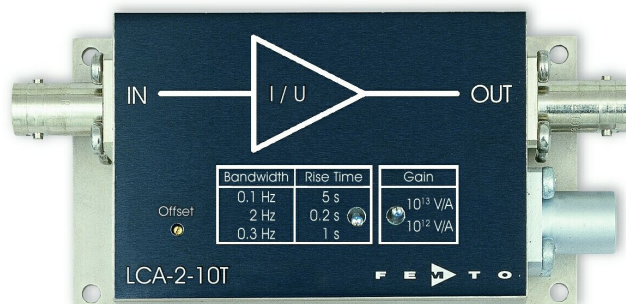
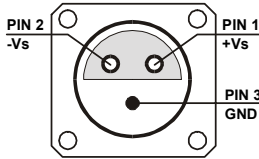


Ultra Low Noise Current Amplifier



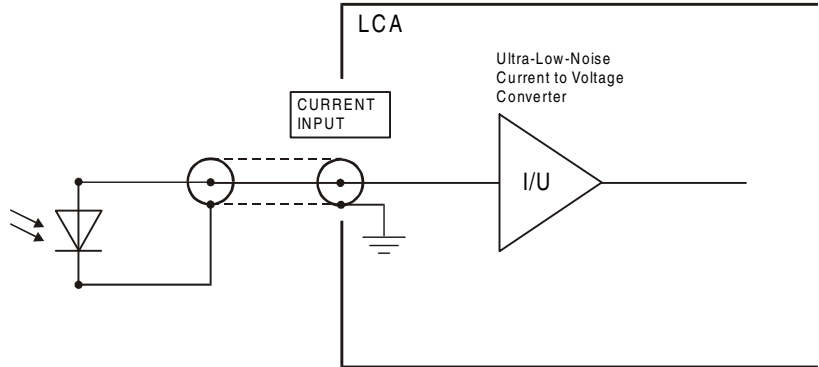
<p>Features</p>	<ul style="list-style-type: none"> • Switchable Transimpedance (Gain) 1×10^{12} V/A and 1×10^{13} V/A • Extremely Low Input Noise Current of $0.18 \text{ fA}/\sqrt{\text{Hz}}$ • Rise Time 0.2 s • Switchable Low Pass Filter 2 Hz, 0.3 Hz and 0.1 Hz • Protection against $\pm 2 \text{ kV}$ Transients 																																																							
<p>Applications</p>	<ul style="list-style-type: none"> • Very Sensitive Current and Charge Measurements • Spectroscopy • Photodiode Amplifier • Conductive Atomic Force Microscopy (cAFM) • Amplifier for Ionization and Charge Detectors • Characterization of Active Electronic Components • Preamplifier for Oscilloscopes, A/D-Converters, Digital Voltmeter etc. 																																																							
<p>Specifications</p>	<p><i>Test Conditions</i> $V_s = \pm 15 \text{ V}$, $T_a = 25^\circ\text{C}$</p> <table border="0"> <tr> <td style="vertical-align: top;">Gain</td> <td>Transimpedance</td> <td>1×10^{12} V/A and 1×10^{13} V/A (@ $\geq 1 \text{ M}\Omega$ load)</td> </tr> <tr> <td></td> <td>Accuracy</td> <td>$\pm 2 \%$</td> </tr> <tr> <td style="vertical-align: top;">Frequency Response</td> <td>Lower Cut-Off Frequency</td> <td>DC</td> </tr> <tr> <td></td> <td>Upper Cut-Off Frequency (- 3 dB)</td> <td>2 Hz, 0.3 Hz and 0.1 Hz</td> </tr> <tr> <td></td> <td>Rise- / Fall-Time (10 % - 90%)</td> <td>0.2 s, 1 s and 5 s</td> </tr> <tr> <td style="vertical-align: top;">Input</td> <td>Equ. Input Noise Current</td> <td>$0.18 \text{ fA}/\sqrt{\text{Hz}}$ (@ 0.2 Hz)</td> </tr> <tr> <td></td> <td>Integrated Input Noise</td> <td>0.3 fA peak-peak (@ 0.1 Hz bandwidth setting) 0.6 fA peak-peak (@ 0.3 Hz bandwidth setting) 2 fA peak-peak (@ 2 Hz bandwidth setting)</td> </tr> <tr> <td></td> <td>Input Bias Current</td> <td>10 fA typ.</td> </tr> <tr> <td></td> <td>Input Bias Current Drift</td> <td>factor 2 / 10°C</td> </tr> <tr> <td></td> <td>Offset Compensation Range</td> <td>$\pm 50 \text{ fA}$, adjustable by offset trimpot</td> </tr> <tr> <td></td> <td>Max. Input Current</td> <td>$\pm 10 \text{ pA}$ (for linear amplification @ 1×10^{12} V/A gain) $\pm 1 \text{ pA}$ (for linear amplification @ 1×10^{13} V/A gain)</td> </tr> <tr> <td></td> <td>Input Offset Voltage</td> <td>$< 0.5 \text{ mV}$</td> </tr> <tr> <td></td> <td>DC Input Impedance</td> <td>$1 \text{ k}\Omega$ (virtual) // 5 pF</td> </tr> <tr> <td style="vertical-align: top;">Output</td> <td>Output Voltage</td> <td>$\pm 10 \text{ V}$ (@ $\geq 1 \text{ M}\Omega$ load)</td> </tr> <tr> <td></td> <td>Output Impedance</td> <td>50Ω (terminate with $\geq 1 \text{ M}\Omega$ load for best performance)</td> </tr> <tr> <td></td> <td>Max. Output Current</td> <td>$\pm 10 \text{ mA}$ (for linear amplification)</td> </tr> <tr> <td style="vertical-align: top;">Power Supply</td> <td>Supply Voltage</td> <td>$\pm 15 \text{ V}$</td> </tr> <tr> <td></td> <td>Supply Current</td> <td>$\pm 15 \text{ mA}$ typ. (depends on operating conditions, recommended power supply capability minimum $\pm 50 \text{ mA}$)</td> </tr> </table>		Gain	Transimpedance	1×10^{12} V/A and 1×10^{13} V/A (@ $\geq 1 \text{ M}\Omega$ load)		Accuracy	$\pm 2 \%$	Frequency Response	Lower Cut-Off Frequency	DC		Upper Cut-Off Frequency (- 3 dB)	2 Hz, 0.3 Hz and 0.1 Hz		Rise- / Fall-Time (10 % - 90%)	0.2 s, 1 s and 5 s	Input	Equ. Input Noise Current	$0.18 \text{ fA}/\sqrt{\text{Hz}}$ (@ 0.2 Hz)		Integrated Input Noise	0.3 fA peak-peak (@ 0.1 Hz bandwidth setting) 0.6 fA peak-peak (@ 0.3 Hz bandwidth setting) 2 fA peak-peak (@ 2 Hz bandwidth setting)		Input Bias Current	10 fA typ.		Input Bias Current Drift	factor 2 / 10°C		Offset Compensation Range	$\pm 50 \text{ fA}$, adjustable by offset trimpot		Max. Input Current	$\pm 10 \text{ pA}$ (for linear amplification @ 1×10^{12} V/A gain) $\pm 1 \text{ pA}$ (for linear amplification @ 1×10^{13} V/A gain)		Input Offset Voltage	$< 0.5 \text{ mV}$		DC Input Impedance	$1 \text{ k}\Omega$ (virtual) // 5 pF	Output	Output Voltage	$\pm 10 \text{ V}$ (@ $\geq 1 \text{ M}\Omega$ load)		Output Impedance	50Ω (terminate with $\geq 1 \text{ M}\Omega$ load for best performance)		Max. Output Current	$\pm 10 \text{ mA}$ (for linear amplification)	Power Supply	Supply Voltage	$\pm 15 \text{ V}$		Supply Current	$\pm 15 \text{ mA}$ typ. (depends on operating conditions, recommended power supply capability minimum $\pm 50 \text{ mA}$)
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Ultra Low Noise Current Amplifier

Specifications (continued)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 2px;">Case</td> <td style="padding: 2px;">Weight</td> <td style="padding: 2px;">210 g (0.5 lbs)</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">Material</td> <td style="padding: 2px;">AlMg4.5Mn, nickel-plated</td> </tr> <tr> <td style="padding: 2px;">Temperature Range</td> <td style="padding: 2px;">Storage Temperature</td> <td style="padding: 2px;">- 40 ... + 100 °C</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">Operating Temperature</td> <td style="padding: 2px;">0 ... + 60 °C</td> </tr> </table>	Case	Weight	210 g (0.5 lbs)		Material	AlMg4.5Mn, nickel-plated	Temperature Range	Storage Temperature	- 40 ... + 100 °C		Operating Temperature	0 ... + 60 °C
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Application Diagrams

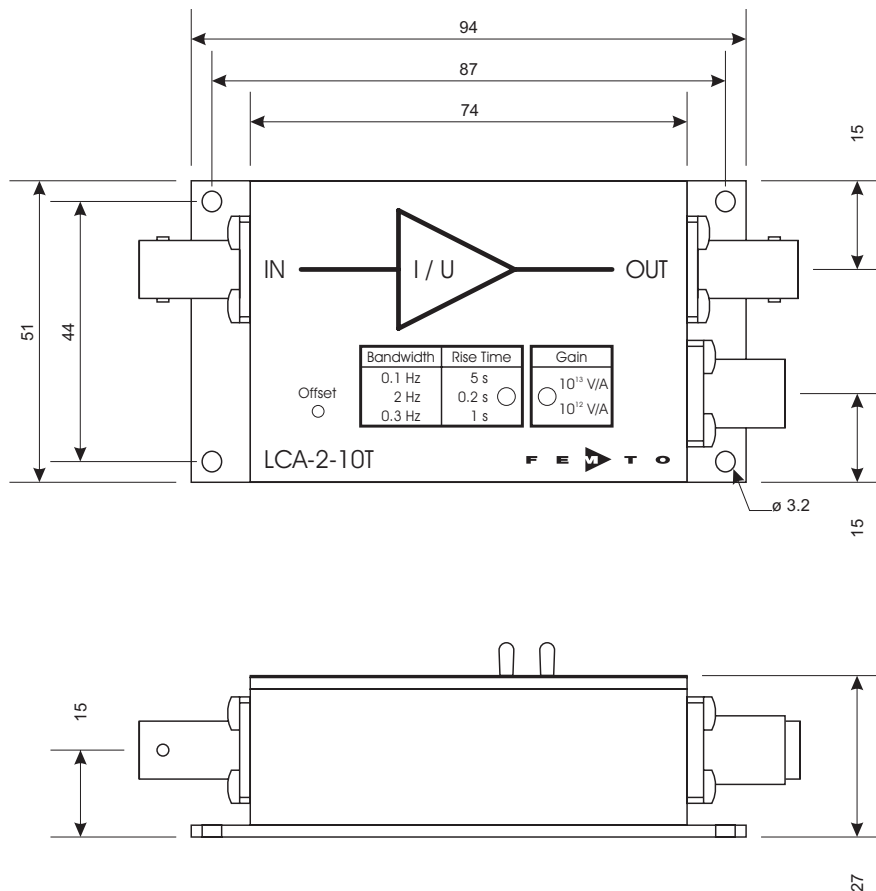
Photo Detector Biasing in Photovoltaic Mode:
Use for Low Speed Applications and Minimum Dark Current.



AZ02-0101-20

Ultra Low Noise Current Amplifier

Dimensions



all measures in mm unless otherwise noted

DZ-LCA-2-10T_R2

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