

## Ultra High-Speed Photoreceiver with Si-PIN Photodiode



The picture shows the HSPR-X-I-1G4-SI-FS with free space input. The photoreceiver will be delivered without post holder and post.

Features	<ul style="list-style-type: none"> <li>• <b>Bandwidth 10 kHz ... 1.4 GHz</b></li> <li>• <b>Si-PIN detector</b></li> <li>• <b>Spectral range 320 ... 1000 nm</b></li> <li>• <b>Amplifier transimpedance (gain) <math>5 \times 10^3</math> V/A (inverting)</b></li> <li>• <b>Conversion gain <math>2.55 \times 10^3</math> V/W @ 760 nm</b></li> </ul>																																		
Applications	<ul style="list-style-type: none"> <li>• <b>Spectroscopy</b></li> <li>• <b>Ultra-fast pulse and transient measurements</b></li> <li>• <b>Optical triggering</b></li> <li>• <b>Optical front-end for oscilloscopes and ultra-fast A/D converters</b></li> </ul>																																		
Specifications	<table border="0"> <tr> <td>Test conditions</td> <td colspan="2"><math>V_S = +15</math> V, <math>T_A = 25</math> °C, system impedance = 50 <math>\Omega</math></td> </tr> <tr> <td rowspan="2">Gain</td> <td>Amplifier transimpedance</td> <td><math>5 \times 10^3</math> V/A (@ 50 <math>\Omega</math> load, inverting)</td> </tr> <tr> <td>Conversion gain</td> <td><math>2.55 \times 10^3</math> V/W (typ. @ 760 nm)</td> </tr> <tr> <td rowspan="3">Frequency Response</td> <td>Lower cut-off frequency (-3 dB)</td> <td>10 kHz (<math>\pm 25</math> %)</td> </tr> <tr> <td>Upper cut-off frequency (-3 dB)</td> <td>1.4 GHz (<math>\pm 15</math> %)</td> </tr> <tr> <td>Rise/fall time (10 % - 90 %)</td> <td>250 ps (<math>\pm 15</math> %)</td> </tr> <tr> <td rowspan="5">Input/Detector</td> <td>Detector material</td> <td>Si-PIN photodiode</td> </tr> <tr> <td rowspan="2">Active area</td> <td>FS-version:</td> <td><math>\varnothing</math> 400 <math>\mu</math>m</td> </tr> <tr> <td>FC-version:</td> <td>integrated ball lens, suitable for fibers up to 400 <math>\mu</math>m core diameter</td> </tr> <tr> <td>Spectral range</td> <td colspan="2">320 ... 1000 nm</td> </tr> <tr> <td rowspan="2">Max. optical peak input power</td> <td>390 <math>\mu</math>W AC</td> <td>(for linear amplification, @ 760 nm)</td> </tr> <tr> <td>10 mW CW</td> <td>(to prevent saturation, @ 760 nm)</td> </tr> <tr> <td>Noise</td> <td>Min. NEP</td> <td>19 pW/<math>\sqrt</math>Hz (@ 760 nm, 100 MHz)</td> </tr> </table>	Test conditions	$V_S = +15$ V, $T_A = 25$ °C, system impedance = 50 $\Omega$		Gain	Amplifier transimpedance	$5 \times 10^3$ V/A (@ 50 $\Omega$ load, inverting)	Conversion gain	$2.55 \times 10^3$ V/W (typ. @ 760 nm)	Frequency Response	Lower cut-off frequency (-3 dB)	10 kHz ( $\pm 25$ %)	Upper cut-off frequency (-3 dB)	1.4 GHz ( $\pm 15$ %)	Rise/fall time (10 % - 90 %)	250 ps ( $\pm 15$ %)	Input/Detector	Detector material	Si-PIN photodiode	Active area	FS-version:	$\varnothing$ 400 $\mu$ m	FC-version:	integrated ball lens, suitable for fibers up to 400 $\mu$ m core diameter	Spectral range	320 ... 1000 nm		Max. optical peak input power	390 $\mu$ W AC	(for linear amplification, @ 760 nm)	10 mW CW	(to prevent saturation, @ 760 nm)	Noise	Min. NEP	19 pW/ $\sqrt$ Hz (@ 760 nm, 100 MHz)
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Specifications (continued)

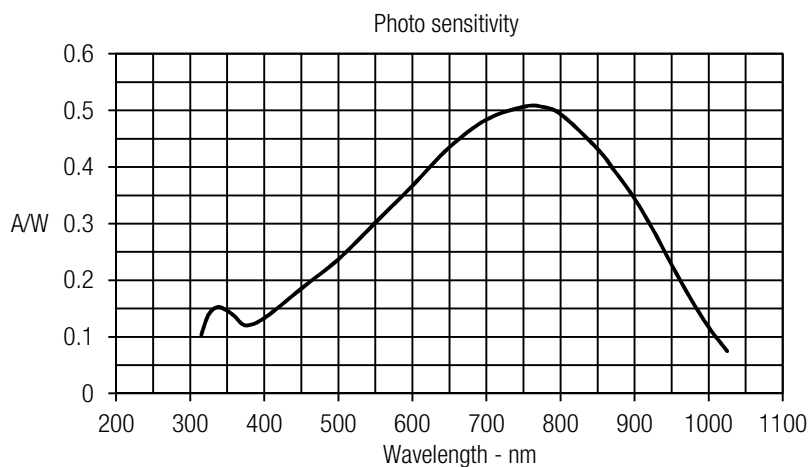
Output	Output impedance                    50 Ω                    (designed for 50 Ω load) Output VSWR                            1.4 : 1                    (@ f < 2.5 GHz) Output return loss                    15.5 dB                    (@ f < 2.5 GHz) Max. output voltage                    2.0 V <sub>PP</sub> (@ 50 Ω load, for linear amplification) Output noise                            typ. 2.5 mV <sub>RMS</sub> or 17 mV <sub>PP</sub> * (measurement BW: 4 GHz)
Power Supply	Supply voltage                            +15 V, 150 mA typ. (depends on operating conditions, recommended power supply capability minimum 200 mA)
Case	Weight                                    100 g (0.23 lbs) Material                                    AlMg4.5Mn, nickel-plated
Temperature Range	Storage temperature                    -40 ... +100 °C Operating temperature                    0 ... +60 °C

\* The peak-to-peak output noise is derived from the RMS noise as follows:  $V_{PP} = V_{RMS} \times 6.6$  (99.9% of the time the output noise voltage will be within the specified peak-to-peak value.)

Absolute Maximum Ratings

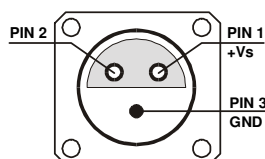
Power supply voltage	±18.5 V
Optical input power	12 mW (averaged)

Spectral Response



Connectors

Input	HSPR-X-I-1G4-SI-FS    25 mm round flange for free space applications HSPR-X-I-1G4-SI-FC    FC fiber optic receptacle
Output	SMA jack (female)
Power supply	Lemo® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52) Pin 1:    +15V Pin 2:    NC Pin 3:    GND



# Ultra High-Speed Photoreceiver with Si-PIN Photodiode

Available Models	HSPR-X-I-1G4-SI-FS HSPR-X-I-1G4-SI-FC HSPR-X-S	free space input fiber optic receptacle customized versions available on request
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Dimensions	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>HSPR-X-I-1G4-SI-FS</p> </div> <div style="text-align: center;"> <p>HSPR-X-I-1G4-SI-FC</p> </div> </div>	
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All measures in mm unless otherwise noted

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