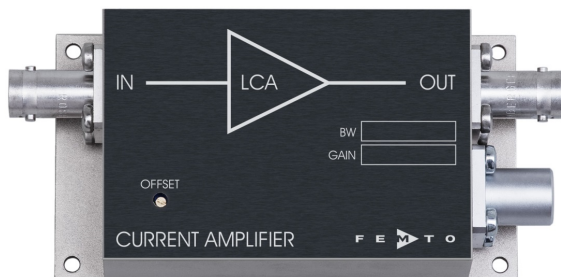


# Ultra-Low-Noise Current Amplifier



|                    |                                                                                                                                                                                                                                                                                                                                                 |                                                                    |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Features           | <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> |                                                                    |
| Applications       | <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>                                                                 |                                                                    |
| Specifications     | Test Conditions                                                                                                                                                                                                                                                                                                                                 | $V_s = \pm 15$ V, $T_a = 25^\circ\text{C}$                         |
| Gain               | Transimpedance                                                                                                                                                                                                                                                                                                                                  | $5 \times 10^7$ V/A ( $>10$ k $\Omega$ Load)                       |
|                    | Accuracy                                                                                                                                                                                                                                                                                                                                        | $\pm 1\%$                                                          |
| Frequency Response | Lower Cut-Off Frequency                                                                                                                                                                                                                                                                                                                         | DC                                                                 |
|                    | Upper Cut-Off Frequency                                                                                                                                                                                                                                                                                                                         | 100 kHz (- 3 dB)                                                   |
|                    | Rise- / Fall-Time                                                                                                                                                                                                                                                                                                                               | 4 $\mu$ s (10% - 90%)                                              |
|                    | Gain Flatness                                                                                                                                                                                                                                                                                                                                   | $\pm 0.1$ dB                                                       |
| Input              | Equ. Input Noise Current                                                                                                                                                                                                                                                                                                                        | 30 fA/√Hz (@ 10 kHz)                                               |
|                    | Equ. Input Noise Voltage                                                                                                                                                                                                                                                                                                                        | 5 nV/√Hz (@ 10 kHz)                                                |
|                    | Input Bias Current                                                                                                                                                                                                                                                                                                                              | 2 pA typ.                                                          |
|                    | Input Bias Current Drift                                                                                                                                                                                                                                                                                                                        | Factor 1.7 / 10 K                                                  |
|                    | Offset Current Compensation                                                                                                                                                                                                                                                                                                                     | $\pm 60$ nA, Adjustable by Offset-Trimpot                          |
|                    | Max. Input Current                                                                                                                                                                                                                                                                                                                              | $\pm 200$ nA (Linear Amplification)                                |
|                    | Input Offset Voltage                                                                                                                                                                                                                                                                                                                            | $< 1$ mV                                                           |
|                    | DC Input Impedance                                                                                                                                                                                                                                                                                                                              | 50 $\Omega$ (Virtual) // 5 pF                                      |
| Output             | Output Voltage                                                                                                                                                                                                                                                                                                                                  | $\pm 10$ V ( $>10$ k $\Omega$ Load)                                |
|                    | Output Impedance                                                                                                                                                                                                                                                                                                                                | 50 $\Omega$ (Terminate with $>10$ k $\Omega$ for best Performance) |
|                    | Max. Output Current                                                                                                                                                                                                                                                                                                                             | $\pm 10$ mA (Linear Amplification)                                 |
| Power Supply       | Supply Voltage                                                                                                                                                                                                                                                                                                                                  | $\pm 15$ V                                                         |
|                    | Supply Current                                                                                                                                                                                                                                                                                                                                  | $\pm 40$ mA typ.                                                   |
| Case               | Weight                                                                                                                                                                                                                                                                                                                                          | 210 gr. (0.5 lbs)                                                  |
|                    | Material                                                                                                                                                                                                                                                                                                                                        | AlMg4.5Mn, nickel-plated                                           |
| Temperature Range  | Storage Temperature                                                                                                                                                                                                                                                                                                                             | $-40 \dots +100$ $^\circ\text{C}$                                  |
|                    | Operating Temperature                                                                                                                                                                                                                                                                                                                           | $0 \dots +60$ $^\circ\text{C}$                                     |

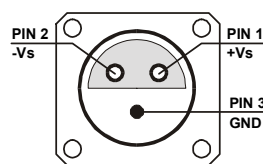
## Ultra-Low-Noise Current Amplifier

### Absolute Maximum Ratings

|                      |            |
|----------------------|------------|
| Input Voltage        | $\pm 5$ V  |
| Power Supply Voltage | $\pm 22$ 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 Photovoltaic Mode:  
Use for Low Speed Applications and Minimum Dark Current.

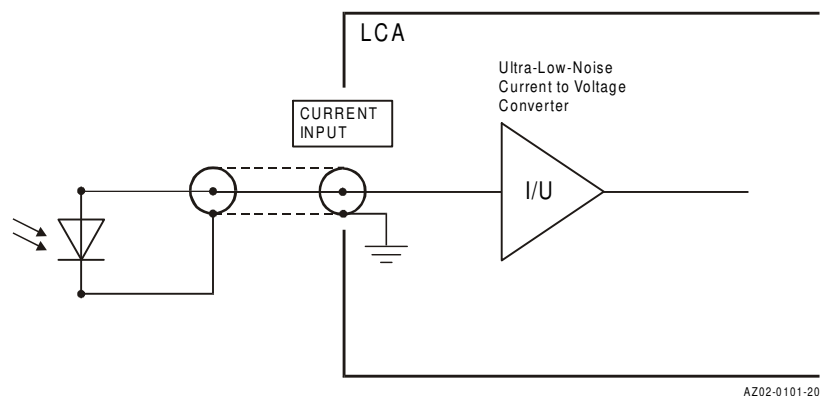
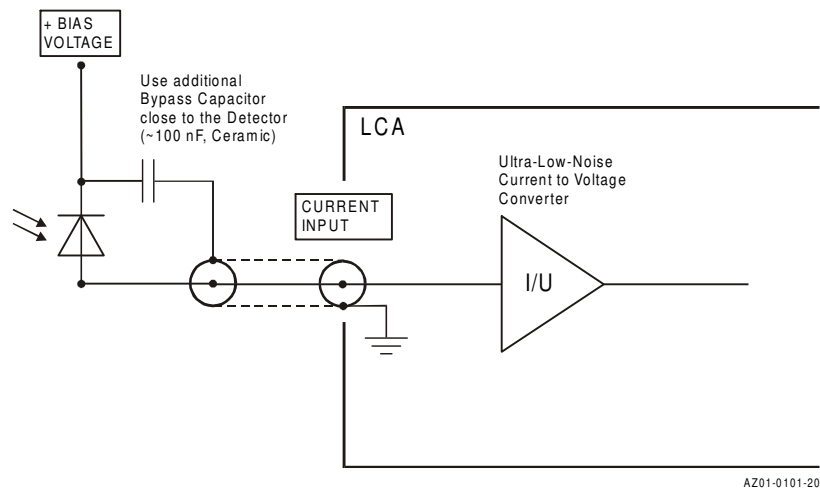
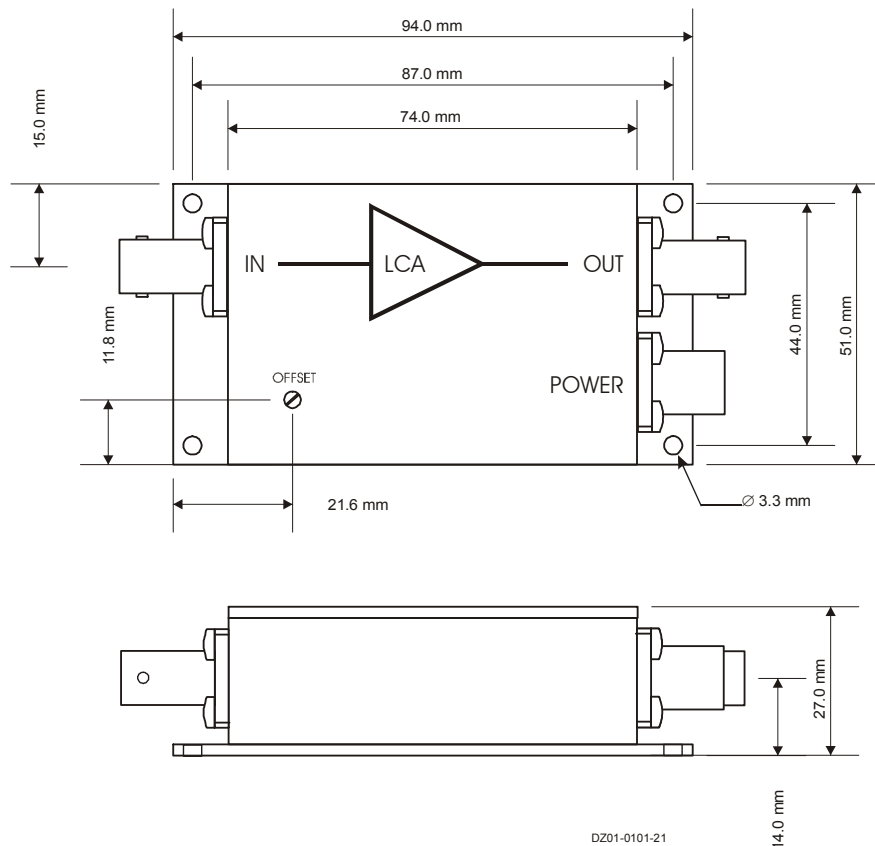


Photo Detector Biasing in Photoconductive Mode:  
Use for Fast Applications and if More Dark Current is Tolerable.  
Bias Voltage Decreases Detector Capacitance.



# Ultra-Low-Noise Current Amplifier

## Dimensions



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