

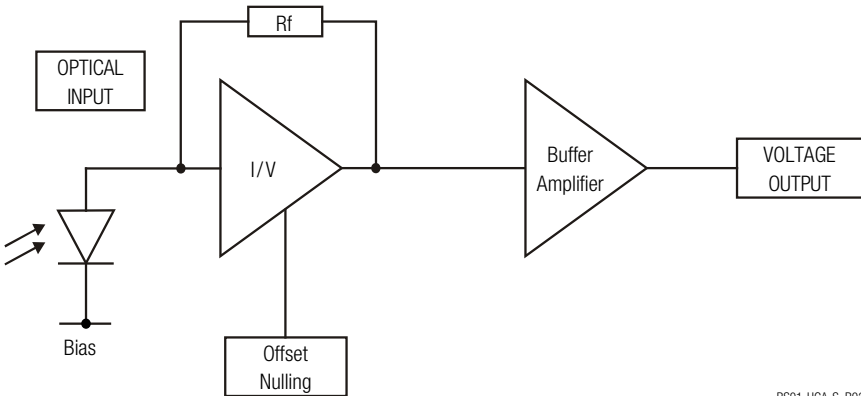
Datasheet

HCA-S-400M-SI

400 MHz Photoreceiver
with Si-PIN Photodiode



The picture shows model HCA-S-400M-SI-FS.
The photoreceiver will be delivered without post holder and post.

| | |
|---------------|--|
| Features | <ul style="list-style-type: none">• Si-PIN photodiode, 0.8 mm active diameter• Bandwidth DC – 400 MHz• Amplifier transimpedance gain 5.0×10^3 V/A• Max. conversion gain 2.7×10^3 V/W @ 800 nm• Spectral range 320 – 1000 nm• Free-space input 1.035"-40 threaded, alternatively 25 mm diameter unthreaded• Easily convertible to fiber optic input (FC and FSMA) with optionally available screw-on adapters• Fiber optic input also available as permanently mounted FC- or FSMA-input• UNC 8-32 and M4 tapped holes for mounting on standard posts with metric and imperial thread |
| Applications | <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 |
| Block Diagram |  <p>BS01-HCA-S_R02</p> |

400 MHz Photoreceiver with Si-PIN Photodiode

Available Versions

HCA-S-400M-SI-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.

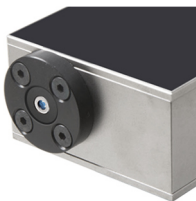
Optionally available:

Fiber adapters PRA-FC, PRA-FCA and PRA-FSMA.

The coupling efficiency will depend on fiber type.

With the relative large 0.8 mm dia. photodiode installed in the HCA-S-400M-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.

HCA-S-400M-SI-FS



Picture shows unthreaded flange with 25 mm diameter

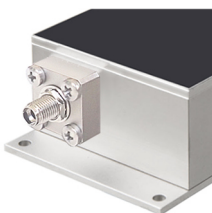
25 mm dia. unthreaded flange for free space applications. Compatible with many optical standard accessories.

HCA-S-400M-SI-FC






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

HCA-S-400M-SI-SMA

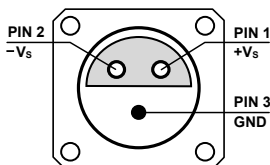


Fix/permanent FSMA fiber connector for high coupling efficiency and excellent conversion gain accuracy.

400 MHz Photoreceiver with Si-PIN Photodiode

| | |
|-----------------------|--|
| Related Models | <p>HCA-S-400M-IN-FST InGaAs-PIN, \varnothing 0.3 mm, 900 - 1700 nm free space input, 1.035"-40 threaded flange</p> <p>HCA-S-400M-IN-FS InGaAs-PIN, \varnothing 0.3 mm, 900 - 1700 nm free space input, 25 mm dia. unthreaded flange</p> <p>HCA-S-400M-IN-FC InGaAs-PIN, integrated ball lens, 900 - 1700 nm FC fiber connector (fix/permanent)</p> |
| Available Accessories | <p>PRA-FC PRA-FCA PRA-FSMA</p>  <p>Fiber-adapter with external 1.035"-40 thread (suitable for FST models only).</p> <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> <p>PS-15-25-L</p>  <p>Power supply Input: 100 – 240 VAC Output: ± 15 VDC</p> |
| Specifications | <p>Test conditions $V_S = \pm 15$ V, $T_A = 25$ °C, output load impedance 50 Ω, warm-up 20 minutes (min. 10 minutes recommended)</p> <p>Gain</p> <p>Transimpedance gain Gain accuracy Conversion gain</p> <p>5.0×10^3 V/A (@ output load 50 Ω) ± 1 % (electrical) 2.7×10^3 V/W typ. (@ 800 nm, output load 50 Ω)</p> <p>Frequency Response</p> <p>Lower cut-off frequency Upper cut-off frequency (–3 dB) Gain flatness</p> <p>DC 400 MHz (± 10 %) ± 1 dB</p> <p>Time Response</p> <p>Rise/fall time (10 % – 90 %)</p> <p>1.0 ns</p> <p>Input</p> <p>Noise equivalent power (NEP) Optical saturation power Input offset compensation range</p> <p>40 pW/$\sqrt{\text{Hz}}$ (@ 800 nm, 100 MHz) 400 μW (for linear amplification, @ 800 nm) ± 200 μA, adjustable by offset potentiometer</p> <p>Detector</p> <p>Detector Active area Spectral range Max. sensitivity</p> <p>Si-PIN photodiode \varnothing 0.8 mm 320 – 1000 nm 0.55 A/W typ. (@ 800 nm)</p> |

400 MHz Photoreceiver with Si-PIN Photodiode

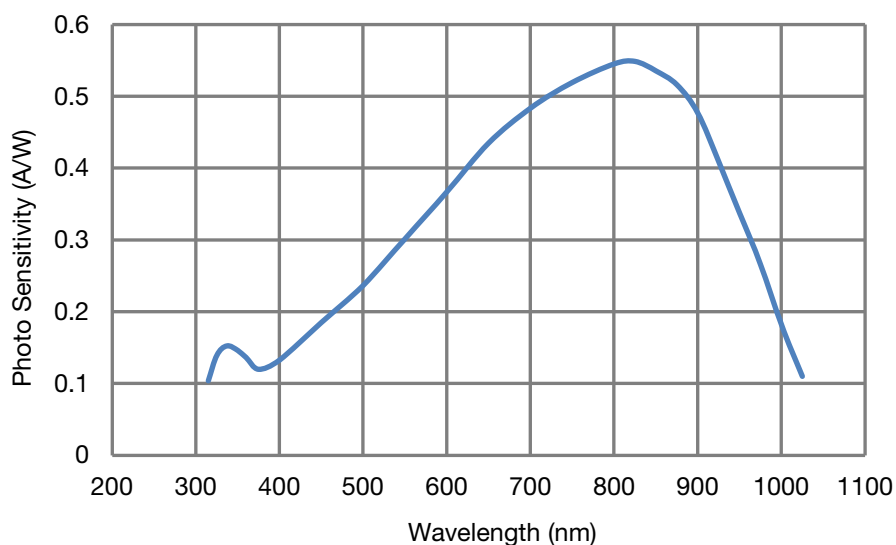
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|------------------------------------|---|---|--|
| Specifications (continued) | | | |
| Output | Output voltage range | $\pm 1.0\text{ V}$ (@ $50\ \Omega$ output load) for linear operation and low harmonic distortion | |
| | Max. output voltage range | $\pm 1.5\text{ V}$ (@ $50\ \Omega$ load) | |
| | Output impedance | $50\ \Omega$ (terminate with $50\ \Omega$ load) | |
| | Output noise | 3 mV_{RMS} (20 mV_{PP}) typ. (@ $50\ \Omega$ load, no signal on detector, measurement bandwidth 1.5 GHz) | |
| 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 | $\pm 15\text{ V}$ ($\pm 14.5\text{ V} \dots \pm 16.5\text{ V}$) | |
| | Supply current | $\pm 55\text{ mA}$ (depends on operating conditions, recommended power supply capability min. $\pm 150\text{ mA}$) | |
| Case | Weight | 209 g (0.46 lbs) HCA-S-400M-SI-FST incl. coupler ring 196 g (0.43 lbs) HCA-S-400M-SI-FS 188 g (0.41 lbs) HCA-S-400M-SI-FC 200 g (0.44 lbs) HCA-S-400M-SI-SMA | |
| | Material | AlMg4.5Mn, nickel-plated | |
| Temperature Range | Storage temperature | $-30\text{ }^{\circ}\text{C} \dots +85\text{ }^{\circ}\text{C}$ | |
| | Operating temperature | $0\text{ }^{\circ}\text{C} \dots +60\text{ }^{\circ}\text{C}$ | |
| Absolute Maximum Ratings | Optical input power (CW) | 20 mW | |
| | Power supply voltage | $\pm 20\text{ V}$ | |
| Connectors | Input | HCA-S-400M-SI-FST | 1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories |
| | | HCA-S-400M-SI-FS | 25 mm dia. unthreaded flange for free space applications |
| | | HCA-S-400M-SI-FC | FC fiber optic connector (fix/permanent, FC/PC and FC/APC compatible) |
| | | HCA-S-400M-SI-SMA | FSMA fiber optic connector (fix/permanent) |
| | Output | BNC jack (female) | |
| | Power supply | LEMO® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52) | |
| |  | | |
| | Pin 1: $+V_s$ Pin 2: $-V_s$ Pin 3: GND | | |
| Scope of Delivery | HCA-S-400M-SI, internally threaded coupler ring (FST version only), LEMO® 3-pin connector, datasheet, transport package | | |

400 MHz Photoreceiver with Si-PIN Photodiode

Ordering Information

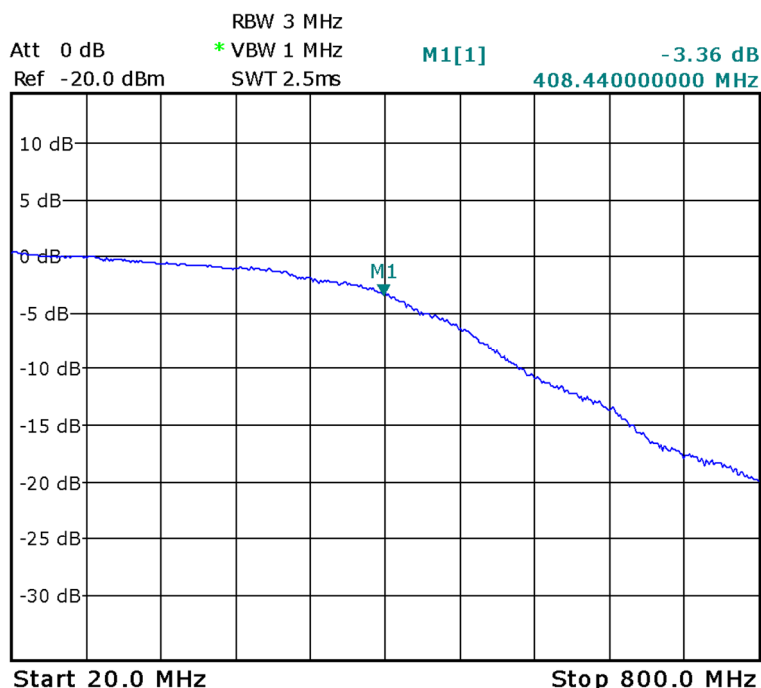
| | |
|-------------------|---|
| HCA-S-400M-SI-FST | 1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories. |
| HCA-S-400M-SI-FS | 25 mm dia. unthreaded flange for free space applications. |
| HCA-S-400M-SI-FC | FC fiber optic connector (fix/permanent, FC/PC and FC/APC compatible). |
| HCA-S-400M-SI-SMA | FSMA fiber optic connector (fix/permanent). |

Spectral Responsivity



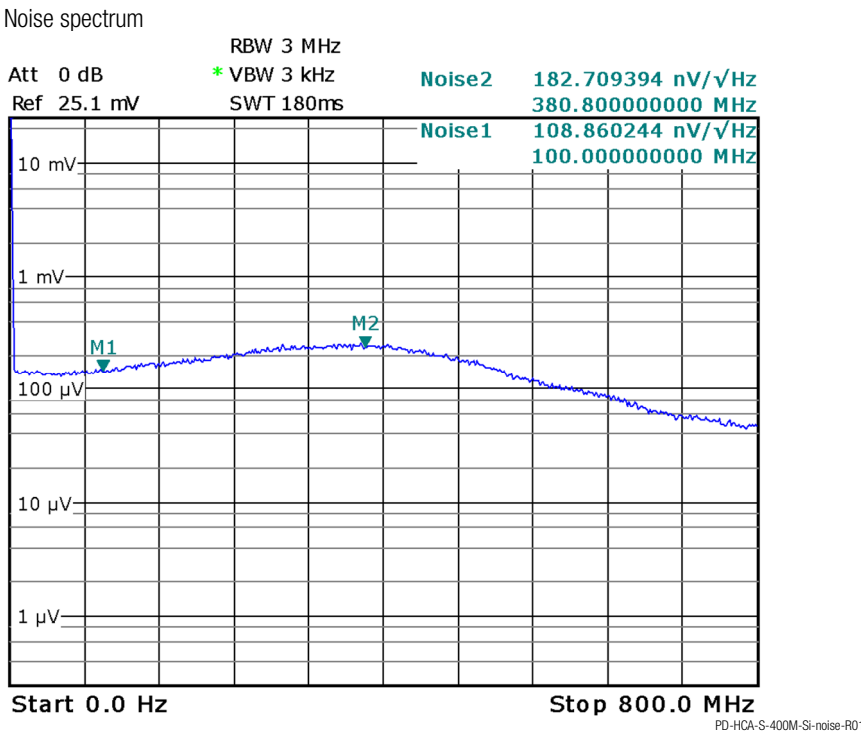
Typical Performance Characteristics

Frequency response



400 MHz Photoreceiver
with Si-PIN Photodiode

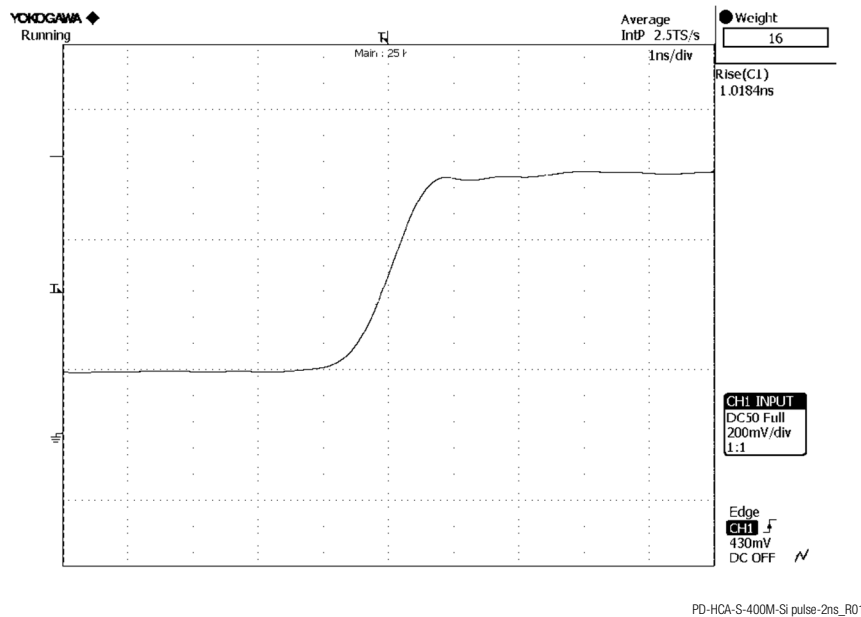
Typical Performance
Characteristics (continued)



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 | 100 MHz | 109 nV/√Hz | 40 pW/√Hz (@ 800 nm) |

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

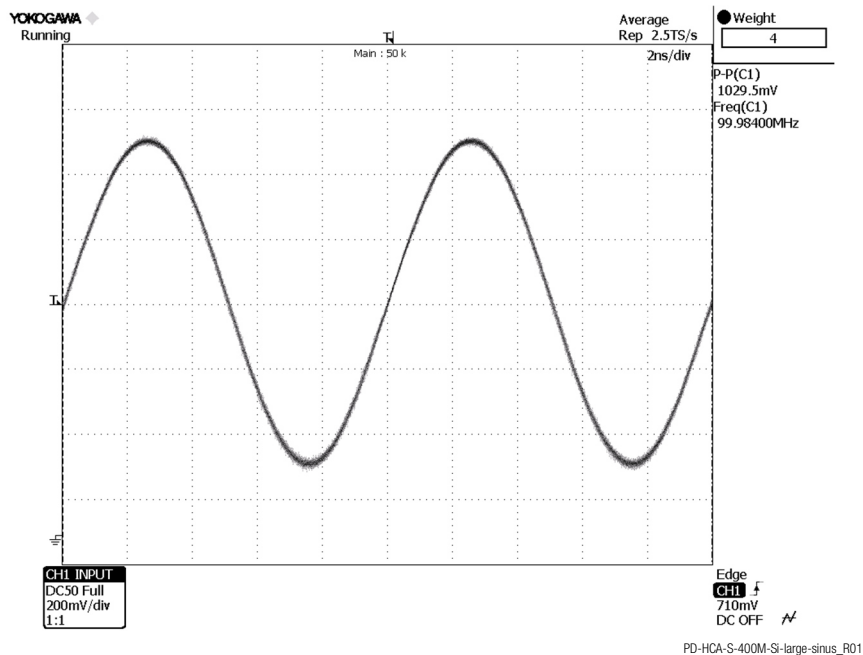


PD-HCA-S-400M-SI pulse-2ns_R01

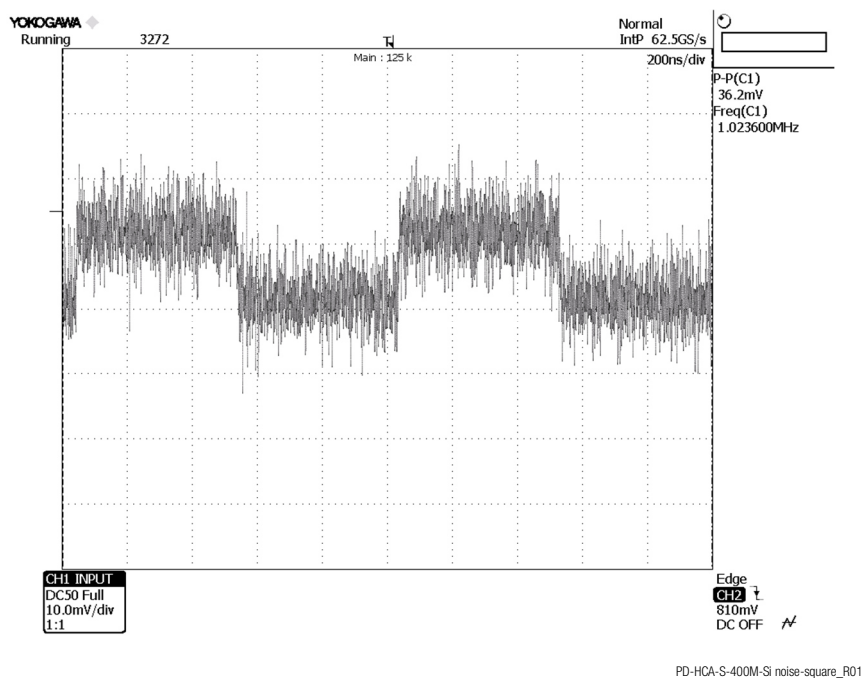
400 MHz Photoreceiver with Si-PIN Photodiode

Typical Performance
Characteristics (continued)

Large signal response
output signal for 100 MHz, 370 μ W modulated optical input signal
(with 4 times averaging)



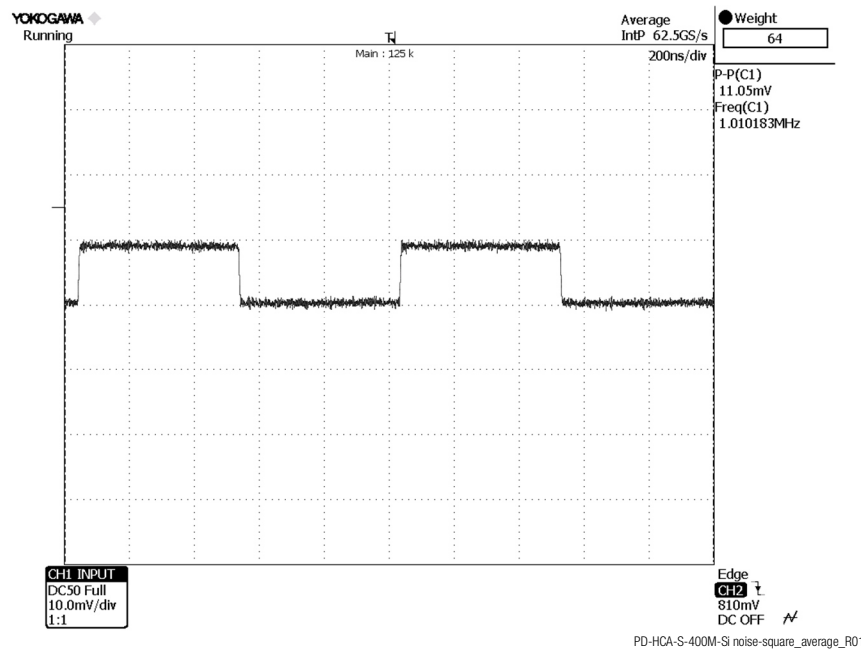
Small signal response
output signal for 3.7 μ W modulated optical input signal, 1 MHz square wave, without averaging



400 MHz Photoreceiver
with Si-PIN Photodiode

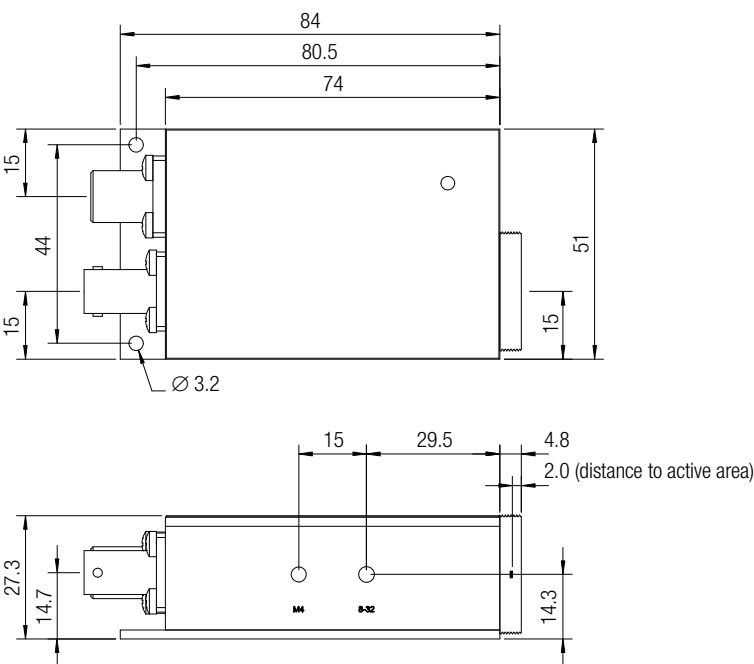
Typical Performance
Characteristics (continued)

Small signal response
output signal for 3.7 μ W modulated optical input signal, 1 MHz square wave,
with 64 times averaging



Dimensions

HCA-S-400M-SI-FST (1.035"-40 threaded free space input)



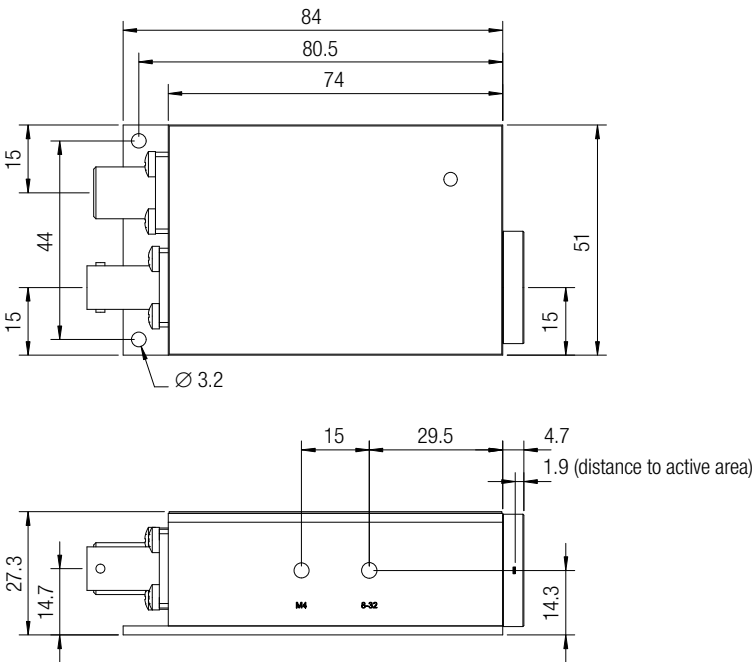
DZ-HCA-S-X00-SI_FST_R1

all dimensions in mm unless otherwise noted

400 MHz Photoreceiver
with Si-PIN Photodiode

Dimensions (continued)

HCA-S-400M-SI-FS (25 mm dia. unthreaded free space input)



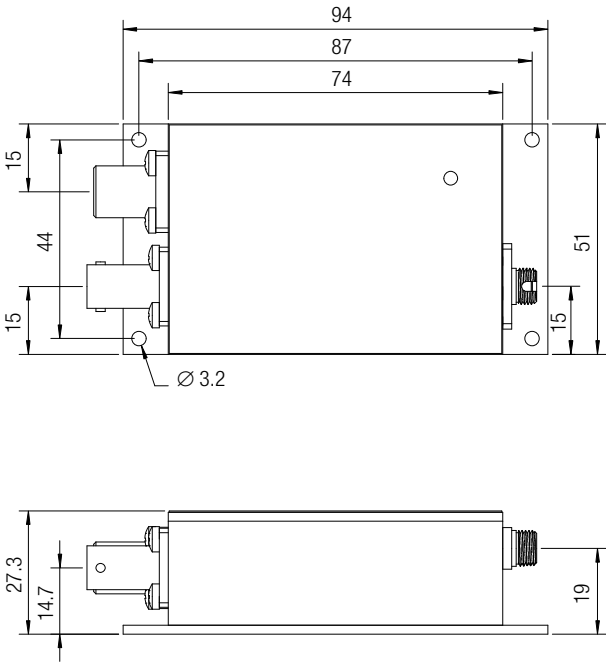
DZ-HCA-S-X00-SI_FS_R1

all dimensions in mm unless otherwise noted

400 MHz Photoreceiver
with Si-PIN Photodiode

Dimensions (continued)

HCA-S-400M-SI-FC (FC fiber optic connector)



DZ-HCA-S-XX-XX_FC_R1

all dimensions in mm unless otherwise noted

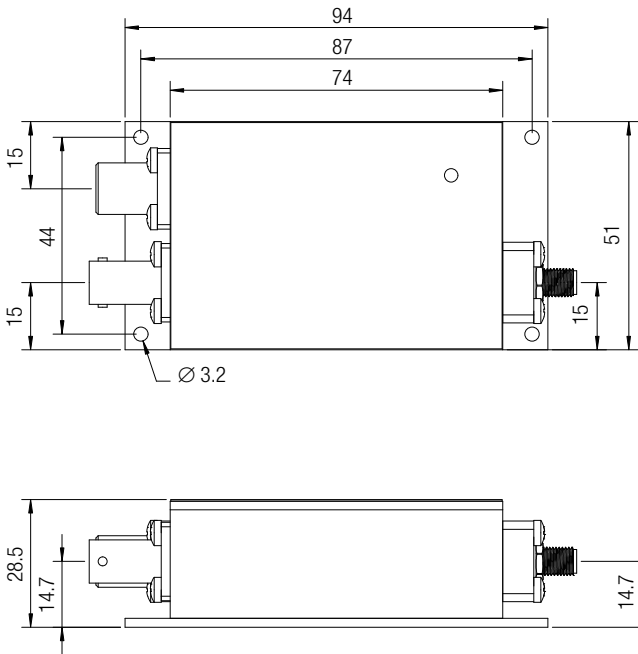
Datasheet

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400 MHz Photoreceiver
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Dimensions (continued)

HCA-S-400M-SI-SMA (FSMA fiber optic connector)



DZ-HCA-S-XX-XX_SMA_R1

all dimensions in mm unless otherwise noted

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