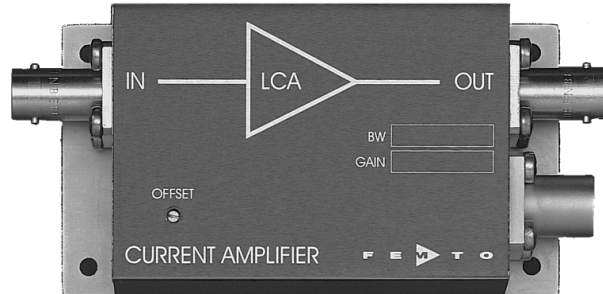




Datasheet

LCA-200K-20M

Ultra-Low-Noise Current Amplifier

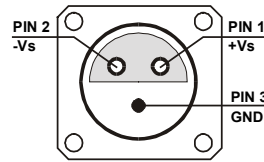


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|--------------------------|---|---|---------------|-------------------------|---|----------------------|-------------------------|--------|-------------------------|------------------|-------------------|------------------|---------------|----------|-------|--------------------------|----------------------|--------------------------|---------------------|--------------------|-----------|--------------------------|-------------------|-----------------------------|--|--------------------|---------------------------------|--------------------|------------------------|--------|----------------|----------------------|------------------|---|---------------------|--------------------------------|--------------|----------------|--------|----------------|--------------|------|--------|-------------------|----------|--------------------------|-------------------|---------------------|-----------------|-----------------------|--------------|
| Features | <ul style="list-style-type: none"> • Bandwidth and Frequency Response Independent of Detector-Capacitance (up to 10 nF) • Extremely Low Noise, 40 fA/√Hz Equivalent Input Noise Current • Bandwidth DC ... 200 kHz • Transimpedance (Gain) 2×10^7 V/A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Applications | <ul style="list-style-type: none"> • Photodiode- and Photomultiplier-Amplifier • Spectroscopy • Charge-Amplifier • Ionisation Detectors • Preamplifier for Lock-Ins, A/D-Converters, etc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Specifications | <p><i>Test Conditions</i> $V_s = \pm 15$ V, $T_a = 25^\circ$ C</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 20%;">Gain</td> <td style="width: 50%;">Transimpedance Accuracy</td> <td style="width: 30%;">2×10^7 V/A (>10 kΩ Load) ± 1%</td> </tr> <tr> <td rowspan="4">Frequency Response</td> <td>Lower Cut-Off Frequency</td> <td>DC</td> </tr> <tr> <td>Upper Cut-Off Frequency</td> <td>200 kHz (- 3 dB)</td> </tr> <tr> <td>Rise- / Fall-Time</td> <td>2 μs (10% - 90%)</td> </tr> <tr> <td>Gain Flatness</td> <td>± 0.1 dB</td> </tr> <tr> <td rowspan="7">Input</td> <td>Equ. Input Noise Current</td> <td>40 fA/√Hz (@ 10 kHz)</td> </tr> <tr> <td>Equ. Input Noise Voltage</td> <td>5 nV/√Hz (@ 10 kHz)</td> </tr> <tr> <td>Input Bias Current</td> <td>2 pA typ.</td> </tr> <tr> <td>Input Bias Current Drift</td> <td>Factor 1.7 / 10 K</td> </tr> <tr> <td>Offset Current Compensation</td> <td>± 150 nA, Adjustable by Offset-Trimpot</td> </tr> <tr> <td>Max. Input Current</td> <td>± 500 nA (Linear Amplification)</td> </tr> <tr> <td>DC Input Impedance</td> <td>50 Ω (Virtual) // 5 pF</td> </tr> <tr> <td rowspan="3">Output</td> <td>Output Voltage</td> <td>± 10 V (>10 kΩ Load)</td> </tr> <tr> <td>Output Impedance</td> <td>50 Ω (Terminate with >10 kΩ for best Performance)</td> </tr> <tr> <td>Max. Output Current</td> <td>± 10 mA (Linear Amplification)</td> </tr> <tr> <td rowspan="2">Power Supply</td> <td>Supply Voltage</td> <td>± 15 V</td> </tr> <tr> <td>Supply Current</td> <td>± 40 mA typ.</td> </tr> <tr> <td rowspan="2">Case</td> <td>Weight</td> <td>210 gr. (0.5 lbs)</td> </tr> <tr> <td>Material</td> <td>AlMg4.5Mn, nickel-plated</td> </tr> <tr> <td rowspan="2">Temperature Range</td> <td>Storage Temperature</td> <td>-40 ... +100 °C</td> </tr> <tr> <td>Operating Temperature</td> <td>0 ... +60 °C</td> </tr> </table> | | Gain | Transimpedance Accuracy | 2×10^7 V/A (>10 kΩ Load) ± 1% | Frequency Response | Lower Cut-Off Frequency | DC | Upper Cut-Off Frequency | 200 kHz (- 3 dB) | Rise- / Fall-Time | 2 μs (10% - 90%) | Gain Flatness | ± 0.1 dB | Input | Equ. Input Noise Current | 40 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 | ± 150 nA, Adjustable by Offset-Trimpot | Max. Input Current | ± 500 nA (Linear Amplification) | DC Input Impedance | 50 Ω (Virtual) // 5 pF | Output | Output Voltage | ± 10 V (>10 kΩ Load) | Output Impedance | 50 Ω (Terminate with >10 kΩ for best Performance) | Max. Output Current | ± 10 mA (Linear Amplification) | Power Supply | Supply Voltage | ± 15 V | Supply Current | ± 40 mA typ. | Case | Weight | 210 gr. (0.5 lbs) | Material | AlMg4.5Mn, nickel-plated | Temperature Range | Storage Temperature | -40 ... +100 °C | Operating Temperature | 0 ... +60 °C |
| Gain | Transimpedance Accuracy | 2×10^7 V/A (>10 kΩ Load) ± 1% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Frequency Response | Lower Cut-Off Frequency | DC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Upper Cut-Off Frequency | 200 kHz (- 3 dB) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Rise- / Fall-Time | 2 μs (10% - 90%) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Gain Flatness | ± 0.1 dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input | Equ. Input Noise Current | 40 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 | ± 150 nA, Adjustable by Offset-Trimpot | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Max. Input Current | ± 500 nA (Linear Amplification) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | DC Input Impedance | 50 Ω (Virtual) // 5 pF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Output | Output Voltage | ± 10 V (>10 kΩ Load) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Output Impedance | 50 Ω (Terminate with >10 kΩ for best Performance) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Max. Output Current | ± 10 mA (Linear Amplification) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Supply | Supply Voltage | ± 15 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Supply Current | ± 40 mA typ. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Case | Weight | 210 gr. (0.5 lbs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Material | AlMg4.5Mn, nickel-plated | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature Range | Storage Temperature | -40 ... +100 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Operating Temperature | 0 ... +60 °C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Absolute Maximum Ratings | <table border="0" style="width: 100%;"> <tr> <td style="width: 20%;">Input Voltage</td> <td style="width: 50%;"></td> <td style="width: 30%;">± 5 V</td> </tr> <tr> <td>Power Supply Voltage</td> <td></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.

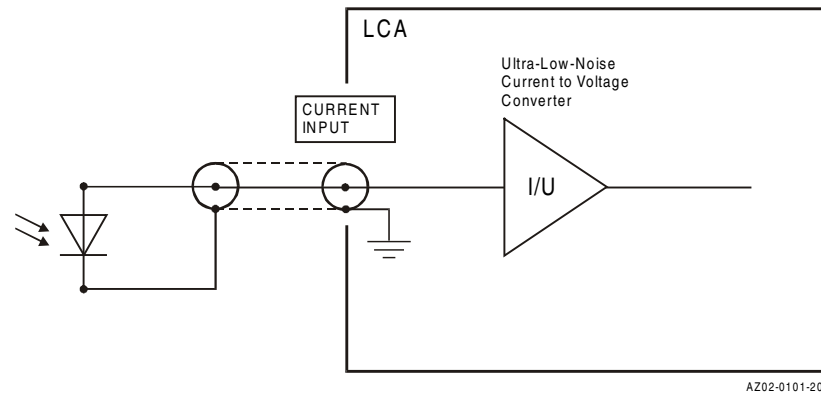
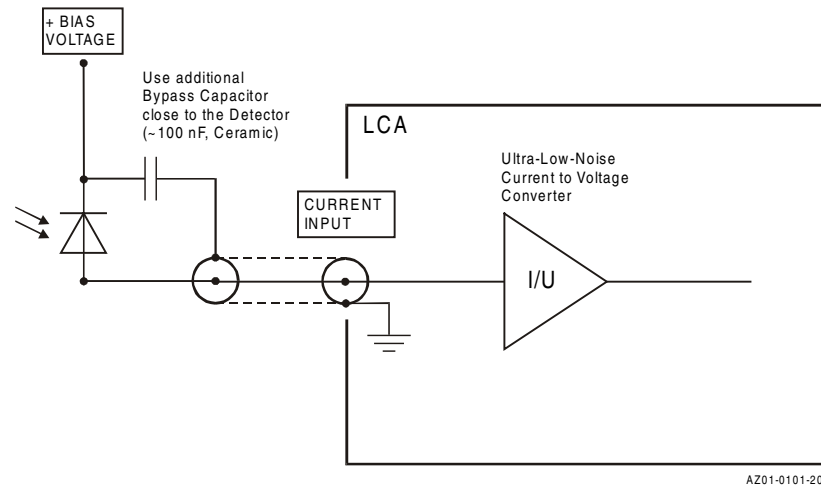
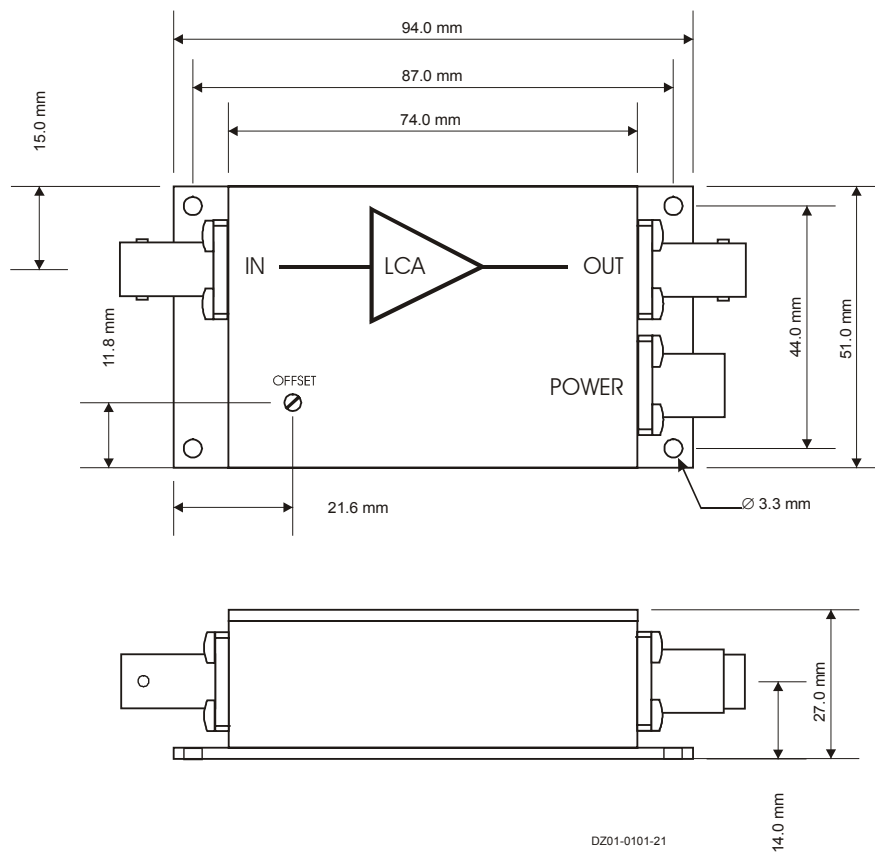


Photo Detector Biasing in Photoconductive Mode:
 Use for Fast Applications and if More Dark Current is Tolerable.
 Bias Voltage Decreases Detector Capacitance.



Ultra-Low-Noise Current Amplifier

Dimensions



DZ01-0101-21

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