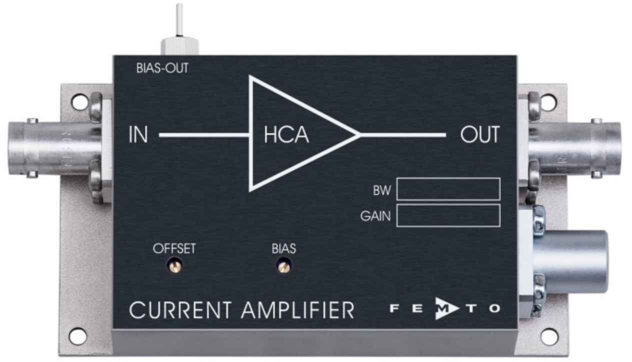
High-Speed Current Amplifier



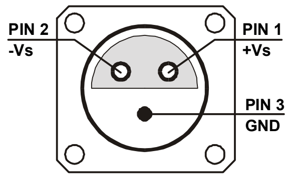
Features	• **Bandwidth DC ... 100 MHz** • **Transimpedance (Gain) 5 x 10^4 V/A** • **Suitable for High Source Capacitance up to 20 pF** • **Low Equivalent Input Noise Current of 3.8 pA/√Hz**
Applications	• **Photodiode and Photomultiplier Amplifier** • **Spectroscopy** • **Charge Amplifier** • **Ionisation Detectors** • **Preamplifier for Lock-Ins, A/D Converters, etc.**

Specifications

	Test Conditions	Vs = ± 15 V, Ta = 25°C	
Gain	Transimpedance	5 x 10^4 V/A	(@ 50 Ω load)
	Gain Accuracy	± 2 %	
Frequency Response	Lower Cut-Off Frequency	DC	
	Upper Cut-Off Frequency (- 3 dB)	100 MHz	(± 10 %, @ Csource 2 to 10 pF)
		80 MHz	(± 10 %, @ Csource 11 to 20 pF)
	Max. Source Capacitance	20 pF	(incl. cable, e.g. typical coax cable 1 pF/cm)
	Rise / Fall Time (10 % - 90 %)	3.4 ns	(@ Csource 2 to 10 pF)
		4.0 ns	(@ Csource 11 to 20 pF)
	Gain Flatness	± 0.3 dB	
Input	Equ. Input Noise Current	3.8 pA/√Hz	(@ 10 MHz)
	Equ. Input Noise Voltage	0.9 nV/√Hz	(@ 10 MHz)
	Equ. Integrated Noise	0.6 µA peak-peak	
	Input Bias Current	12 µA typ.	
	Input Bias Current Drift	3 nA / °C	
	Offset Current Compensation	± 40 µA adjustable by offset trimpot	
	Input Current Range	± 30 µA (for linear amplification)	
	Input Offset Voltage	< 1 mV	
	DC Input Impedance	56 Ω (virtual) // 5 pF	
Output	Output Voltage Range	± 1.5 V	(@ 50 Ω load)
		for linear operation and low harmonic distortion	
	Max. Output Voltage Range	± 1.7 V	(@ 50 Ω load)
	Output Impedance	50 Ω (terminate with 50 Ω load for best performance)	
Bias Output	Bias Output Voltage Range	± 12 V, adjustable by bias trimpot	
	Bias Output Impedance	10 kΩ // 1 µF	

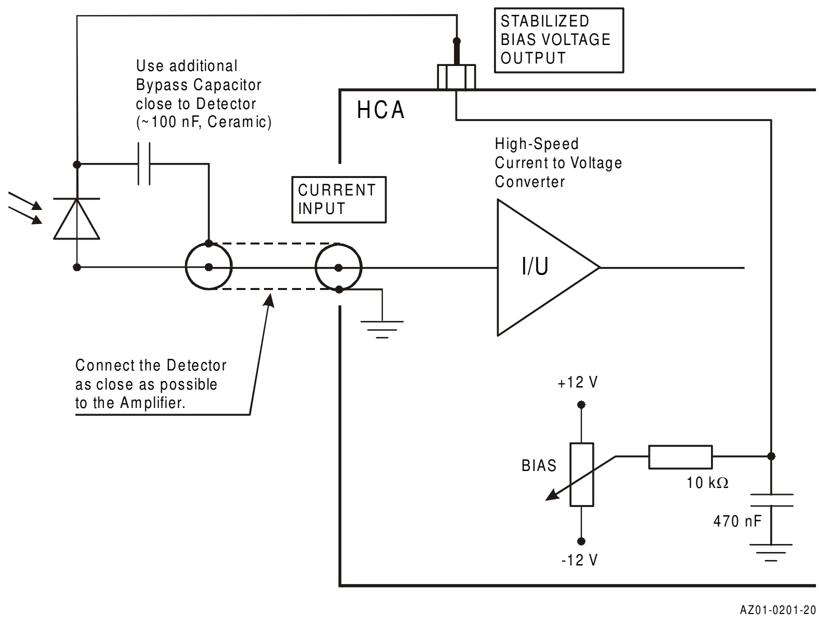
High-Speed Current Amplifier

Specifications (continued)		
Power Supply	Supply Voltage	± 15 V
	Supply Current	± 50 mA typ. (depends on operating conditions, recommended power supply capability minimum ± 150 mA)
Case	Weight	210 g (0.5 lbs)
	Material	AlMg4.5Mn, nickel-plated
Temperature Range	Storage Temperature	-40 ... +100 °C
	Operating Temperature	0 ... +60 °C
Absolute Maximum Ratings	Input Voltage	± 5 V
	Power Supply Voltage	± 22 V
Connectors	Input	BNC
	Output	BNC
	Power Supply	LEMO series 1S, 3-pin fixed socket Pin 1: + 15V Pin 2: - 15V Pin 3: GND



Application Diagrams

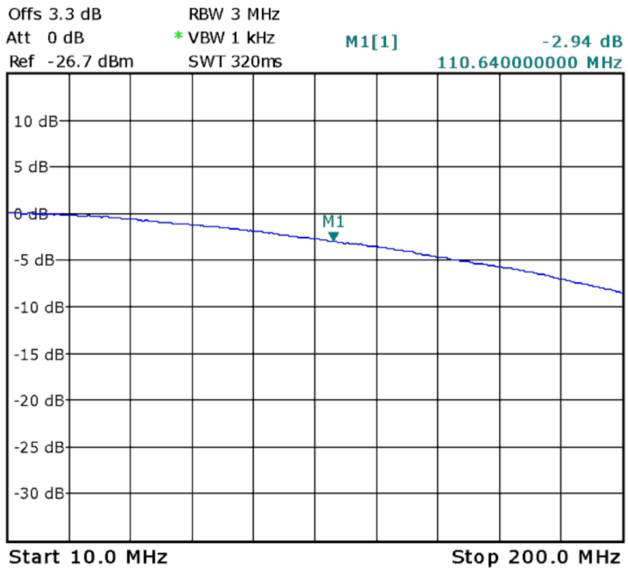
Photo Detector Biasing in Photoconductive Mode:
Best choice for high speed applications and optimum signal to noise performance.



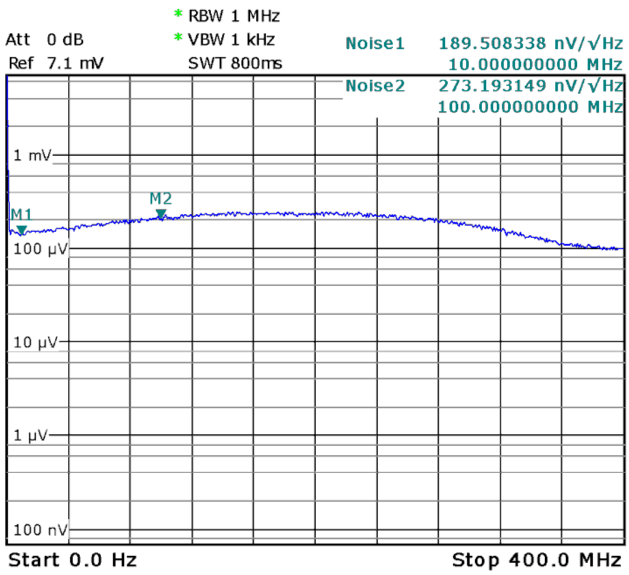
High-Speed Current Amplifier

Typical Performance Characteristics

Frequency Response



Noise Spectrum



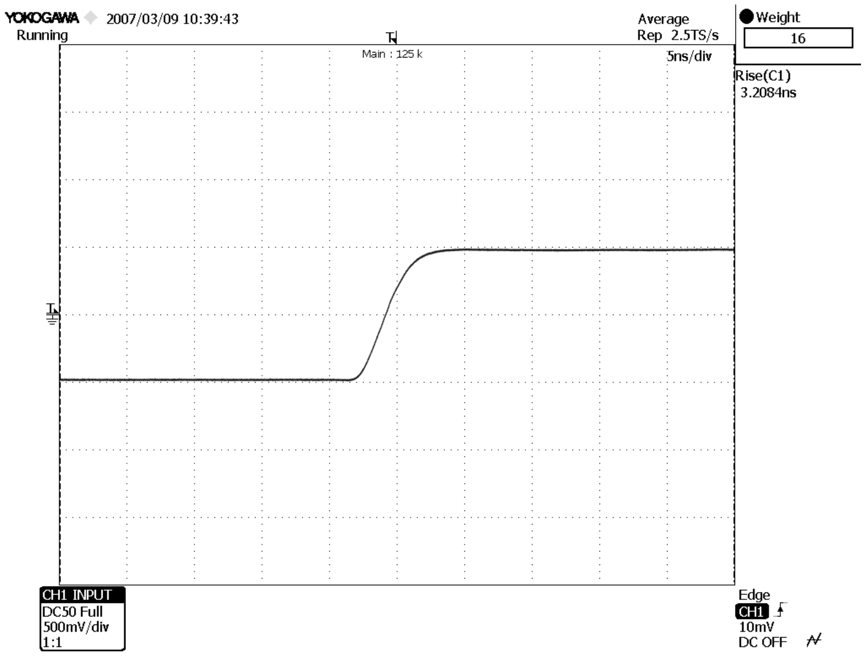
Note: Spectral noise data is measured at the amplifier output with open but shielded input. To determine the spectral input noise divide the measured output noise by the amplifier gain of 5×10^4 V/A, i.e.:

Marker	Frequency	Output Noise	Resulting Input Noise
1	10 MHz	190 nV/√Hz	3.8 pA√Hz
2	100 MHz	273 nV/√Hz	5.5 pA√Hz

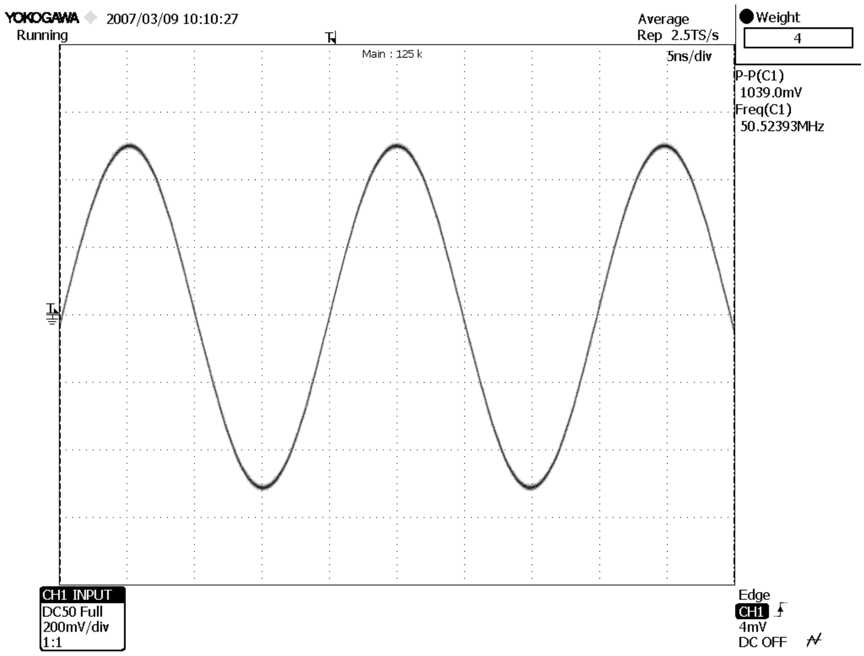
High-Speed Current Amplifier

Typical Performance Characteristics (continued)

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



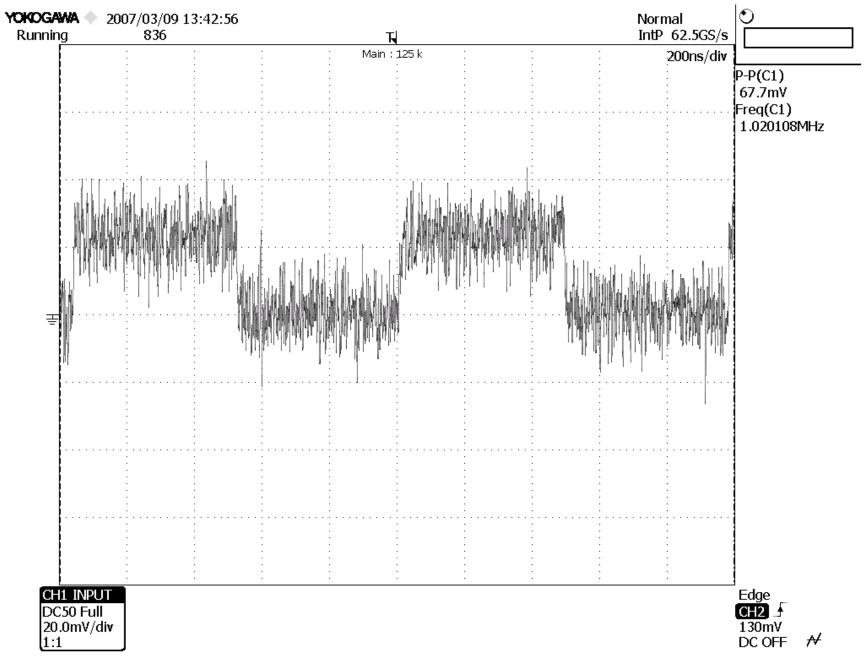
Large Signal Response
output signal for 50 MHz, 20 µA peak-peak input signal
(with 4 times averaging)

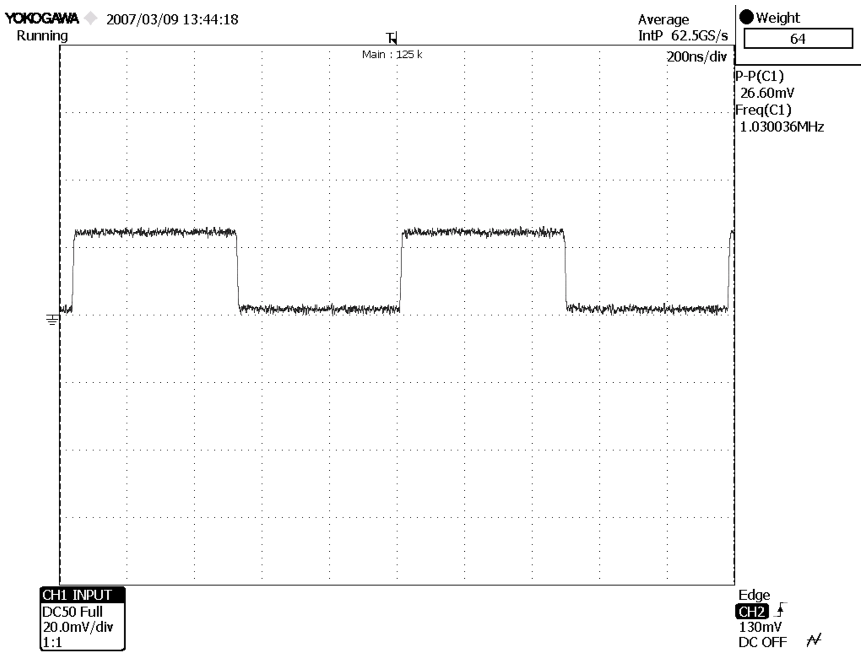


High-Speed Current Amplifier

Typical Performance Characteristics (continued)

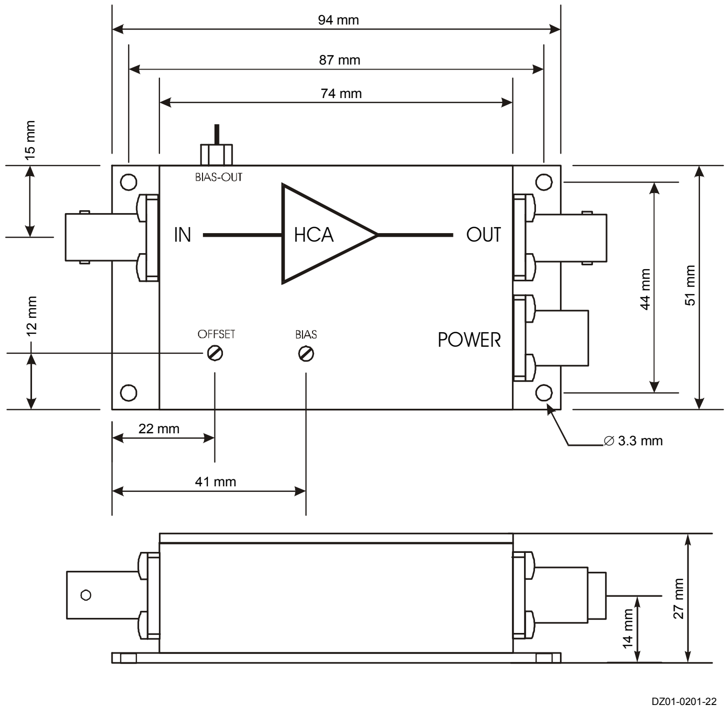
Small Signal Response
output signal for 1 MHz, 500 nA peak-peak square wave input signal
(without (top) and with 64 times averaging (bottom))





High-Speed Current Amplifier

Dimensions



FEMTO Messtechnik GmbH
Klosterstr. 64
10179 Berlin · Germany
Phone: +49 30 280 4711-0
Fax: +49 30 280 4711-11
Email: info@femto.de
www.femto.de