

200 MHz Photoreceiver with InGaAs-PIN Photodiode



The picture shows model HCA-S-200M-IN-FS.
The photoreceiver will be delivered without post holder and post.

<p>Features</p>	<ul style="list-style-type: none"> • InGaAs-PIN photodiode • Bandwidth DC – 200 MHz • Amplifier transimpedance gain 2.0×10^4 V/A • Max. conversion gain 1.9×10^4 V/W @ 1550 nm • Spectral range 900 – 1700 nm • Free-space input 1.035"-40 threaded, alternatively 25 mm diameter unthreaded • Fiber optic input available as permanently mounted FC-input • UNC 8-32 and M4 tapped holes for mounting on standard posts with metric and imperial thread
<p>Applications</p>	<ul style="list-style-type: none"> • Spectroscopy • Fast pulse and transient measurements • Optical triggering • Optical front-end for oscilloscopes, A/D converters and HF lock-in amplifiers
<p>Block Diagram</p>	

BS01-HCA-S_R02

200 MHz Photoreceiver with InGaAs-PIN Photodiode

Available Versions

HCA-S-200M-IN-FST

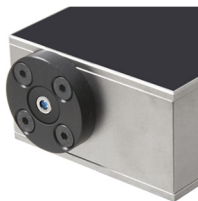
1.035"-40 threaded flange for free space applications. Compatible with many optical standard accessories.



Picture shows 1.035"-40 threaded flange with internally threaded coupler ring (outer diameter 30 mm)

HCA-S-200M-IN-FS

25 mm dia. unthreaded flange for free space applications. Compatible with many optical standard accessories.



Picture shows unthreaded flange with 25 mm diameter

HCA-S-200M-IN-FC

Fix/permanent FC fiber connector for high coupling efficiency and excellent conversion gain accuracy.



Related Models

HCA-S-200M-SI-FST

Si-PIN, Ø 0.8 mm, 320 – 1000 nm free space input, 1.035"-40 threaded flange

HCA-S-200M-SI-FS

Si-PIN, Ø 0.8 mm, 320 – 1000 nm free space input, 25 mm dia. unthreaded flange

HCA-S-200M-SI-FC

Si-PIN, Ø 0.8 mm, 320 – 1000 nm FC fiber connector (fix/permanent)

HCA-S-200M-SI-SMA

Si-PIN, Ø 0.8 mm, 320 – 1000 nm SMA fiber connector (fix/permanent)

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Available Accessories

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

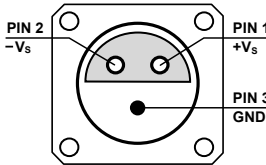


Power supply
Input: 100 – 240 VAC
Output: ±15 VDC

Specifications

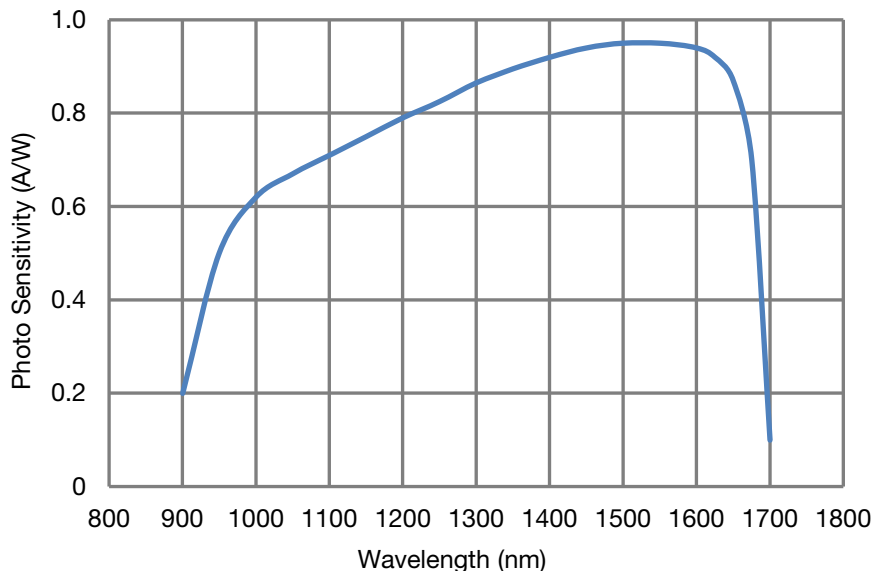
	Test conditions	$V_S = \pm 15\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, output load impedance $50\ \Omega$, warm-up 20 minutes (min. 10 minutes recommended)
Gain	Transimpedance gain Gain accuracy Conversion gain	$2.0 \times 10^4\text{ V/A}$ (@ output load $50\ \Omega$) $\pm 1\%$ (electrical) $1.9 \times 10^4\text{ V/W typ.}$ (@ 1550 nm, output load $50\ \Omega$)
Frequency Response	Lower cut-off frequency Upper cut-off frequency (–3 dB) Gain flatness	DC 200 MHz ($\pm 15\%$) $\pm 1\text{ dB}$
Time Response	Rise/fall time (10 % – 90 %)	1.8 ns
Input	Noise equivalent power (NEP) Optical saturation power Input offset compensation range	$5.2\text{ pW}/\sqrt{\text{Hz}}$ (@ 1550 nm, 10 MHz) 60 μW (for linear amplification, @ 1550 nm) $\pm 100\ \mu\text{A}$, adjustable by offset potentiometer
Detector	Detector Active area (FS/FST version) Active area (FC version) Spectral range Max. sensitivity	InGaAs-PIN photodiode $\varnothing 0.3\text{ mm}$ integrated ball lens suitable for fibers up to 62.5 μm core diameter 900 – 1700 nm 0.95 A/W typ. (@ 1550 nm)
Output	Output voltage range Max. output voltage range Output impedance Output noise	$\pm 1.2\text{ V}$ (@ $50\ \Omega$ output load) for linear operation and low harmonic distortion $\pm 1.7\text{ V}$ (@ $50\ \Omega$ output load) $50\ \Omega$ (terminate with $50\ \Omega$ load) $4.5\text{ mV}_{\text{RMS}}$ (30 mV_{PP}) typ. (@ $50\ \Omega$ load, no signal on detector, measurement bandwidth 500 MHz)
Input Flange	Material	1.4305 stainless steel, nickel-plated (FST flange) AlMg4.5Mn, nickel-plated (FS flange)
Coupler Ring (FST version only)	Material	1.4305 stainless steel, glass bead blasted
Power Supply	Supply voltage Supply current	$\pm 15\text{ V}$ ($\pm 14.5\text{ V} \dots \pm 16.5\text{ V}$) $\pm 60\text{ mA}$ (depends on operating conditions, recommended power supply capability min. $\pm 150\text{ mA}$)

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Specifications (continued)			
Case	Weight	209 g (0.46 lbs) HCA-S-200M-IN-FST incl. coupler ring 196 g (0.43 lbs) HCA-S-200M-IN-FS 188 g (0.41 lbs) HCA-S-200M-IN-FC	
	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)	10 mW	
	Power supply voltage	±20 V	
Connectors	Input	HCA-S-200M-IN-FST	1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories
		HCA-S-200M-IN-FS	25 mm dia. unthreaded flange for free space applications
		HCA-S-200M-IN-FC	FC fiber optic connector (fix/permanent, FC/PC and FC/APC compatible)
	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	HCA-S-200M-IN, internally threaded coupler ring (FST version only), LEMO® 3-pin connector, datasheet, transport package		
Ordering Information	HCA-S-200M-IN-FST	1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories.	
	HCA-S-200M-IN-FS	25 mm dia. unthreaded flange for free space applications.	
	HCA-S-200M-IN-FC	FC fiber optic connector (fix/permanent, FC/PC and FC/APC compatible).	

200 MHz Photoreceiver with InGaAs-PIN Photodiode

Spectral Responsivity

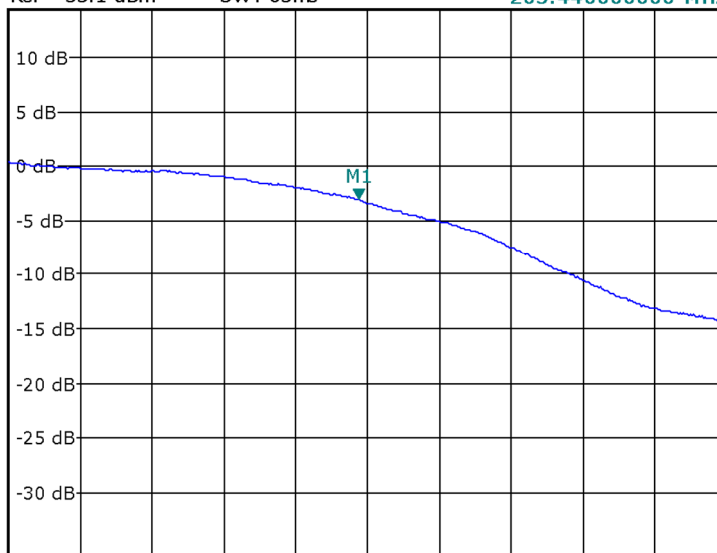


DB-Sens-HCA-S-200M-IN_R01

Typical Performance Characteristics

Frequency response

Offs -34.1 dB RBW 3 MHz
 Att 5 dB * VBW 10 kHz M1[1] -3.08 dB
 Ref -53.1 dBm SWT 65ms 205.44000000 MHz



Start 20.0 MHz Stop 400.0 MHz

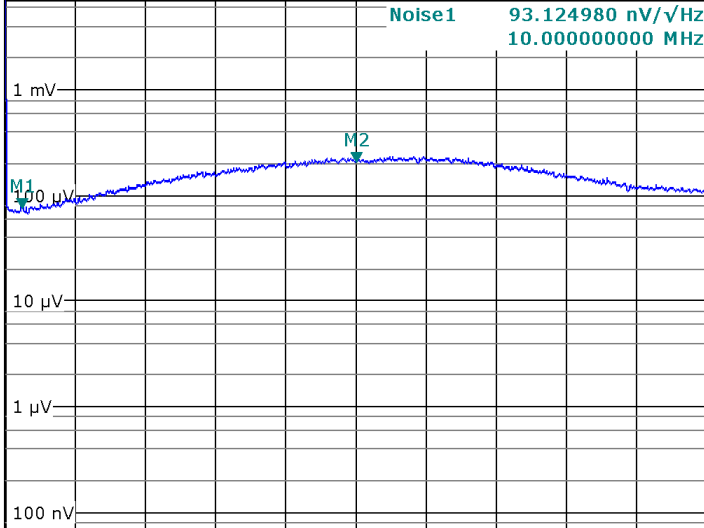
PD-HCA-S-200M-IN-bw_R01

200 MHz Photoreceiver with InGaAs-PIN Photodiode

Typical Performance Characteristics (continued)

Noise spectrum

Att 0 dB * RBW 1 MHz
 Ref 7.07 mV * VBW 1 kHz
 Noise2 274.681387 nV/√Hz
 200.00000000 MHz
 Noise1 93.124980 nV/√Hz
 10.00000000 MHz



CF 200.0 MHz Span 400.0 MHz

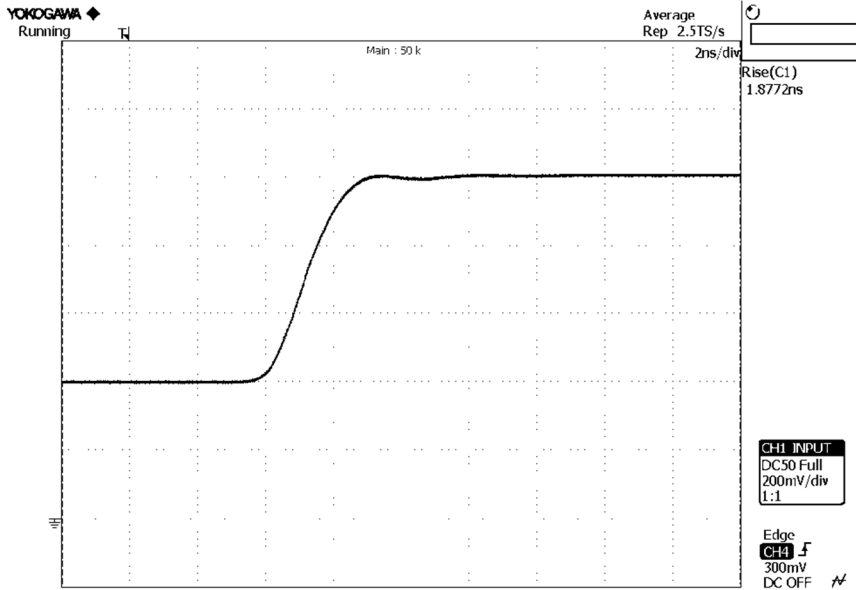
PD-HCA-S-200M-IN-noise_R01

Note: spectral noise data is measured at the amplifier output with no signal on the photodiode. To determine the spectral input noise divide the measured output noise by the amplifier conversion gain.

Conversion gain (V/W) = amplifier gain (V/A) × photo sensitivity (A/W).

Marker	frequency	output noise	resulting input noise (NEP)
1	10 MHz	93 nV/√Hz	4.9 pW/√Hz (@ 1550 nm)

Pulse response to square wave input signal (with 16 times averaging)

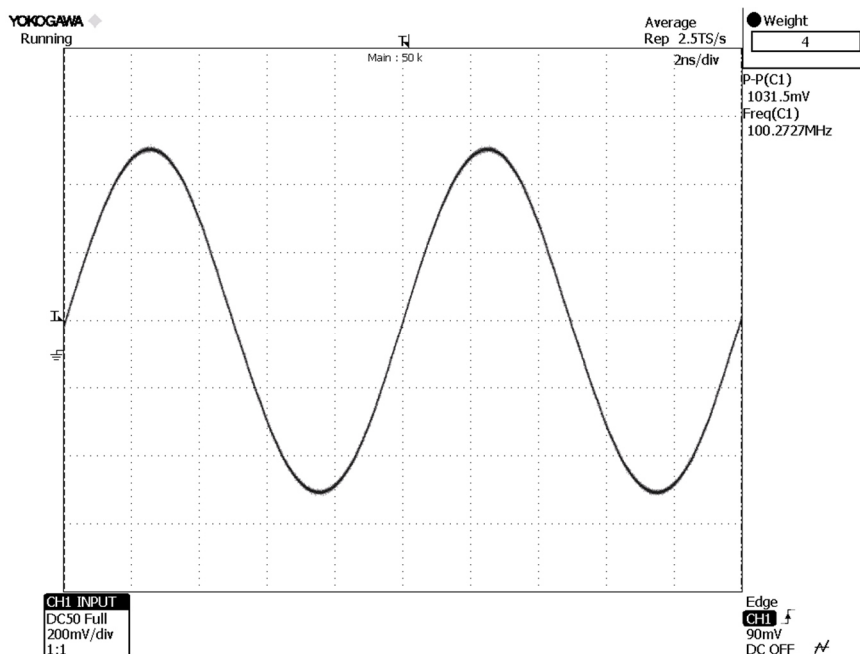


PD-HCA-S-200M-IN-pulse-2ns_R01

200 MHz Photoreceiver with InGaAs-PIN Photodiode

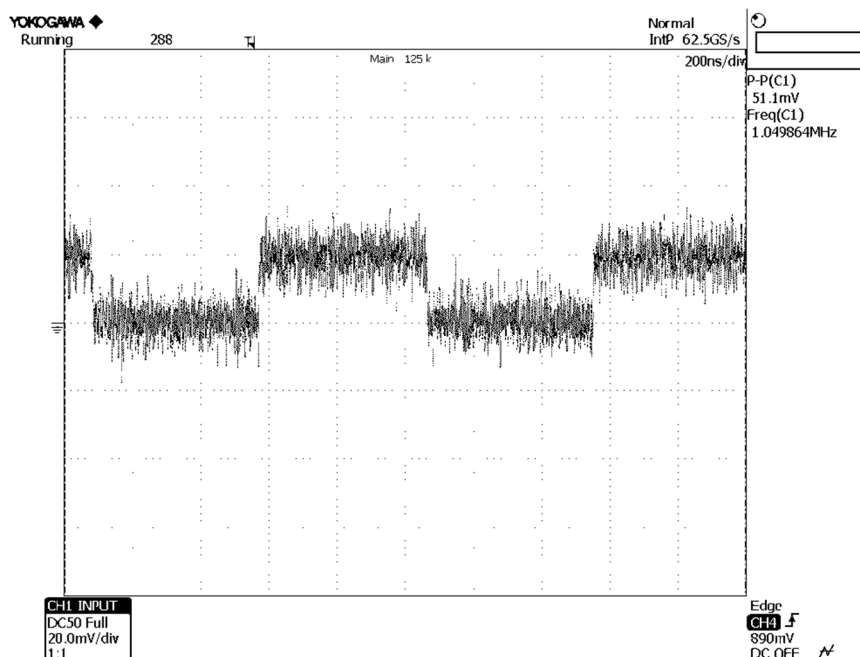
Typical Performance
Characteristics (continued)

Large signal response
output signal for 100 MHz, 55 μ W modulated optical input signal
(with 4 times averaging)



PD-HCA-S-200M-IN-large-sinus_R01

Small signal response
output signal for 1.2 μ W modulated optical input signal, 1 MHz square wave, without averaging

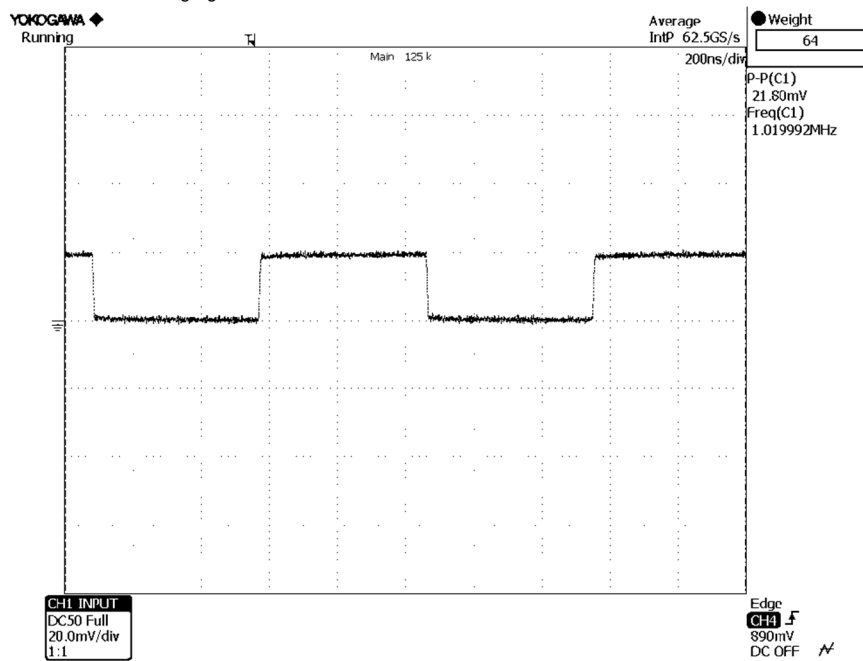


PD-HCA-S-200M-IN-noise-square_R01

200 MHz Photoreceiver with InGaAs-PIN Photodiode

Typical Performance
Characteristics (continued)

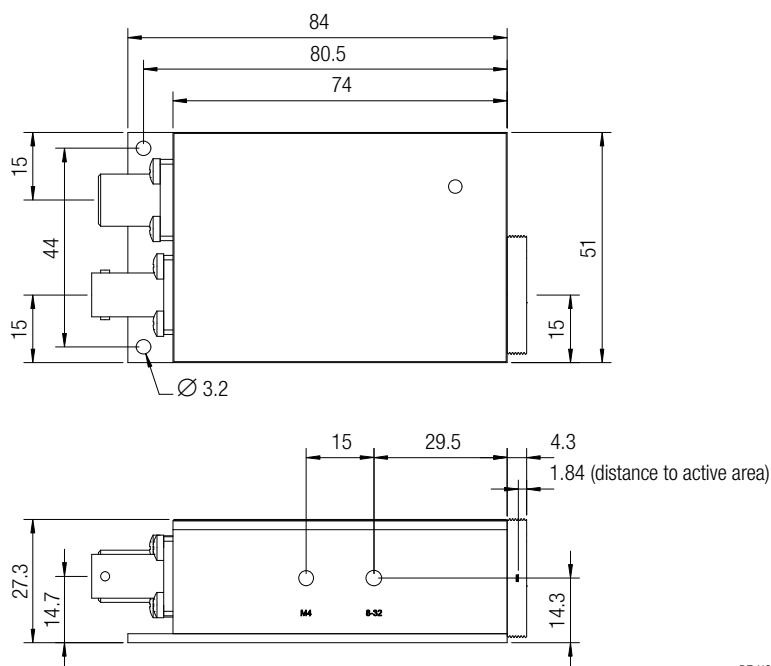
Small signal response
output signal for 1.2 μ W modulated optical input signal, 1 MHz square wave,
with 64 times averaging



PD-HCA-S-200M-IN-noise-square_average_R01

Dimensions

HCA-S-200M-IN-FST (1.035"-40 threaded free space input)



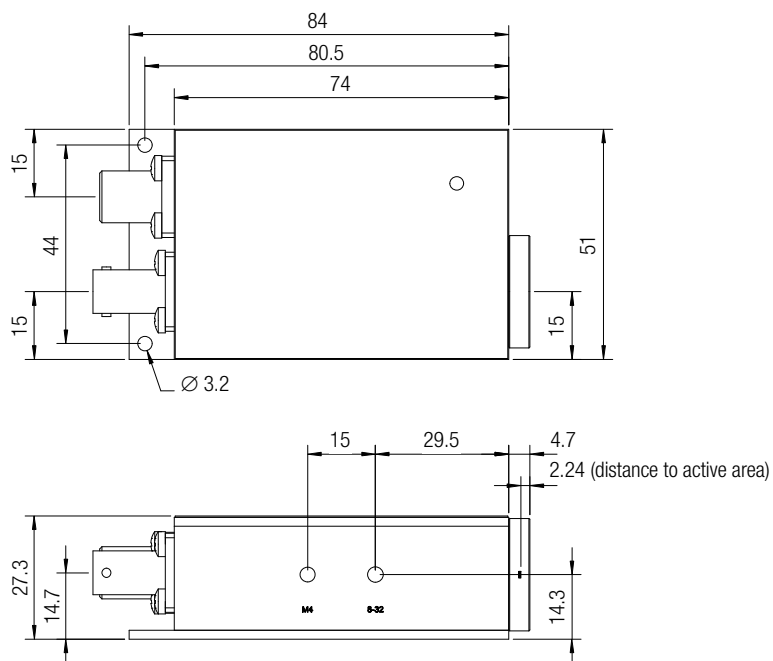
DZ-HCA-S-X00-IN_FST_R1

all dimensions in mm unless otherwise noted

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Dimensions (continued)

HCA-S-200M-IN-FS (25 mm dia. unthreaded free space input)



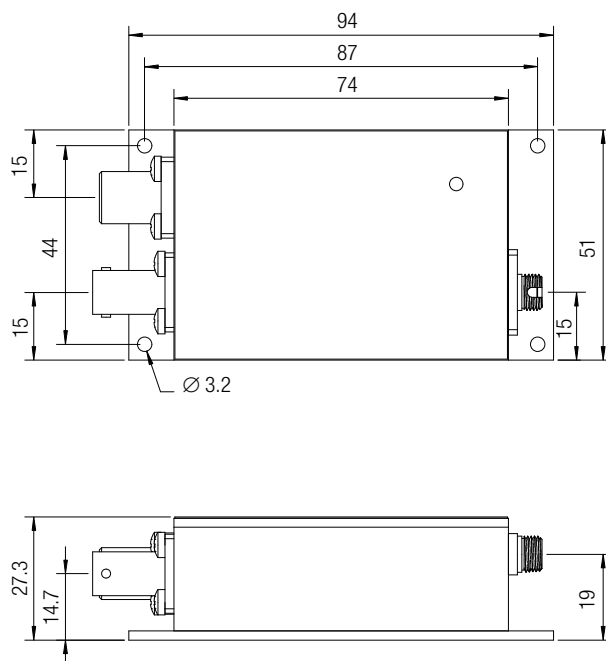
DZ-HCA-S-X00-IN_FS_R1

all dimensions in mm unless otherwise noted

200 MHz Photoreceiver with InGaAs-PIN Photodiode

Dimensions (continued)

HCA-S-200M-IN-FC (FC fiber optic connector)



DZ-HCA-S-XX-XX_FC_R1

all dimensions in mm unless otherwise noted

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