



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, 0.3 mm Active Diameter • 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 colspan="2"><i>Test Conditions</i></td> <td><i>$V_s = \pm 15$ V, $T_a = 25^\circ$C</i></td> </tr> <tr> <td rowspan="2">Gain</td> <td>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="4">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 (± 10 %)</td> </tr> <tr> <td>Rise/Fall Time (10% - 90%)</td> <td>1.8 ns</td> </tr> <tr> <td>Gain Flatness</td> <td>± 1 dB</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 0.3 mm</td> </tr> <tr> <td>Spectral Response</td> <td>900 ... 1700 nm</td> </tr> <tr> <td>Input</td> <td>Offset Compensation Range</td> <td>± 10 V/A adjustable by pinset</td> </tr> <tr> <td></td> <td>Optical Saturation Power</td> <td>60 μW (for linear amplification, @ 1550 nm)</td> </tr> <tr> <td></td> <td>Min. NEP</td> <td>4.9 pW/\sqrtHz (@ 1550 nm, 10 MHz)</td> </tr> </table>	<i>Test Conditions</i>		<i>$V_s = \pm 15$ V, $T_a = 25^\circ$C</i>	Gain	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 (± 10 %)	Rise/Fall Time (10% - 90%)	1.8 ns	Gain Flatness	± 1 dB	Detector	Detector Material	InGaAs PIN photodiode	Active Area	\varnothing 0.3 mm	Spectral Response	900 ... 1700 nm	Input	Offset Compensation Range	± 10 V/A adjustable by pinset		Optical Saturation Power	60 μ W (for linear amplification, @ 1550 nm)		Min. NEP	4.9 pW/ \sqrt Hz (@ 1550 nm, 10 MHz)
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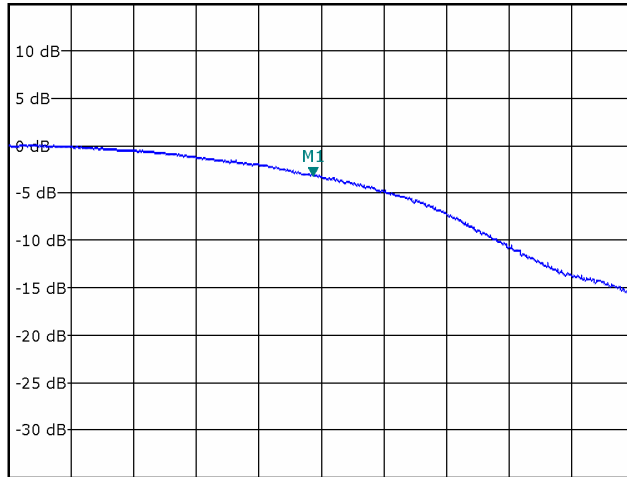
Specifications (continued)		
Output	Output Voltage Range	$\pm 1.2\text{ V}$ (@ 50 Ω load) for linear operation and low harmonic distortion
	Max. Output Voltage Range	$\pm 1.7\text{ V}$ (@ 50 Ω load)
	Output Impedance	50 Ω (designed for 50 Ω load)
	Output Noise	ca. 20 mV peak-peak or 3 mV rms (@ 50 Ω load, no signal on detector)
Power Supply	Supply Voltage	$\pm 15\text{ V}$
	Supply Current	$\pm 60\text{ mA typ.}$ (depends on operating conditions, recommended power supply capability minimum $\pm 150\text{ mA}$)
Case	Weight	210 g (0.5 lbs)
	Material	AlMg4.5Mn, nickel-plated
Temperature Range	Storage Temperature	- 40 ... + 100 $^{\circ}\text{C}$
	Operating Temperature	0 ... + 60 $^{\circ}\text{C}$
Absolute Maximum Ratings	Optical Input Power	10 mW
	Power Supply Voltage	$\pm 22\text{ V}$
Spectral Response	<p>The graph plots Photo Sensitivity [A/W] on the y-axis (0 to 1.0) against Wavelength [nm] on the x-axis (800 to 1800). The curve starts at approximately 0.2 A/W at 900 nm, rises to about 0.6 A/W at 1000 nm, reaches a peak of 0.95 A/W at 1500 nm, and then drops sharply to 0 A/W by 1700 nm.</p>	
Connectors	Input	HCA-S-200M-IN-FS 25 mm round flange for free space applications HCA-S-200M-IN-FC FC fiber optic receptacle
	Output	BNC
	Power Supply	LEMO series 1S, 3-pin fixed socket Pin 1: + 15V Pin 2: - 15V Pin 3: GND
	<p>The diagram shows a circular LEMO connector with three pins. Pin 1 is at the top right, labeled '+Vs'. Pin 2 is at the top left, labeled '-Vs'. Pin 3 is at the bottom center, labeled 'GND'.</p>	

200 MHz Photoreceiver with InGaAs PIN Photodiode

Typical Performance Characteristics

Frequency Response

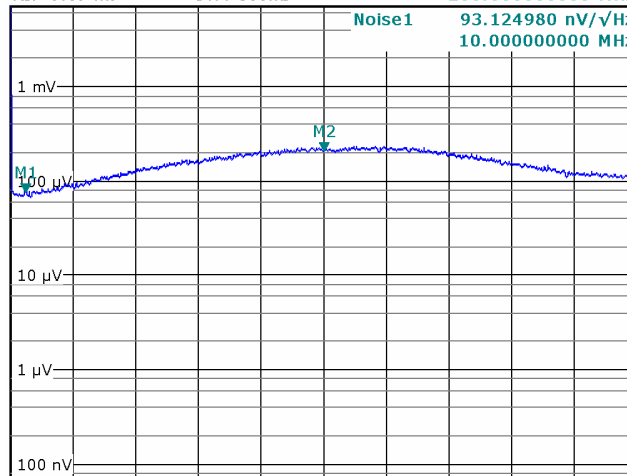
Offs 4.90 dB * RBW 1 MHz
 Att 0 dB * VBW 1 MHz M1[1] -3.26 dB
 Ref -15.10 dBm SWT 2.5ms 200.000000000 MHz



Start 10.0 MHz Stop 400.0 MHz

Noise Spectrum

Att 0 dB * RBW 1 MHz Noise2 274.681387 nV/√Hz
 Ref 7.07 mV * VBW 1 kHz 200.000000000 MHz
 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.

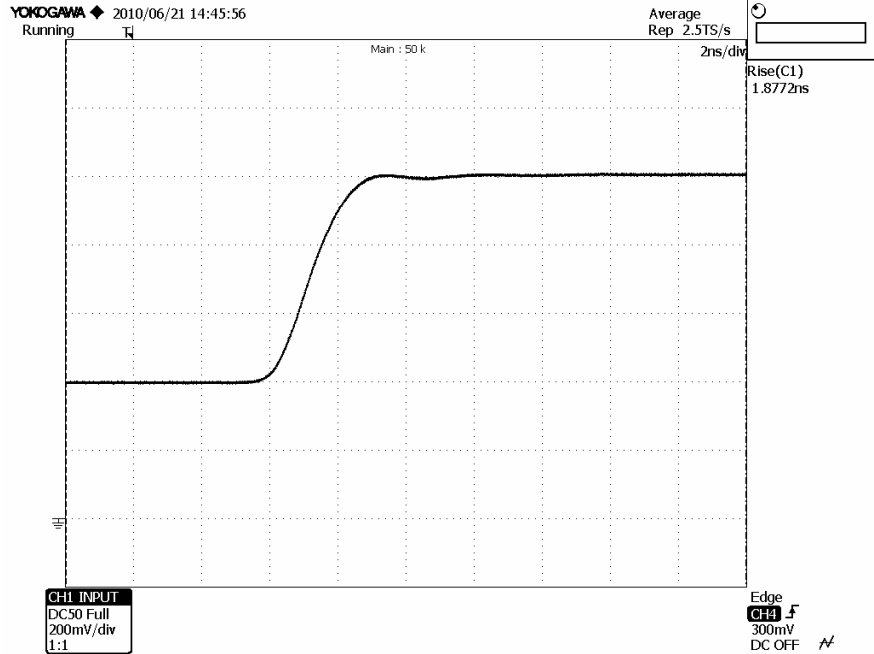
Conversion gain (V/W) = amplifier gain (20,000 V/A) x photo sensitivity (A/W).

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)

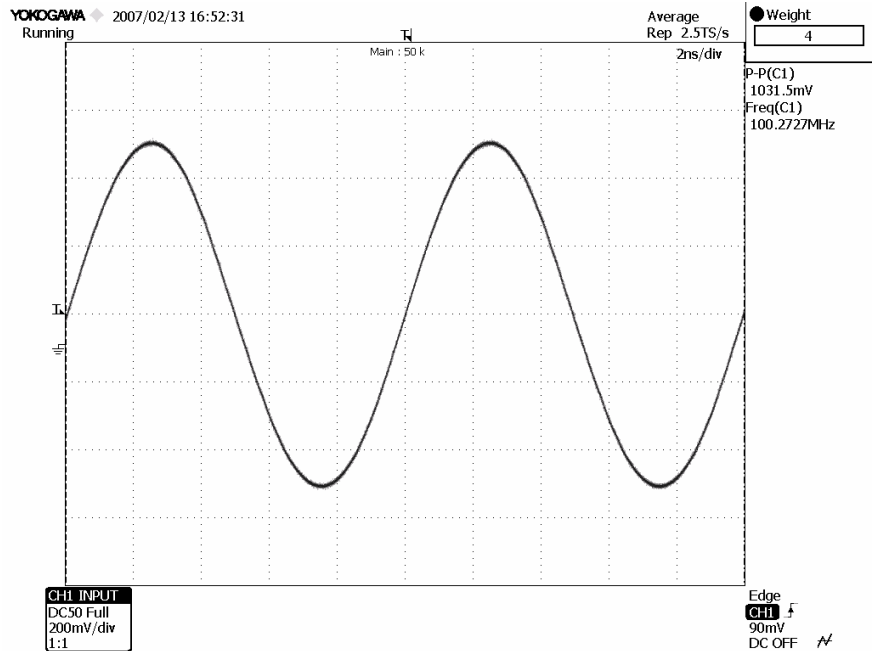
200 MHz Photoreceiver with InGaAs PIN Photodiode

Typical Performance Characteristics
(continued)

Pulse Response to Square Wave Input Signal
(with 16 times averaging)



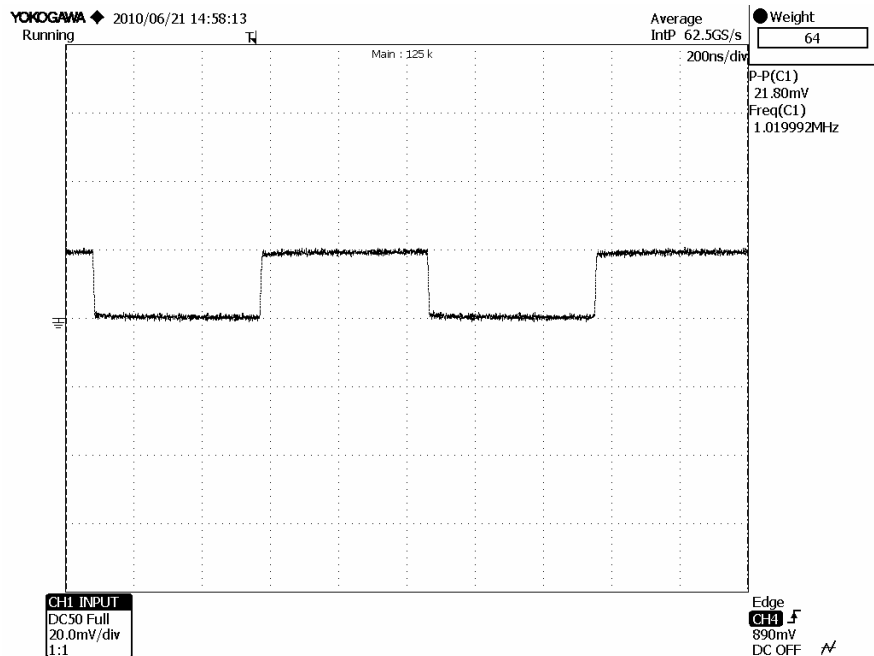
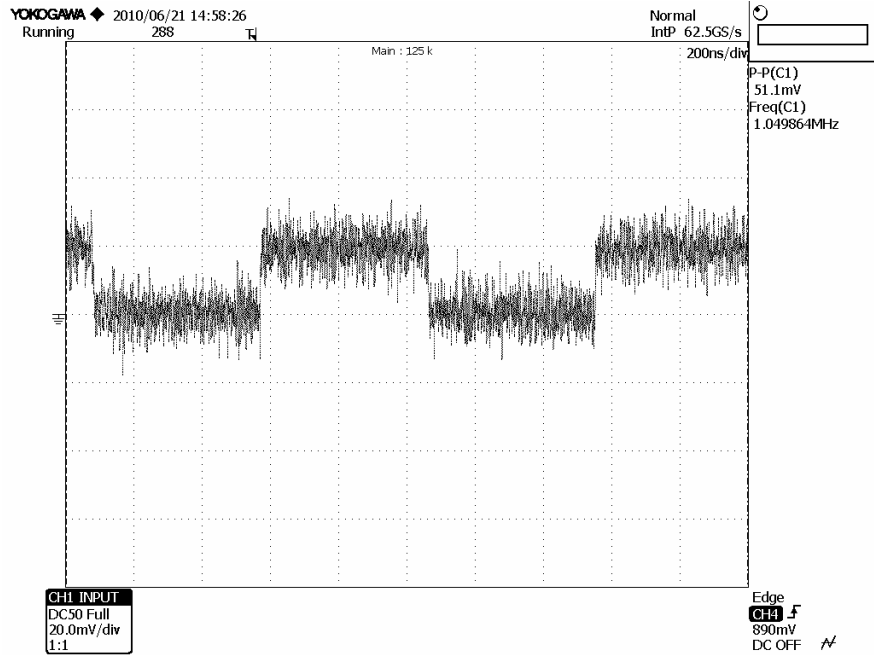
Large Signal Response
output signal for 100 MHz, 55 μ W modulated optical input signal
(with 4 times averaging)



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

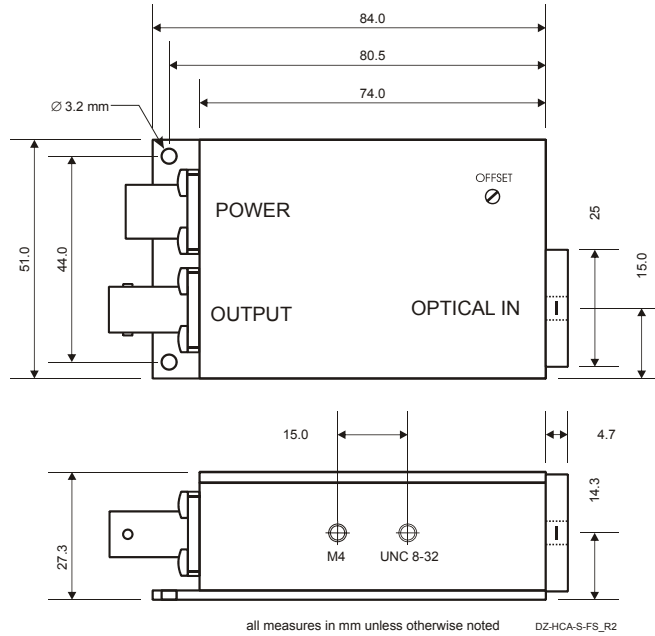
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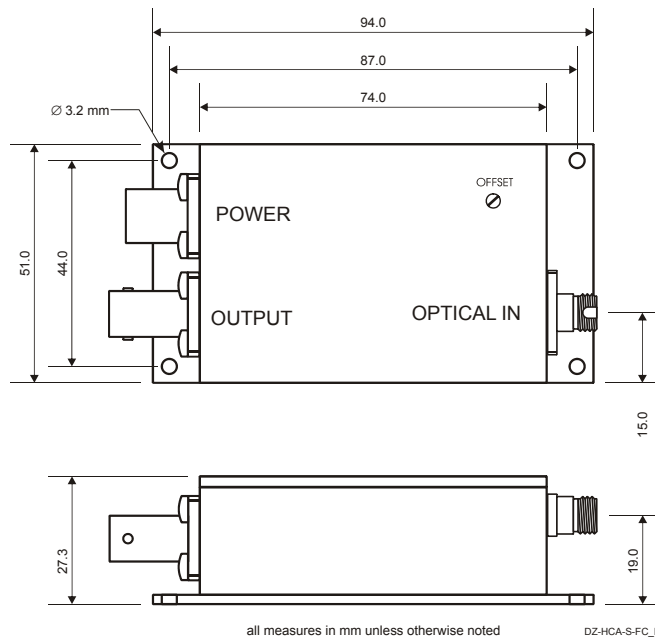
200 MHz Photoreceiver with InGaAs PIN Photodiode

Dimensions

HCA-S-200M-IN-FS



HCA-S-200M-IN-FC



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