA-FSMA, with the relative large 0.5 mm dia. photodiode installed in the LCA-S-400K-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</p>												
Related Model	<p>LCA-S-400K-SI-FST</p> <p>Si-PIN, Ø 3 mm, 320 - 1060 nm free space input, 1.035"-40 threaded flange</p>												
Available Accessories	<div> <p>PRA-FC PRA-FCA PRA-FSMA</p>  <p>Fiber-adapter with external 1.035"-40 thread (suitable for FST models only)</p> </div> <div> <p>PRA-PAP</p>  <p>Alternative mounting option: post adapter plate, easy to mount on FEMTO photoreceiver series OE, FWPR, PWPR, HCA-S and LCA-S</p> </div> <div> <p>PS-15-25-L</p>  <p>Power Supply input: 100 – 240 VAC output: ±15 VDC</p> </div>												
Specifications	<table> <tr> <td>Test conditions</td><td>$V_s = \pm 15\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, output load impedance $1\text{ M}\Omega$, warm-up 20 minutes (min. 10 minutes recommended)</td></tr> <tr> <td>Gain</td><td> <p>Transimpedance gain $1.0 \times 10^7\text{ V/A}$ (@ output load $\geq 100\text{ k}\Omega$)</p> <p>Gain accuracy $\pm 1\%$ (electrical)</p> <p>Conversion gain $9.5 \times 10^6\text{ V/W typ.}$ (@ 1550 nm, output load $\geq 100\text{ k}\Omega$)</p> </td></tr> <tr> <td>Frequency Response</td><td> <p>Lower cut-off frequency DC</p> <p>Upper cut-off frequency (–3 dB) 400 kHz</p> <p>Gain flatness $\pm 0.5\text{ dB}$</p> </td></tr> <tr> <td>Time Response</td><td>Rise/fall time (10 % – 90 %) 1 μs</td></tr> <tr> <td>Input</td><td> <p>Noise equivalent power (NEP) 75 fW/$\sqrt{\text{Hz}}$ (@ 1550 nm, 10 kHz)</p> <p>Optical saturation power 1 μW (for linear amplification, @ 1550 nm)</p> <p>Input offset compensation range $\pm 300\text{ nA}$, adjustable by offset potentiometer</p> </td></tr> <tr> <td>Detector</td><td> <p>Detector InGaAs-PIN photodiode</p> <p>Active area Ø 0.5 mm</p> <p>Spectral range 900 – 1700 nm</p> <p>Max. sensitivity 0.95 A/W typ. (@ 1550 nm)</p> </td></tr> </table>	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)	Gain	<p>Transimpedance gain $1.0 \times 10^7\text{ V/A}$ (@ output load $\geq 100\text{ k}\Omega$)</p> <p>Gain accuracy $\pm 1\%$ (electrical)</p> <p>Conversion gain $9.5 \times 10^6\text{ V/W typ.}$ (@ 1550 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) 400 kHz</p> <p>Gain flatness $\pm 0.5\text{ dB}$</p>	Time Response	Rise/fall time (10 % – 90 %) 1 μs	Input	<p>Noise equivalent power (NEP) 75 fW/$\sqrt{\text{Hz}}$ (@ 1550 nm, 10 kHz)</p> <p>Optical saturation power 1 μW (for linear amplification, @ 1550 nm)</p> <p>Input offset compensation range $\pm 300\text{ nA}$, adjustable by offset potentiometer</p>	Detector	<p>Detector InGaAs-PIN photodiode</p> <p>Active area Ø 0.5 mm</p> <p>Spectral range 900 – 1700 nm</p> <p>Max. sensitivity 0.95 A/W typ. (@ 1550 nm)</p>
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Specifications (continued)		
Output	Output voltage range Output impedance Max. output current Output noise	–3 V ... +10 V (@ $\geq 100\text{ k}\Omega$ output load) 50 Ω (terminate with $\geq 100\text{ k}\Omega$ load) 30 mA (short-circuit proof) 2, mV RMS (15 mV peak-peak) typ. (@ $\geq 100\text{ k}\Omega$ load, no signal on detector, measurement bandwidth 1 MHz)
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	$\pm 15\text{ V}$ ($\pm 14.5\text{ V}$... $\pm 16.5\text{ V}$) $\pm 40\text{ mA}$ (depends on operating conditions, recommended power supply capability min. $\pm 150\text{ mA}$)
Case	Weight Material	212 g (0.47 lbs) LCA-S-400K-IN-FST incl. coupler ring AlMg4.5Mn, nickel-plated
Temperature Range	Storage temperature Operating temperature	–30 °C ... +85 °C 0 °C ... +60 °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)  <div> Pin 1: +15 V Pin 2: –15 V Pin 3: GND </div>
Scope of Delivery	LCA-S-400K-IN, internally threaded coupler ring, LEMO® 3-pin connector, datasheet, transport package	
Ordering Information	LCA-S-400K-IN-FST	1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories

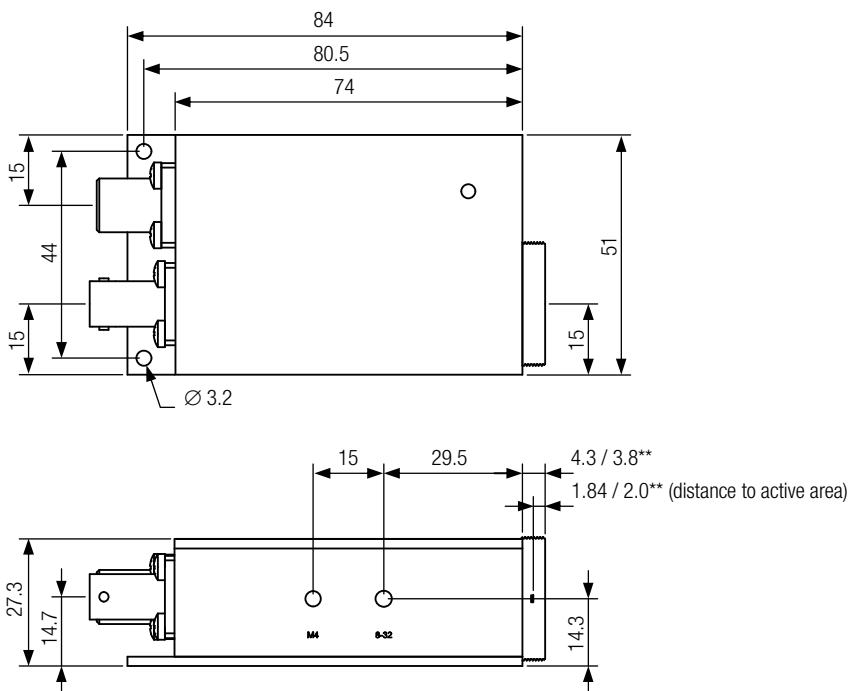
Low Noise 400 kHz Photoreceiver with InGaAs-PIN Photodiode

Spectral Responsivity



Dimensions

LCA-S-400K-IN-FST



** For serial number 08-121-080 and later

all dimensions in mm unless otherwise noted

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