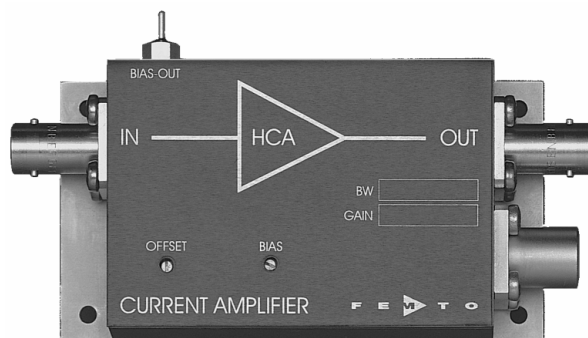


# High Speed Current Amplifier



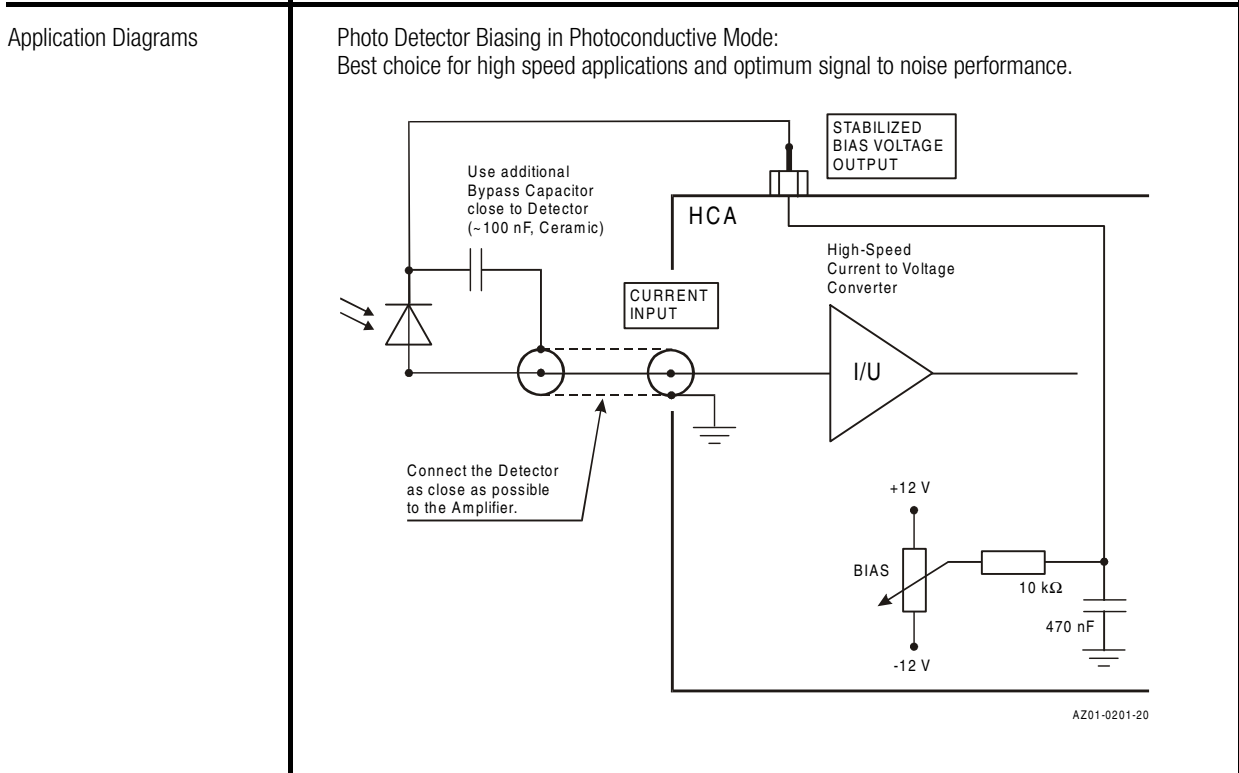
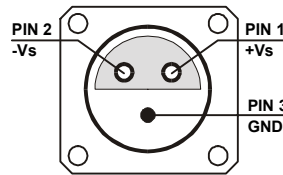
|                       |  |   |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|-----------------------|--|---|--|------------------------|-------------------------------|------|----------------|---------------------------------------|---------------|-------|--------------------|-------------------------|----|----------------------------------|--------|--------------------------------|-------|---------------|----------|-------|--------------------------|-----------------------|--------------------------|----------------------|--------------------|-----------|--------------------------|-------------------|-----------------------------|--------------------------------------|---------------------|------------------------------------|----------------------|------|--------------------|------------------------|--------|----------------------|---|------------------|--|-------------|---------------------------|------------------------------------|-----------------------|---------------|
| <p>Features</p>       | <ul style="list-style-type: none"> <li>• <b>Bandwidth and Frequency Response Independent of Detector Capacitance (up to 15 pF)</b></li> <li>• <b>Low Noise 1.1pA/√Hz Equivalent Input Noise Current</b></li> <li>• <b>Bandwidth DC ... 10 MHz</b></li> <li>• <b>Transimpedance (Gain) 1 x 10<sup>5</sup> V/A</b></li> <li>• <b>Protection against ± 3.5 kV Transients</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> | <table border="0"> <tr> <td></td> <td><i>Test Conditions</i></td> <td><i>Vs = ± 15 V, Ta = 25°C</i></td> </tr> <tr> <td rowspan="2">Gain</td> <td>Transimpedance</td> <td>1 x 10<sup>5</sup> V/A (@ 50 Ω load)</td> </tr> <tr> <td>Gain Accuracy</td> <td>± 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 (- 3 dB)</td> <td>10 MHz</td> </tr> <tr> <td>Rise / Fall Time (10 % - 90 %)</td> <td>35 ns</td> </tr> <tr> <td>Gain Flatness</td> <td>± 0.3 dB</td> </tr> <tr> <td rowspan="8">Input</td> <td>Equ. Input Noise Current</td> <td>1.1pA/√Hz (@ 100 kHz)</td> </tr> <tr> <td>Equ. Input Noise Voltage</td> <td>6 nV/√Hz (@ 100 kHz)</td> </tr> <tr> <td>Input Bias Current</td> <td>5 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>± 20 µA adjustable by offset trimpot</td> </tr> <tr> <td>Input Current Range</td> <td>± 15 µA (for linear amplification)</td> </tr> <tr> <td>Input Offset Voltage</td> <td>2 mV</td> </tr> <tr> <td>DC Input Impedance</td> <td>50 Ω (virtual) // 5 pF</td> </tr> <tr> <td rowspan="2">Output</td> <td>Output Voltage Range</td> <td>± 1.5 V (@ 50 Ω load)<br/>for linear operation and low harmonic distortion</td> </tr> <tr> <td>Output Impedance</td> <td>50 Ω (terminate with 50 Ω load for best performance)</td> </tr> <tr> <td rowspan="2">Bias Output</td> <td>Bias Output Voltage Range</td> <td>± 12 V, adjustable by bias trimpot</td> </tr> <tr> <td>Bias Output Impedance</td> <td>10 kΩ // 1 µF</td> </tr> </table> |   |  | <i>Test Conditions</i> | <i>Vs = ± 15 V, Ta = 25°C</i> | Gain | Transimpedance | 1 x 10 <sup>5</sup> V/A (@ 50 Ω load) | Gain Accuracy | ± 1 % | Frequency Response | Lower Cut-Off Frequency | DC | Upper Cut-Off Frequency (- 3 dB) | 10 MHz | Rise / Fall Time (10 % - 90 %) | 35 ns | Gain Flatness | ± 0.3 dB | Input | Equ. Input Noise Current | 1.1pA/√Hz (@ 100 kHz) | Equ. Input Noise Voltage | 6 nV/√Hz (@ 100 kHz) | Input Bias Current | 5 pA typ. | Input Bias Current Drift | Factor 1.7 / 10 K | Offset Current Compensation | ± 20 µA adjustable by offset trimpot | Input Current Range | ± 15 µA (for linear amplification) | Input Offset Voltage | 2 mV | DC Input Impedance | 50 Ω (virtual) // 5 pF | Output | Output Voltage Range | ± 1.5 V (@ 50 Ω load)<br>for linear operation and low harmonic distortion | Output Impedance | 50 Ω (terminate with 50 Ω load for best performance) | Bias Output | Bias Output Voltage Range | ± 12 V, adjustable by bias trimpot | Bias Output Impedance | 10 kΩ // 1 µF |
|                       | <i>Test Conditions</i>   | <i>Vs = ± 15 V, Ta = 25°C</i>   |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
| Gain                  | Transimpedance   | 1 x 10 <sup>5</sup> V/A (@ 50 Ω load)                                     |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Gain Accuracy  | ± 1 %   |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
| Frequency Response    | Lower Cut-Off Frequency  | DC  |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Upper Cut-Off Frequency (- 3 dB)   | 10 MHz  |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Rise / Fall Time (10 % - 90 %)   | 35 ns   |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Gain Flatness  | ± 0.3 dB  |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
| Input                 | Equ. Input Noise Current   | 1.1pA/√Hz (@ 100 kHz)   |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Equ. Input Noise Voltage   | 6 nV/√Hz (@ 100 kHz)  |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Input Bias Current   | 5 pA typ.   |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Input Bias Current Drift   | Factor 1.7 / 10 K   |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Offset Current Compensation  | ± 20 µA adjustable by offset trimpot                                      |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Input Current Range  | ± 15 µA (for linear amplification)  |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Input Offset Voltage   | 2 mV  |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | DC Input Impedance   | 50 Ω (virtual) // 5 pF  |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
| Output                | Output Voltage Range   | ± 1.5 V (@ 50 Ω load)<br>for linear operation and low harmonic distortion |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Output Impedance   | 50 Ω (terminate with 50 Ω load for best performance)                      |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
| Bias Output           | Bias Output Voltage Range  | ± 12 V, adjustable by bias trimpot  |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |
|                       | Bias Output Impedance  | 10 kΩ // 1 µF   |  |                        |                               |      |                |                                       |               |       |                    |                         |    |                                  |        |                                |       |               |          |       |                          |                       |                          |                      |                    |           |                          |                   |                             |                                      |                     |                                    |                      |      |                    |                        |        |                      |   |                  |  |             |                           |                                    |                       |               |

## High Speed Current Amplifier

|                            |  |   |
|----------------------------|--|---|
| Specifications (continued) |  |   |
| Power Supply               | Supply Voltage<br>Supply Current             | $\pm 15\text{ V}$<br>$\pm 50\text{ mA typ.}$<br>(depends on operating conditions, recommended power supply capability minimum $\pm 150\text{ mA}$ ) |
| Case                       | Weight<br>Material                           | 210 g (0.5 lbs)<br>AlMg4.5Mn, nickel-plated   |
| Temperature Range          | Storage Temperature<br>Operating Temperature | $-40 \dots +100\text{ }^\circ\text{C}$<br>$0 \dots +60\text{ }^\circ\text{C}$   |

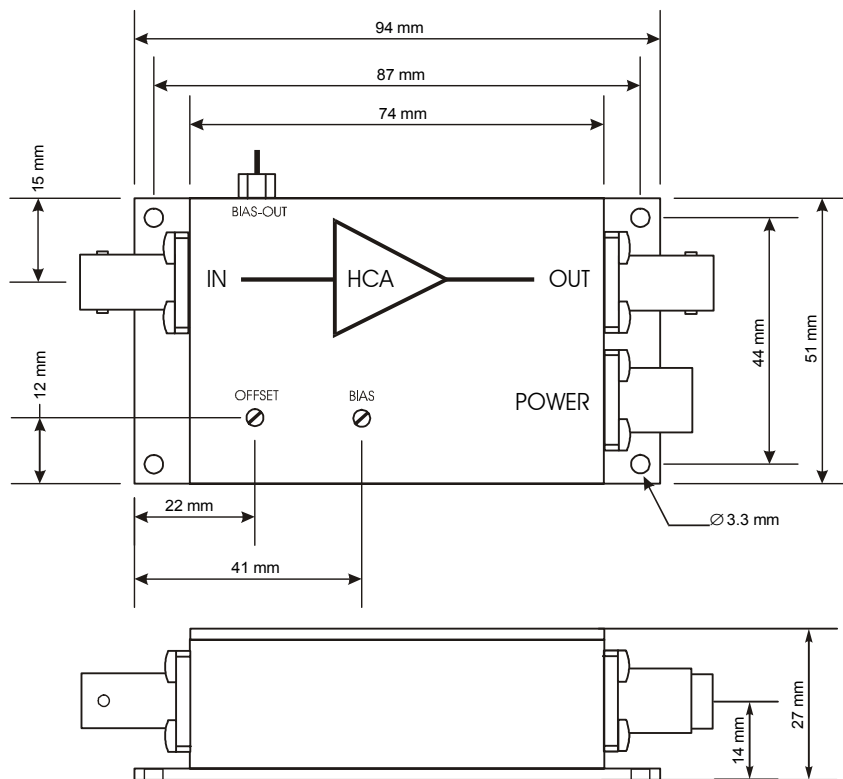
|                          |  |   |
|--------------------------|--|---|
| Absolute Maximum Ratings | Input Voltage<br>Input Voltage Transient<br>Power Supply Voltage | $\pm 5\text{ V}$<br>$\pm 3.5\text{ kV}$ (pulsewidth 10 ns)<br>$\pm 22\text{ V}$ |
|--------------------------|--|---|

|            |                                 |  |
|------------|---------------------------------|--|
| Connectors | Input<br>Output<br>Power Supply | BNC<br>BNC<br>LEMO series 1S, 3-pin fixed socket<br>Pin 1: +15V<br>Pin 2: -15V<br>Pin 3: GND |
|------------|---------------------------------|--|



High Speed Current Amplifier

Dimensions



DZ01-0201-22

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