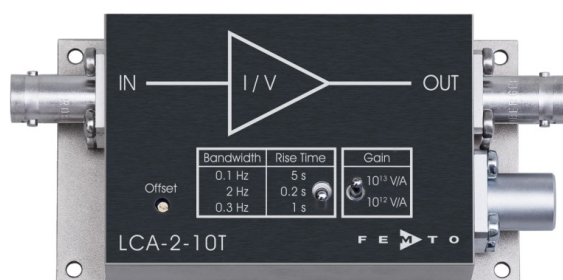
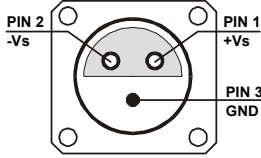


# Ultra-Low-Noise Current Amplifier



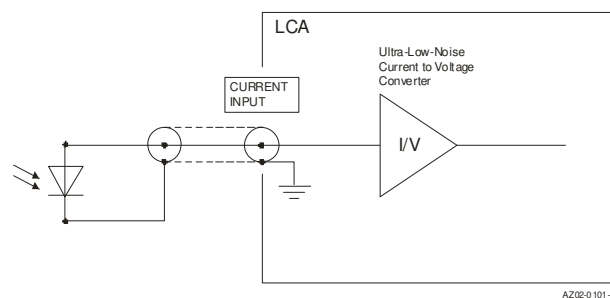
<p>Features</p>	<ul style="list-style-type: none"> <li>• <b>Switchable transimpedance (gain) <math>1 \times 10^{12}</math> V/A and <math>1 \times 10^{13}</math> V/A</b></li> <li>• <b>Extremely low input noise current of <math>0.18 \text{ fA}/\sqrt{\text{Hz}}</math></b></li> <li>• <b>Rise time <math>0.2 \text{ s}</math></b></li> <li>• <b>Switchable low pass filter <math>2 \text{ Hz}</math>, <math>0.3 \text{ Hz}</math> and <math>0.1 \text{ Hz}</math></b></li> <li>• <b>Protection against <math>\pm 2 \text{ kV}</math> transients</b></li> </ul>	
<p>Applications</p>	<ul style="list-style-type: none"> <li>• <b>Very sensitive current and charge measurements</b></li> <li>• <b>Spectroscopy</b></li> <li>• <b>Photodiode amplifier</b></li> <li>• <b>Conductive atomic force microscopy (cAFM)</b></li> <li>• <b>Amplifier for ionization and charge detectors</b></li> <li>• <b>Characterization of active electronic components</b></li> <li>• <b>Preamplifier for oscilloscopes, A/D converters, digital voltmeter etc.</b></li> </ul>	
<p>Specifications</p>	<p>Test Conditions</p> <p>Gain</p> <p>Frequency Response</p> <p>Input</p> <p>Output</p> <p>Power Supply</p>	<p><math>V_s = \pm 15 \text{ V}</math>, <math>T_A = 25^\circ\text{C}</math> Warm-up 20 minutes (min. 10 minutes recommended)</p> <p><math>1 \times 10^{12}</math> V/A and <math>1 \times 10^{13}</math> V/A (@ <math>\geq 1 \text{ M}\Omega</math> load) <math>\pm 2 \%</math></p> <p>DC 2 Hz, 0.3 Hz and 0.1 Hz 0.2 s, 1 s and 5 s</p> <p>0.18 fA/<math>\sqrt{\text{Hz}}</math> (@ 0.2 Hz) 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)</p> <p>20 fA typ. / 30 fA max. factor 2 / 10 °C <math>\pm 50 \text{ fA}</math>, adjustable by offset trimpot <math>\pm 10 \text{ pA}</math> (for linear amplification @ <math>1 \times 10^{12}</math> V/A gain) <math>\pm 1 \text{ pA}</math> (for linear amplification @ <math>1 \times 10^{13}</math> V/A gain)</p> <p><math>&lt; 0.5 \text{ mV}</math> 1 k<math>\Omega</math> (virtual) // 5 pF</p> <p><math>\pm 10 \text{ V}</math> (@ <math>\geq 1 \text{ M}\Omega</math> load) 50 <math>\Omega</math> (terminate with <math>\geq 1 \text{ M}\Omega</math> load for best performance) <math>\pm 10 \text{ mA}</math> (for linear amplification)</p> <p><math>\pm 15 \text{ V}</math> <math>\pm 15 \text{ mA}</math> typ. (depends on operating conditions, recommended power supply capability minimum <math>\pm 50 \text{ mA}</math>)</p>

## Ultra-Low-Noise Current Amplifier

Specifications (continued)	<p>Case</p> <p>Weight 210 g (0.5 lbs)</p> <p>Material AlMg4.5Mn, nickel-plated</p> <p>Temperature Range</p> <p>Storage temperature -40 ... +100 °C</p> <p>Operating temperature 0 ... +60 °C</p>
Absolute Maximum Ratings	<p>Input voltage ±10 V</p> <p>Power supply voltage ±20 V</p> <p>Transient input voltage ±2 kV human body model (HBM)</p>
Connectors	<p>Input BNC</p> <p>Output BNC</p> <p>Power supply Lemo® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52)</p> <p>Pin 1: +15V</p> <p>Pin 2: -15V</p> <p>Pin 3: GND</p> 

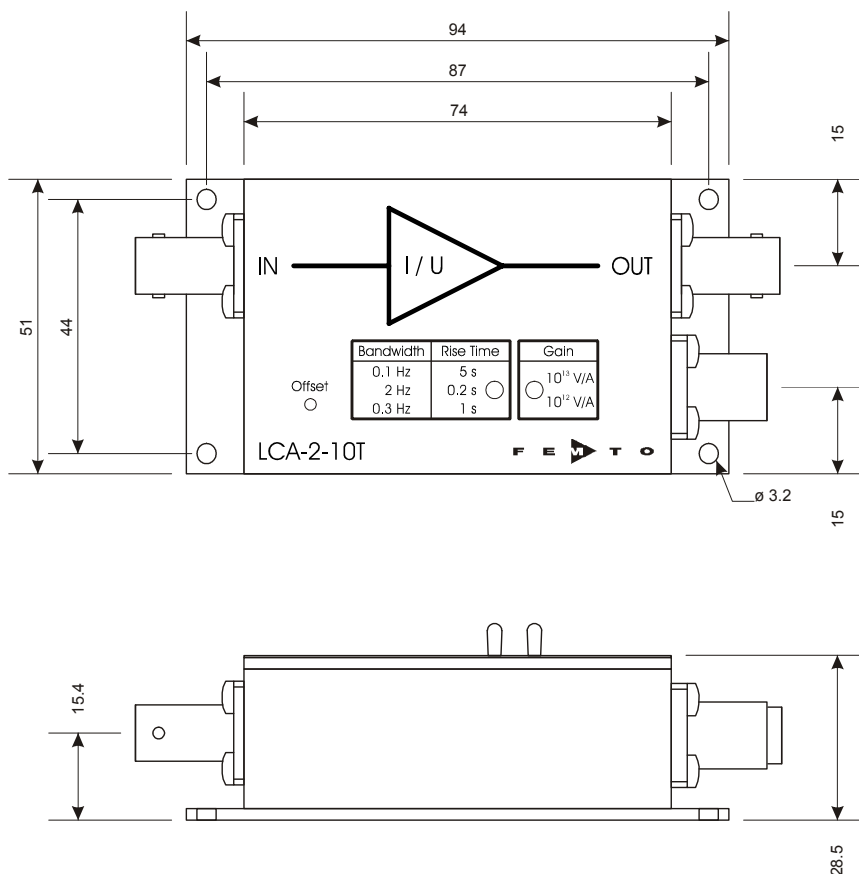
Application Diagrams

Photo detector biasing in photovoltaic mode:  
Use for low speed applications and minimum dark current.



# Ultra-Low-Noise Current Amplifier

Dimensions



all measures in mm unless otherwise noted

DZ-LCA-2-10T\_R3

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