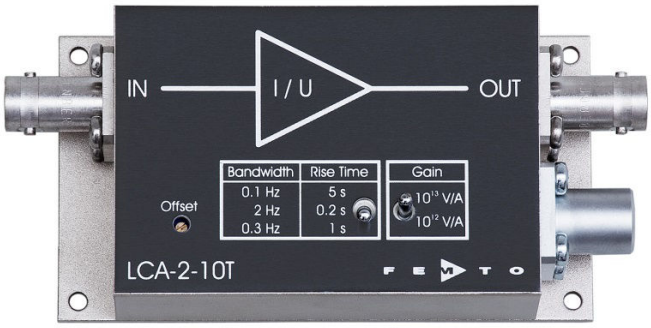
# Ultra Low Noise Current Amplifier

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|---|---|---|
| Features | • **Switchable transimpedance (gain) 1 x $10^{12}$ V/A and 1 x $10^{13}$ V/A**<br>• **Extremely low input noise current of 0.18 fA/√Hz**<br>• **Rise time 0.2 s**<br>• **Switchable low pass filter 2 Hz, 0.3 Hz and 0.1 Hz**<br>• **Protection against ±2 kV transients** | |
| Applications | • **Very sensitive current and charge measurements**<br>• **Spectroscopy**<br>• **Photodiode amplifier**<br>• **Conductive atomic force microscopy (cAFM)**<br>• **Amplifier for ionization and charge detectors**<br>• **Characterization of active electronic components**<br>• **Preamplifier for oscilloscopes, A/D converters, digital voltmeter etc.** | |
| Specifications | Test Conditions | $V_S$ = ±15 V, $T_A$ = 25°C<br>Warm-up 20 minutes (min. 10 minutes recommended) |
| Gain | Transimpedance | 1 x $10^{12}$ V/A and 1 x $10^{13}$ V/A (@ ≥1 MΩ load) |
| | Accuracy | ±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 fA/√Hz (@ 0.2 Hz) |
| | Integrated input noise | 0.3 fA peak-peak (@ 0.1 Hz bandwidth setting)<br>0.6 fA peak-peak (@ 0.3 Hz bandwidth setting)<br>2 fA peak-peak (@ 2 Hz bandwidth setting) |
| | Input bias current | 20 fA typ. / 30 fA max. |
| | Input bias current drift | factor 2 / 10 °C |
| | Offset compensation range | ±50 fA, adjustable by offset trimpot |
| | Max. input current | ±10 pA (for linear amplification @ 1 x $10^{12}$ V/A gain)<br>±1 pA (for linear amplification @ 1 x $10^{13}$ V/A gain) |
| | Input offset voltage | <0.5 mV |
| | DC input impedance | 1 kΩ (virtual) // 5 pF |
| Output | Output voltage | ±10 V (@ ≥1 MΩ load) |
| | Output impedance | 50 Ω (terminate with ≥1 MΩ load for best performance) |
| | Max. output current | ±10 mA (for linear amplification) |
| Power Supply | Supply voltage | ±15 V |
| | Supply current | ±15 mA typ. (depends on operating conditions,<br>recommended power supply capability minimum ±50 mA) |

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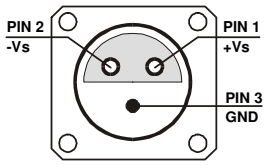
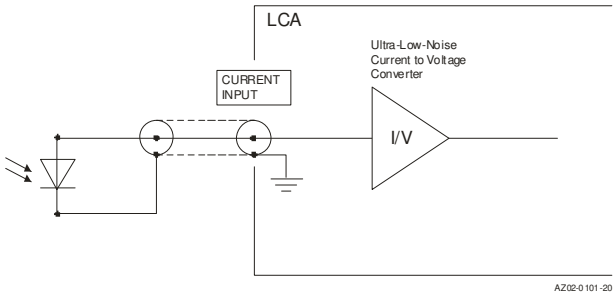
|---|---|---|
| Specifications (continued) | | |
| Case | Weight | 210 g (0.5 lbs) |
| | Material | AlMg4.5Mn, nickel-plated |
| Temperature Range | Storage temperature | –40 ... +100 °C |
| | Operating temperature | 0 ... +60 °C |
| Absolute Maximum Ratings | Input voltage | ±10 V |
| | Power supply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




Application Diagrams

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



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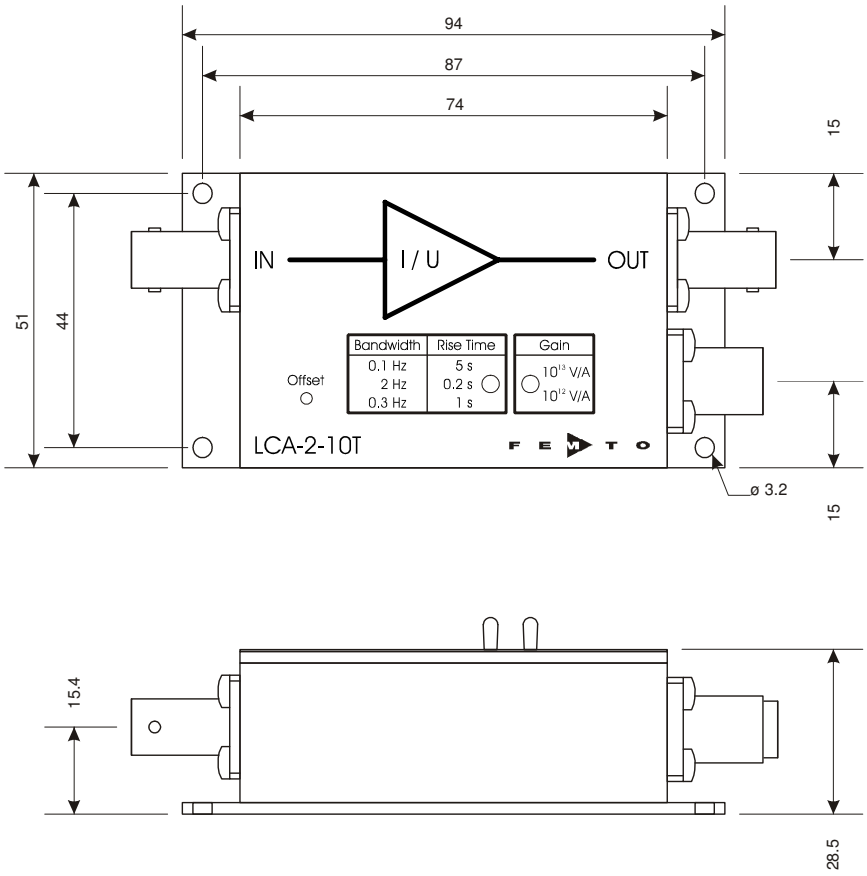
Dimensions




all measures in mm unless otherwise noted

DZ-LCA-2-10T_R3

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