



Datasheet

HCA-S-200M-IN

**200 MHz Photoreceiver
with InGaAs PIN Photodiode**



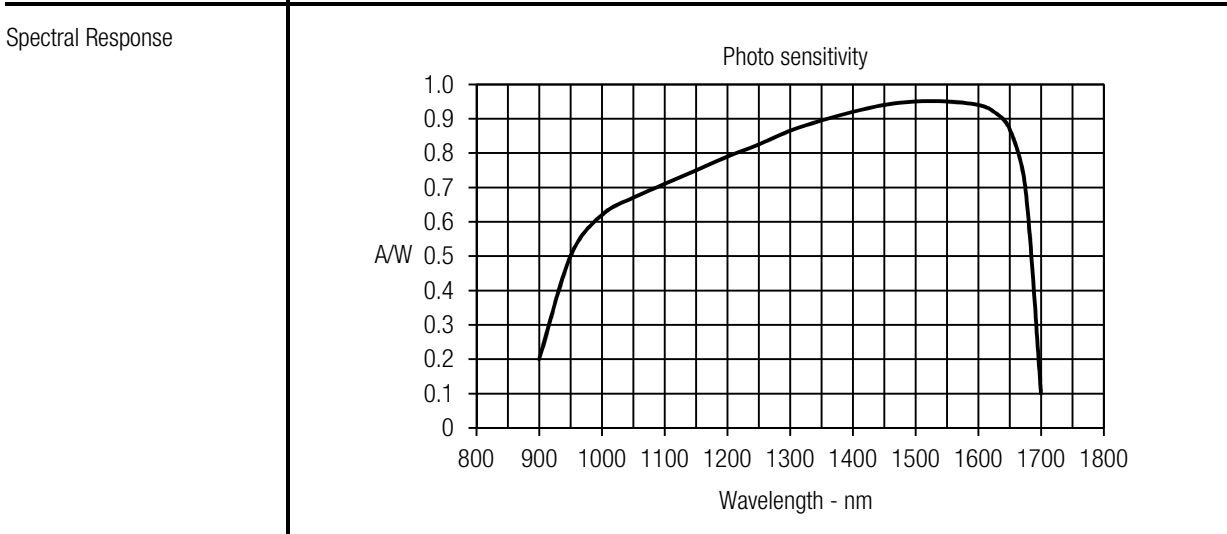
The picture shows the HCA-S-200M-IN-FS with free space input.
The photoreceiver will be delivered without post holder and post.

Features	<ul style="list-style-type: none"> • InGaAs PIN detector • Spectral range 900 ... 1700 nm • Bandwidth DC ... 200 MHz • Amplifier transimpedance (gain) 2.0×10^4 V/A • Max. conversion gain 1.9×10^4 V/W @ 1550 nm 																													
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 																													
Specifications	<table border="0"> <tr> <td>Test conditions</td> <td colspan="2">$V_s = \pm 15$ V, $T_A = 25$ °C, system impedance = 50 Ω</td> </tr> <tr> <td rowspan="2">Gain</td> <td>Amplifier transimpedance</td> <td>2.0×10^4 V/A (@ 50 Ω load)</td> </tr> <tr> <td>Max. conversion gain</td> <td>1.9×10^4 V/W (@ 1550 nm)</td> </tr> <tr> <td rowspan="3">Frequency Response</td> <td>Lower cut-off frequency</td> <td>DC</td> </tr> <tr> <td>Upper cut-off frequency (-3 dB)</td> <td>200 MHz (± 15 %)</td> </tr> <tr> <td>Rise/fall time (10 % - 90 %)</td> <td>1.8 ns</td> </tr> <tr> <td rowspan="3">Detector</td> <td>Detector material</td> <td>InGaAs PIN photodiode</td> </tr> <tr> <td>Active area</td> <td>\varnothing 300 μm (free space "-FS" version only)</td> </tr> <tr> <td>Spectral response</td> <td>900 ... 1700 nm</td> </tr> <tr> <td rowspan="3">Input</td> <td>Input offset compensation range</td> <td>± 100 μA adjustable by offset potentiometer</td> </tr> <tr> <td>Optical saturation power</td> <td>60 μW (for linear amplification, @ 1550 nm)</td> </tr> <tr> <td>NEP</td> <td>5.2 pW/\sqrtHz (@ 1550 nm, 10 MHz)</td> </tr> </table>	Test conditions	$V_s = \pm 15$ V, $T_A = 25$ °C, system impedance = 50 Ω		Gain	Amplifier transimpedance	2.0×10^4 V/A (@ 50 Ω load)	Max. conversion gain	1.9×10^4 V/W (@ 1550 nm)	Frequency Response	Lower cut-off frequency	DC	Upper cut-off frequency (-3 dB)	200 MHz (± 15 %)	Rise/fall time (10 % - 90 %)	1.8 ns	Detector	Detector material	InGaAs PIN photodiode	Active area	\varnothing 300 μ m (free space "-FS" version only)	Spectral response	900 ... 1700 nm	Input	Input offset compensation range	± 100 μ A adjustable by offset potentiometer	Optical saturation power	60 μ W (for linear amplification, @ 1550 nm)	NEP	5.2 pW/ \sqrt Hz (@ 1550 nm, 10 MHz)
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200 MHz Photoreceiver with InGaAs PIN Photodiode

Specifications (continued)	
Output	<p>Output voltage range ± 1.2 V (@ 50 Ω load) for linear amplification and low harmonic distortion</p> <p>Max. output voltage range ± 1.7 V (@ 50 Ω load)</p> <p>Output impedance 50 Ω (designed for 50 Ω load)</p> <p>Output noise typ. 30 mV_{PP} or 4.5 mV_{RMS} (@ 50 Ω load, no signal on detector)</p>
Power Supply	<p>Supply voltage ± 15 V</p> <p>Supply current ± 60 mA typ. (depends on operating conditions, recommended power supply capability min. ± 150 mA)</p>
Case	<p>Weight 210 g (0.5 lbs)</p> <p>Material AlMg4.5Mn, nickel-plated</p>
Temperature Range	<p>Storage temperature $-40 \dots +100$ °C</p> <p>Operating temperature $0 \dots +60$ °C</p>

Absolute Maximum Ratings	<p>Optical input power 10 mW</p> <p>Power supply voltage ± 22 V</p>
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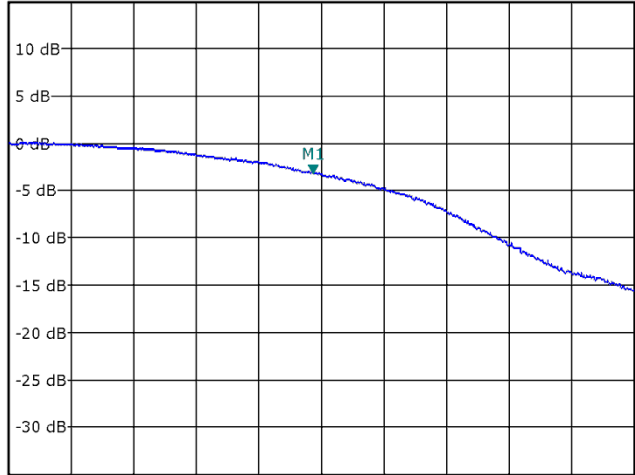
Connectors	<p>Input HCA-S-200M-IN-FS 25 mm round flange for free space applications</p> <p> HCA-S-200M-IN-FC FC fiber optic receptacle</p> <p>Output BNC jack (female)</p> <p>Power supply Lemo® series 1S, 3-pin fixed socket (Mating plug type: FFA.1S.303.CLAC52)</p> <p> Pin 1: +15 V</p> <p> Pin 2: -15 V</p> <p> Pin 3: GND</p>
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200 MHz Photoreceiver with InGaAs PIN Photodiode

Typical Performance Characteristics

Frequency response

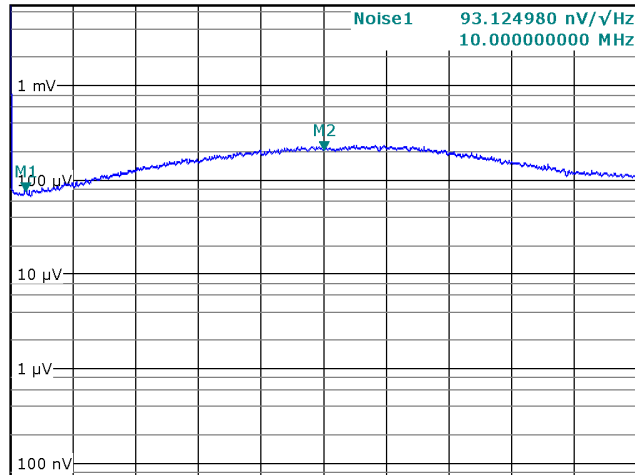
Offs 4.90 dB * RBW 1 MHz
 Att 0 dB * VBW 1 MHz
 Ref -15.10 dBm SWT 2.5ms



Start 10.0 MHz Stop 400.0 MHz

Noise spectrum

Att 0 dB * RBW 1 MHz
 Ref 7.07 mV * VBW 1 kHz
 Ref 7.07 mV SWT 800ms



CF 200.0 MHz Span 400.0 MHz

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.

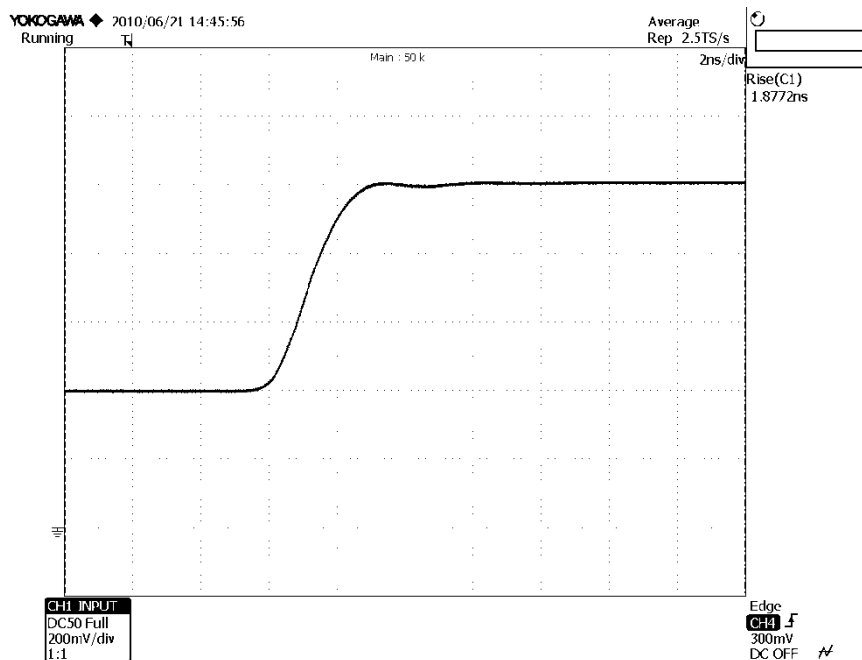
Conversion gain (V/W) = amplifier gain (20,000 V/A) x photo sensitivity (A/W).

Marker	Frequency	Output noise	Resulting input noise (NEP)
1	10 MHz	93 nV/√Hz	4.9 pW/√Hz (@ 1550 nm)
2	200 MHz	275 nV/√Hz	15 pW/√Hz (@ 1550 nm)

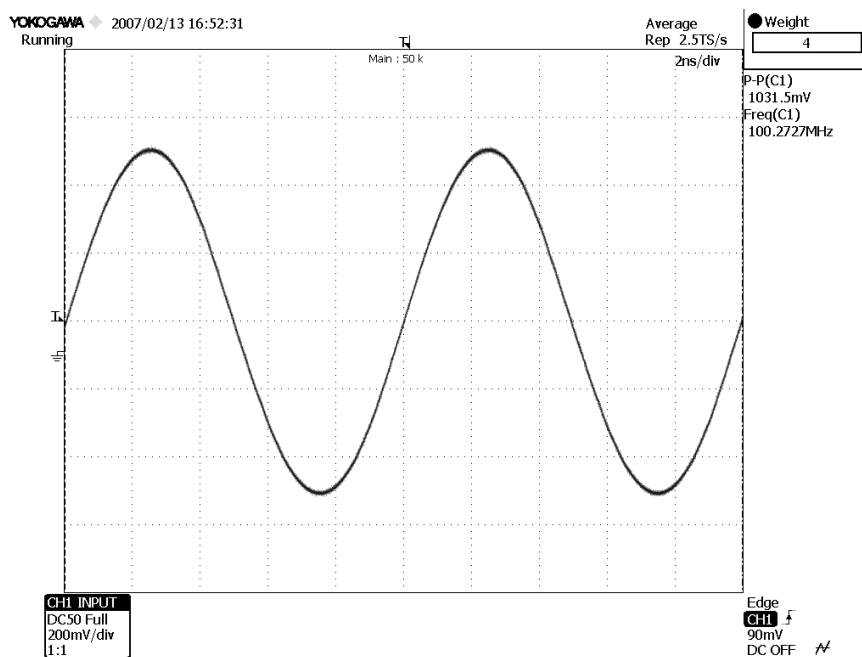
200 MHz Photoreceiver with InGaAs PIN Photodiode

Typical Performance
Characteristics
(continued)

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



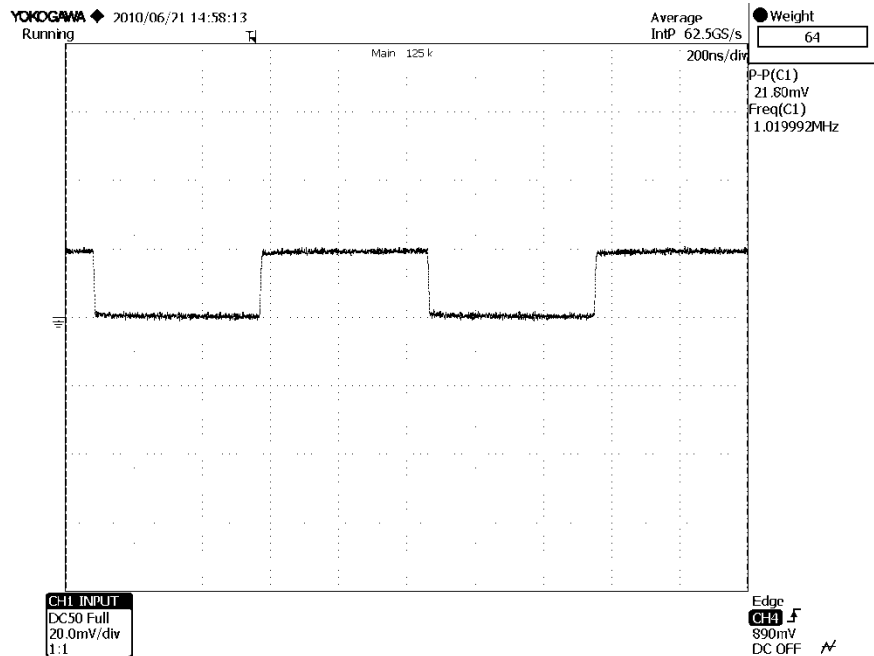
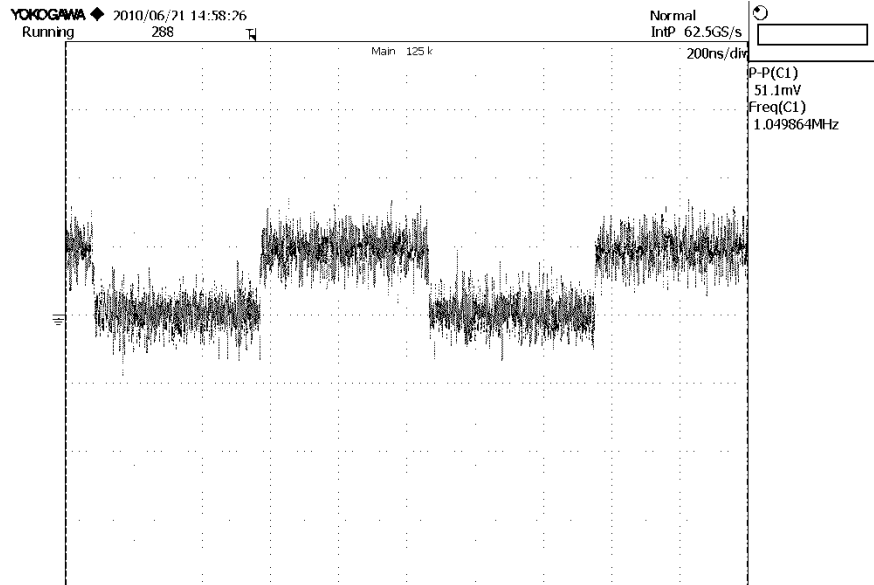
Large signal response
output signal for 100 MHz, 55 μ W modulated optical input signal
(with 4 times averaging)



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
(without (top) and with 64 times averaging (bottom))



Available Models

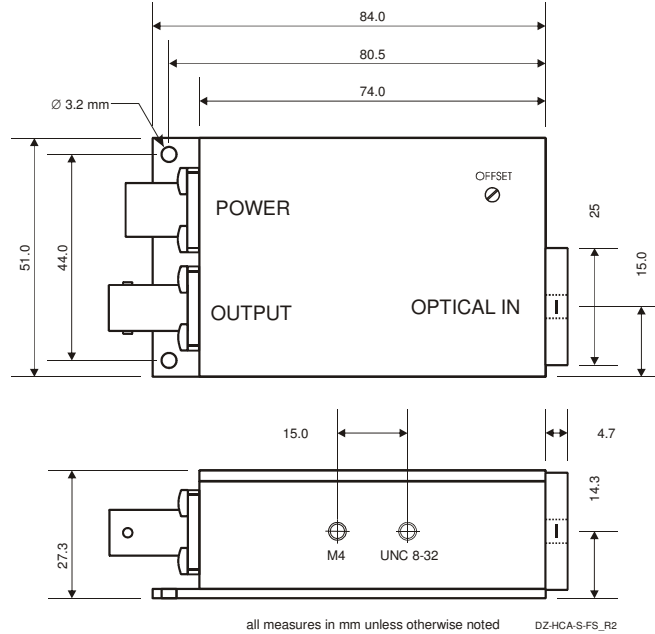
HCA-S-200M-IN-FS
HCA-S-200M-IN-FC
HCA-S

free space input
FC fiber optic receptacle
customized versions available on request

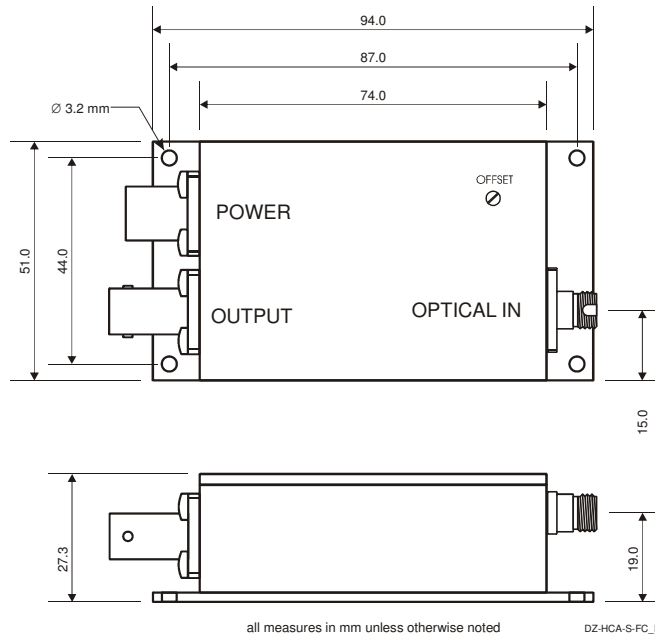
200 MHz Photoreceiver with InGaAs PIN Photodiode

Dimensions

HCA-S-200M-IN-FS



HCA-S-200M-IN-FC



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