

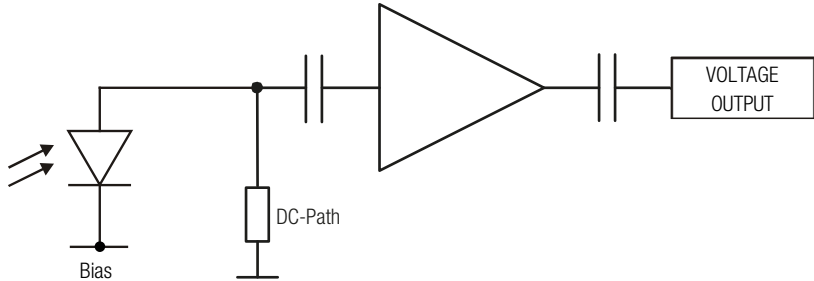
Datasheet

HSA-X-S-1G4-SI

Ultra High Speed Photoreceiver
with Si-PIN Photodiode



The picture shows model HSA-X-S-1G4-SI-FS.
The photoreceiver will be delivered without post holder and post.

Features	<ul style="list-style-type: none">• Si-PIN photodiode• Bandwidth 10 kHz – 1.4 GHz• Amplifier transimpedance gain 5.0×10^3 V/A• Max. conversion gain 2.55×10^3 V/W @ 760 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• 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• Ultra-fast pulse and transient measurements• Optical triggering• Optical front-end for oscilloscopes and ultra-fast A/D converters
Block Diagram	 <p>The block diagram shows the internal circuit of the photoreceiver. It starts with a photodiode (represented by a triangle with two arrows) connected to a bias voltage (Bias). The output of the photodiode is connected to a DC-Path (represented by a rectangle). The DC-Path is connected to an amplifier (represented by a triangle). The output of the amplifier is connected to a voltage output (represented by a rectangle labeled VOLTAGE OUTPUT).</p> <p>BS01-HSA-X-S_R01</p>

Ultra High Speed Photoreceiver with Si-PIN Photodiode

Available Versions

HSA-X-S-1G4-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 0.4 mm dia. photodiode installed in the HSA-X-S-1G4-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.

HSA-X-S-1G4-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.

HSA-X-S-1G4-SI-FC



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

Related Models

HSPR-X-I-1G4-SI-FST

Si-PIN, \varnothing 0.4 mm, 320 – 1000 nm, inverting output free space input, 1.035"-40 threaded flange

HSPR-X-I-1G4-SI-FS

Si-PIN, \varnothing 0.4 mm, 320 – 1000 nm, inverting output free space input, 25 mm dia. unthreaded flange

HSPR-X-I-1G4-SI-FC

Si-PIN, integrated ball lens, 320 – 1000 nm, inverting output, FC fiber connector (fix/permanent)

HSA-X-2G-IN-FST

InGaAs-PIN, \varnothing 0.1 mm, 900 – 1700 nm free space input, 1.035"-40 threaded flange



HSA-X-2G-IN-FS

InGaAs-PIN, \varnothing 0.1 mm, 900 – 1700 nm free space input, 25 mm dia. unthreaded flange

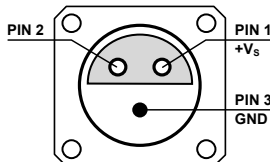
HSA-X-2G-IN-FC

InGaAs-PIN, integrated ball lens, 900 – 1700 nm FC fiber connector (fix/permanent)

Ultra High Speed Photoreceiver with Si-PIN Photodiode

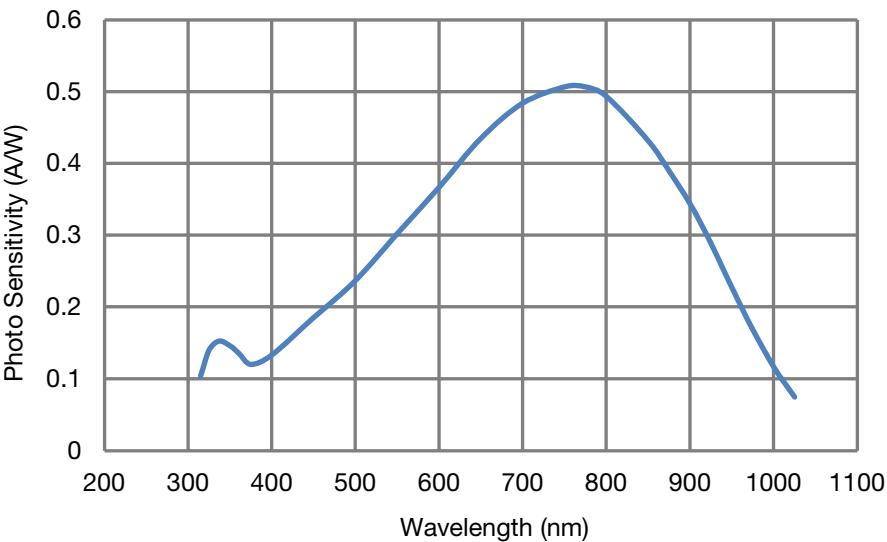
Related Models (continued)	<div>HSPR-X-I-2G-IN-FST</div> <div>InGaAs-PIN, \varnothing 0.1 mm, 900 – 1700 nm, inverting output free space input, 1.035"-40 threaded flange</div> <div>HSPR-X-I-2G-IN-FS</div> <div>InGaAs-PIN, \varnothing 0.1 mm, 900 – 1700 nm, inverting output free space input, 25 mm dia. unthreaded flange</div> <div>HSPR-X-I-2G-IN-FC</div> <div>InGaAs-PIN, integrated ball lens, 900 – 1700 nm, inverting output, FC fiber connector (fix/permanent)</div>																
Available Accessories	<div><div>PRA-FC PRA-FCA PRA-FSMA</div><div></div><div>Fiber-adaptor with external 1.035"-40 thread (suitable for FST models only).</div></div> <div><div>PS-15-25-L</div><div></div><div>Power supply Input: 100 – 240 VAC Output: ± 15 VDC</div></div>																
Specifications	<table><tr><td>Test conditions</td><td>$V_S = +15$ V, $T_A = 25$ °C, output load impedance 50 Ω, warm-up 20 minutes (min. 10 minutes recommended)</td></tr><tr><td>Gain</td><td><div>Transimpedance gain</div><div>Conversion gain</div><div>5.0×10^3 V/A (@ output load 50 Ω)</div><div>2.55×10^3 V/W typ. (@ 760 nm, output load 50 Ω)</div></td></tr><tr><td>Frequency Response</td><td><div>Lower cut-off frequency (–3 dB)</div><div>Upper cut-off frequency (–3 dB)</div><div>10 kHz</div><div>1.4 GHz ($\pm 15\%$)</div></td></tr><tr><td>Time Response</td><td><div>Rise/fall time (10 % – 90 %)</div><div>250 ps ($\pm 15\%$)</div></td></tr><tr><td>Input</td><td><div>Noise equivalent power (NEP)</div><div>Optical saturation power</div><div>32 pW/$\sqrt{\text{Hz}}$ (@ 760 nm, 100 MHz)</div><div>370 μW AC (for linear amplification, @ 760 nm)</div><div>10 mW CW (to prevent saturation, @ 760 nm)</div></td></tr><tr><td>Detector</td><td><div>Detector</div><div>Active area (FS/FST version)</div><div>Active area (FC version)</div><div>Si-PIN photodiode</div><div>\varnothing 400 μm</div><div>integrated ball lens</div><div>suitable for fibers up to 400 μm core diameter</div></td></tr><tr><td></td><td><div>Spectral range</div><div>Max. sensitivity</div><div>320 – 1000 nm</div><div>0.51 A/W typ. (@ 760 nm)</div></td></tr><tr><td>Output</td><td><div>Output voltage range</div><div>Output VSWR</div><div>Output return loss</div><div>Output impedance</div><div>Output noise</div><div>1.9 V_{PP} (@ 50 Ω output load) for linear operation and low harmonic distortion</div><div>2.5:1 (@ $f < 2.5$ GHz)</div><div>7.3 dB (@ $f < 2.5$ GHz)</div><div>50 Ω (terminate with 50 Ω load)</div><div>3.6 mV_{RMS} (24 mV_{PP}) typ. (@ 50 Ω load, no signal on detector, measurement bandwidth 4 GHz)</div></td></tr></table>	Test conditions	$V_S = +15$ V, $T_A = 25$ °C, output load impedance 50 Ω , warm-up 20 minutes (min. 10 minutes recommended)	Gain	<div>Transimpedance gain</div> <div>Conversion gain</div> <div>5.0×10^3 V/A (@ output load 50 Ω)</div> <div>2.55×10^3 V/W typ. (@ 760 nm, output load 50 Ω)</div>	Frequency Response	<div>Lower cut-off frequency (–3 dB)</div> <div>Upper cut-off frequency (–3 dB)</div> <div>10 kHz</div> <div>1.4 GHz ($\pm 15\%$)</div>	Time Response	<div>Rise/fall time (10 % – 90 %)</div> <div>250 ps ($\pm 15\%$)</div>	Input	<div>Noise equivalent power (NEP)</div> <div>Optical saturation power</div> <div>32 pW/$\sqrt{\text{Hz}}$ (@ 760 nm, 100 MHz)</div> <div>370 μW AC (for linear amplification, @ 760 nm)</div> <div>10 mW CW (to prevent saturation, @ 760 nm)</div>	Detector	<div>Detector</div> <div>Active area (FS/FST version)</div> <div>Active area (FC version)</div> <div>Si-PIN photodiode</div> <div>\varnothing 400 μm</div> <div>integrated ball lens</div> <div>suitable for fibers up to 400 μm core diameter</div>		<div>Spectral range</div> <div>Max. sensitivity</div> <div>320 – 1000 nm</div> <div>0.51 A/W typ. (@ 760 nm)</div>	Output	<div>Output voltage range</div> <div>Output VSWR</div> <div>Output return loss</div> <div>Output impedance</div> <div>Output noise</div> <div>1.9 V_{PP} (@ 50 Ω output load) for linear operation and low harmonic distortion</div> <div>2.5:1 (@ $f < 2.5$ GHz)</div> <div>7.3 dB (@ $f < 2.5$ GHz)</div> <div>50 Ω (terminate with 50 Ω load)</div> <div>3.6 mV_{RMS} (24 mV_{PP}) typ. (@ 50 Ω load, no signal on detector, measurement bandwidth 4 GHz)</div>
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Specifications (continued)	
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 +15 V Supply current 130 mA (depends on operating conditions, recommended power supply capability min. 200 mA)
Case	Weight 133 g (0.29 lbs) HSA-X-S-1G4-SI-FST incl. coupler ring 120 g (0.26 lbs) HSA-X-S-1G4-SI-FS 110 g (0.24 lbs) HSA-X-S-1G4-SI-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) 12 mW (averaged) Power supply voltage 20 V
Connectors	Input HSA-X-S-1G4-SI-FST 1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories HSA-X-S-1G4-SI-FS 25 mm dia. unthreaded flange for free space applications HSA-X-S-1G4-SI-FC FC fiber optic connector (fix/permanent, 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)  Pin 1: +15 V Pin 2: NC Pin 3: GND
Scope of Delivery	HSA-X-S-1G4-SI, internally threaded coupler ring (FST version only), LEMO® 3-pin connector, datasheet, transport package
Ordering Information	HSA-X-S-1G4-SI-FST 1.035"-40 threaded flange for free space applications and for use with various types of optical standard accessories. HSA-X-S-1G4-SI-FS 25 mm dia. unthreaded flange for free space applications. HSA-X-S-1G4-SI-FC FC fiber optic connector (fix/permanent, FC/PC and FC/APC compatible).

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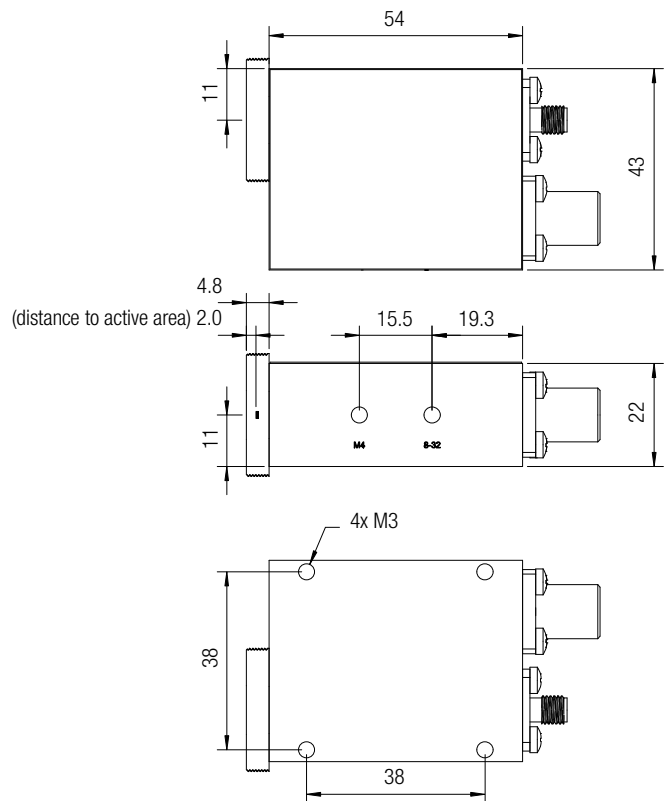
Spectral Responsivity



DB-Sens-HSA-X-S-1G4-SI_R01

Dimensions

HSA-X-S-1G4-SI-FST (1.035"-40 threaded free space input)



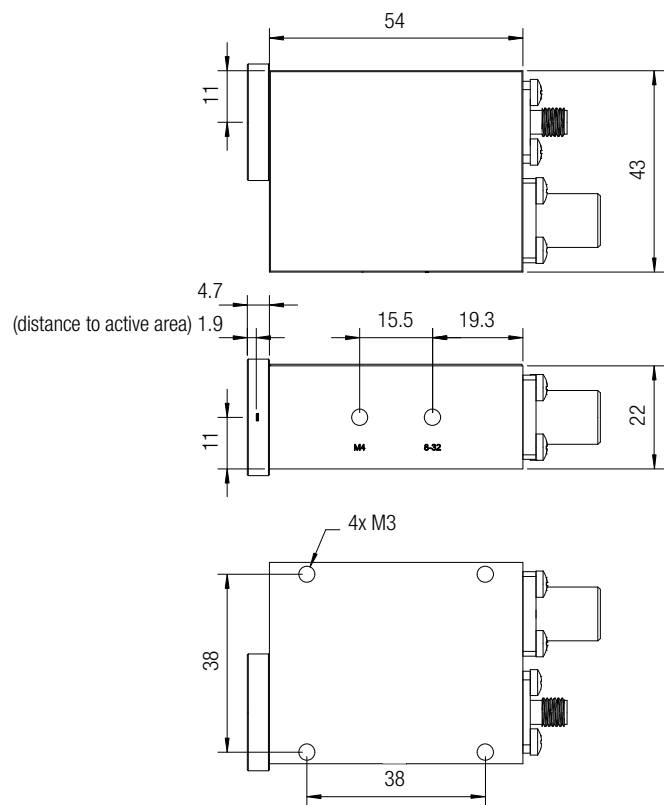
DZ-HSA-X-S-1G4-SI_FST_R1

all dimensions in mm unless otherwise noted

Ultra High Speed Photoreceiver
with Si-PIN Photodiode

Dimensions (continued)

HSA-X-S-1G4-SI-FS (25 mm dia. unthreaded free space input)



DZ-HSA-X-S-1G4-SI_FS_R1

all dimensions in mm unless otherwise noted

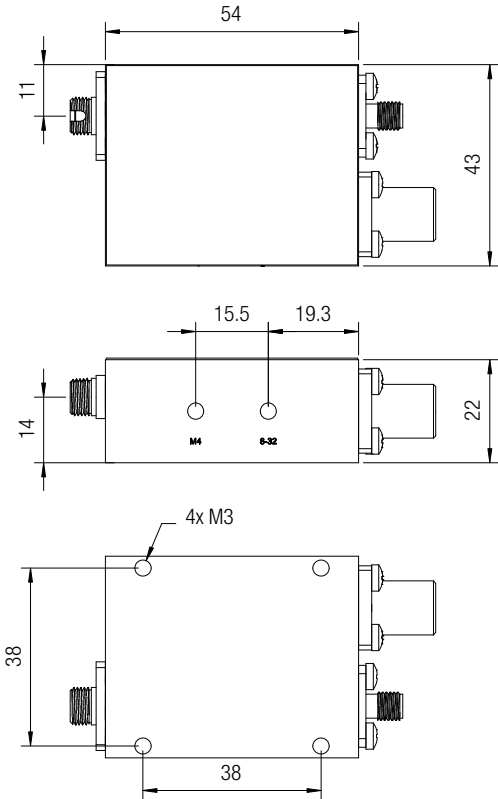
Datasheet

HSA-X-S-1G4-SI

Ultra High Speed Photoreceiver
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Dimensions (continued)

HSA-X-S-1G4-SI-FC (FC fiber optic connector)



DZ-HSA-X-S-1G4-SI_FC_R1

all dimensions in mm unless otherwise noted

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