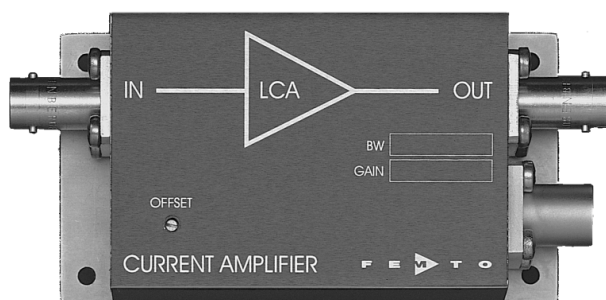


## Ultra-Low-Noise Current Amplifier

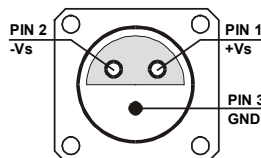


|                                 |  |   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
|---------------------------------|--|---|---------------|-------------------------|---|--------------------|--|--|-------|---|---|--------|---|---|--------------|----------------------------------|------------------------|------|--------------------|---|-------------------|--|---------------------------------|
| <p>Features</p>                 | <ul style="list-style-type: none"> <li>• <b>Bandwidth and Frequency Response Independent of Detector-Capacitance (up to 10 nF)</b></li> <li>• <b>Extremely Low Noise, 30 fA/√Hz Equivalent Input Noise Current</b></li> <li>• <b>Bandwidth DC ... 100 kHz</b></li> <li>• <b>Transimpedance (Gain) <math>5 \times 10^7</math> V/A</b></li> </ul>  |   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| <p>Applications</p>             | <ul style="list-style-type: none"> <li>• <b>Photodiode- and Photomultiplier-Amplifier</b></li> <li>• <b>Spectroscopy</b></li> <li>• <b>Charge-Amplifier</b></li> <li>• <b>Ionisation Detectors</b></li> <li>• <b>Preamplifier for Lock-Ins, A/D-Converters, etc.</b></li> </ul>  |   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| <p>Specifications</p>           | <p><i>Test Conditions</i> <span style="float: right;"><math>V_s = \pm 15</math> V, <math>T_a = 25^\circ</math>C</span></p> <table border="0"> <tr> <td style="vertical-align: top;">Gain</td> <td>Transimpedance Accuracy</td> <td><math>5 \times 10^7</math> V/A (&gt;10 kΩ Load)<br/>± 1%</td> </tr> <tr> <td style="vertical-align: top;">Frequency Response</td> <td>Lower Cut-Off Frequency<br/>Upper Cut-Off Frequency<br/>Rise- / Fall-Time<br/>Gain Flatness</td> <td>DC<br/>100 kHz (- 3 dB)<br/>4 μs (10% - 90%)<br/>± 0.1 dB</td> </tr> <tr> <td style="vertical-align: top;">Input</td> <td>Equ. Input Noise Current<br/>Equ. Input Noise Voltage<br/>Input Bias Current<br/>Input Bias Current Drift<br/>Offset Current Compensation<br/>Max. Input Current<br/>Input Offset Voltage<br/>DC Input Impedance</td> <td>30 fA/√Hz (@ 10 kHz)<br/>5 nV/√Hz (@ 10 kHz)<br/>2 pA typ.<br/>Factor 1.7 / 10 K<br/>± 60 nA, Adjustable by Offset-Trimpot<br/>± 200 nA (Linear Amplification)<br/>&lt; 1 mV<br/>50 Ω (Virtual) // 5 pF</td> </tr> <tr> <td style="vertical-align: top;">Output</td> <td>Output Voltage<br/>Output Impedance<br/>Max. Output Current</td> <td>± 10 V (&gt;10 kΩ Load)<br/>50 Ω (Terminate with &gt;10 kΩ for best Performance)<br/>± 10 mA (Linear Amplification)</td> </tr> <tr> <td style="vertical-align: top;">Power Supply</td> <td>Supply Voltage<br/>Supply Current</td> <td>± 15 V<br/>± 40 mA typ.</td> </tr> <tr> <td style="vertical-align: top;">Case</td> <td>Weight<br/>Material</td> <td>210 gr. (0.5 lbs)<br/>AlMg4.5Mn, nickel-plated</td> </tr> <tr> <td style="vertical-align: top;">Temperature Range</td> <td>Storage Temperature<br/>Operating Temperature</td> <td>-40 ... +100 °C<br/>0 ... +60 °C</td> </tr> </table> |   | Gain          | Transimpedance Accuracy | $5 \times 10^7$ V/A (>10 kΩ Load)<br>± 1% | Frequency Response | Lower Cut-Off Frequency<br>Upper Cut-Off Frequency<br>Rise- / Fall-Time<br>Gain Flatness | DC<br>100 kHz (- 3 dB)<br>4 μs (10% - 90%)<br>± 0.1 dB | Input | Equ. Input Noise Current<br>Equ. Input Noise Voltage<br>Input Bias Current<br>Input Bias Current Drift<br>Offset Current Compensation<br>Max. Input Current<br>Input Offset Voltage<br>DC Input Impedance | 30 fA/√Hz (@ 10 kHz)<br>5 nV/√Hz (@ 10 kHz)<br>2 pA typ.<br>Factor 1.7 / 10 K<br>± 60 nA, Adjustable by Offset-Trimpot<br>± 200 nA (Linear Amplification)<br>< 1 mV<br>50 Ω (Virtual) // 5 pF | Output | Output Voltage<br>Output Impedance<br>Max. Output Current | ± 10 V (>10 kΩ Load)<br>50 Ω (Terminate with >10 kΩ for best Performance)<br>± 10 mA (Linear Amplification) | Power Supply | Supply Voltage<br>Supply Current | ± 15 V<br>± 40 mA typ. | Case | Weight<br>Material | 210 gr. (0.5 lbs)<br>AlMg4.5Mn, nickel-plated | Temperature Range | Storage Temperature<br>Operating Temperature | -40 ... +100 °C<br>0 ... +60 °C |
| Gain                            | Transimpedance Accuracy  | $5 \times 10^7$ V/A (>10 kΩ Load)<br>± 1%   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| Frequency Response              | Lower Cut-Off Frequency<br>Upper Cut-Off Frequency<br>Rise- / Fall-Time<br>Gain Flatness   | DC<br>100 kHz (- 3 dB)<br>4 μs (10% - 90%)<br>± 0.1 dB  |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| Input                           | Equ. Input Noise Current<br>Equ. Input Noise Voltage<br>Input Bias Current<br>Input Bias Current Drift<br>Offset Current Compensation<br>Max. Input Current<br>Input Offset Voltage<br>DC Input Impedance  | 30 fA/√Hz (@ 10 kHz)<br>5 nV/√Hz (@ 10 kHz)<br>2 pA typ.<br>Factor 1.7 / 10 K<br>± 60 nA, Adjustable by Offset-Trimpot<br>± 200 nA (Linear Amplification)<br>< 1 mV<br>50 Ω (Virtual) // 5 pF |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| Output                          | Output Voltage<br>Output Impedance<br>Max. Output Current  | ± 10 V (>10 kΩ Load)<br>50 Ω (Terminate with >10 kΩ for best Performance)<br>± 10 mA (Linear Amplification)   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| Power Supply                    | Supply Voltage<br>Supply Current   | ± 15 V<br>± 40 mA typ.  |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| Case                            | Weight<br>Material   | 210 gr. (0.5 lbs)<br>AlMg4.5Mn, nickel-plated   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| Temperature Range               | Storage Temperature<br>Operating Temperature   | -40 ... +100 °C<br>0 ... +60 °C   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| <p>Absolute Maximum Ratings</p> | <table border="0"> <tr> <td>Input Voltage</td> <td>± 5 V</td> </tr> <tr> <td>Power Supply Voltage</td> <td>± 22 V</td> </tr> </table>  |   | Input Voltage | ± 5 V                   | Power Supply Voltage                      | ± 22 V             |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| Input Voltage                   | ± 5 V  |   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |
| Power Supply Voltage            | ± 22 V   |   |               |                         |   |                    |  |  |       |   |   |        |   |   |              |                                  |                        |      |                    |   |                   |  |                                 |

## Ultra-Low-Noise Current Amplifier

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 Photovoltaic Mode:  
 Use for Low Speed Applications and Minimum Dark Current.

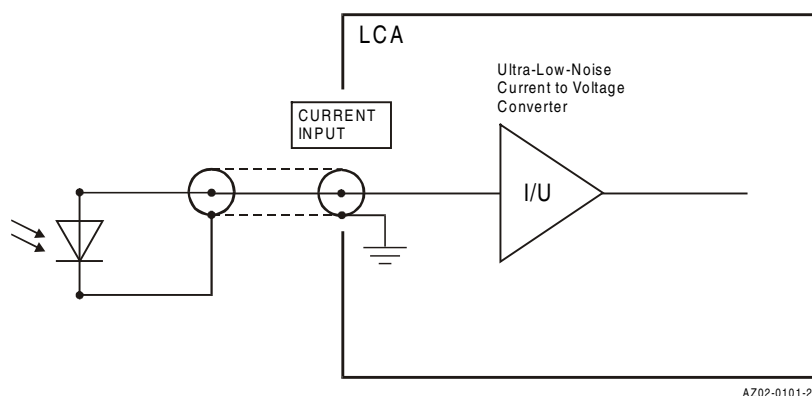
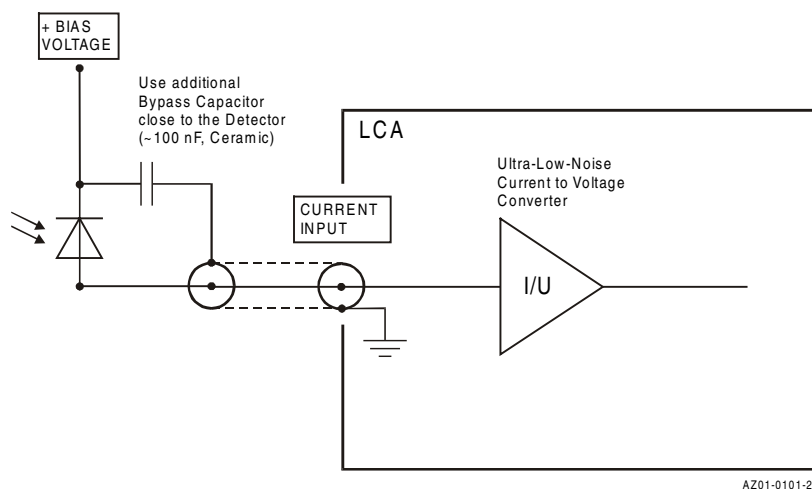
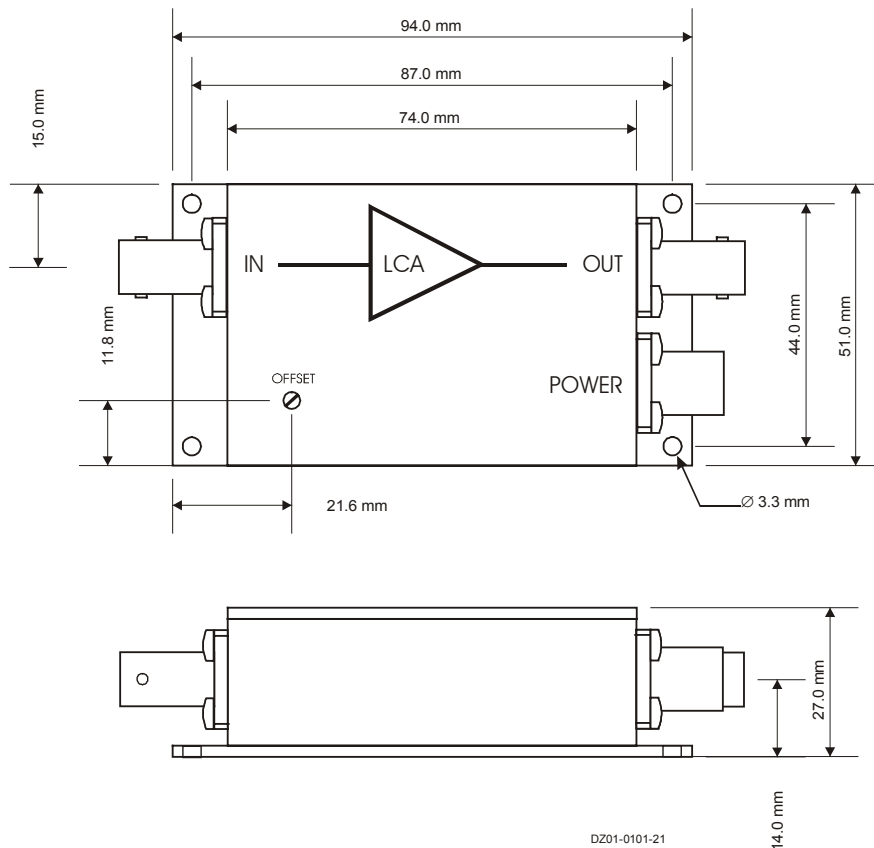


Photo Detector Biasing in Photoconductive Mode:  
 Use for Fast Applications and if More Dark Current is Tolerable.  
 Bias Voltage Decreases Detector Capacitance.



Ultra-Low-Noise Current Amplifier

Dimensions



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