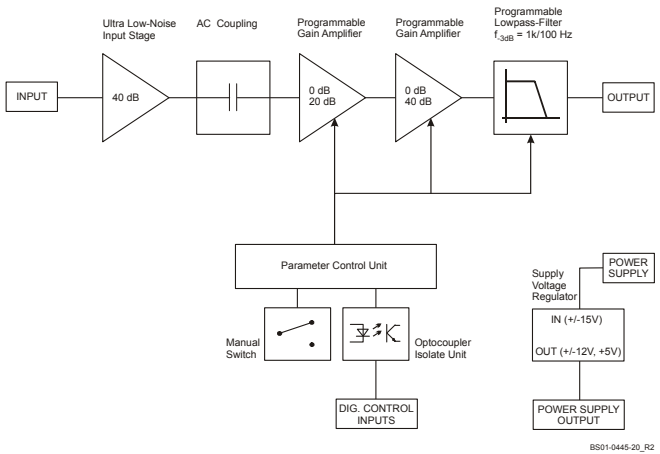
Measurement Devices

FEMTO®

LASER COMPONENTS®

## Datasheet DLPVA-100-BUN-S

# Ultra-Low-Noise Variable Gain Low-Frequency Voltage Amplifier


| | |
|---|---|
| Features | • **Variable gain 40 to 100 dB, switchable in 20 dB steps**<br>• **Bipolar input stage, recommended for low impedance sources smaller than 50 Ω**<br>• **Ultra low input voltage noise: 400 pV/√Hz**<br>• **AC coupled, single ended**<br>• **Bandwidth 1.5 Hz - 100 kHz, switchable to 1 kHz**<br>• **Local and remote control** |
| Applications | • **Ultra low-noise laboratory amplifier**<br>• **Pulsed thermal EMF analysis**<br>• **Chopped thermopiles / bolometers**<br>• **Industrial sensors**<br>• **Detector preamplifier**<br>• **Integrated measurement systems** |
| Block Diagram |  |



SOPHISTICATED TOOLS FOR SIGNAL RECOVERY FEMTO

DE-DLPVA-100-BUN-S_R5/LK,JMi/17OKT2019



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|---|---|---|
| Specifications | Test conditions | $V_S$ = ±15 V, $T_A$ = 25 °C, load impedance = 1 MΩ |
| Gain | Gain values | 40, 60, 80, 100 dB<br>indicated by four LEDs |
| | Gain accuracy | ±1 % |
| Frequency Response | Lower cut-off frequency | 1.5 Hz |
| | Upper cut-off frequency | 100 kHz, 12 dB/Oct<br>switchable to 1 kHz, 6 dB/Oct. |
| Time Response | Rise/fall time (10 % - 90 %) | 3.5 µs (@ BW = 100 kHz)<br>350 µs (@ BW = 1 kHz) |
| Input | Input impedance | 1 kΩ typ. |
| | Equivalent input voltage noise | Gain setting / Noise<br>100 dB: 400 pV/√Hz<br>80 dB: 420 pV/√Hz<br>60 dB: 800 pV/√Hz<br>40 dB: 6 nV/√Hz |
| | Equivalent input current noise | 5,5 pA/√Hz |
| | 1/f-noise corner | 100 Hz |
| | Input bias current | 30 µA |
| | Maximum input DC-offset voltage for linear amplification | ±90 mV |
| | **Important notice:** The input must see a source impedance below 200 Ω. | |
| Output | Output impedance | <100 Ω (terminate with > 100 kΩ load for best performance) |
| | Output voltage range for linear amplification | ±10 V (@ > 100 kΩ load) |
| | Output current (max.) | ±20 mA |
| | Output overload recovery time | 0.5 ms (after 20x overload) |
| Overload LED | The amplifier features a LED to signalize an overload condition. The Overload LED will turn on if the signal level within the signal path exceeds the linear operating range. In order to ensure the correct operation of the amplifier without signal distortions reduce the gain setting until the Overload LED turns off.<br>The Overload LED may also turn on when the amplifier is operated with open input or with a high source impedance, e. g. external AC coupling. In this case the bias current may cause a considerable input voltage. For proper operation please use a source impedance of less than 100 Ω or switch to a lower gain setting. | |
| Remote Digital Control | Control input voltage range | Low: –0.8 ...+0.8 V<br>High: +1.8 ... +12 V, TTL / CMOS compatible |
| | Control input current | 0 mA @ 0 V, 1.5 mA @ +5 V, 4.5 mA @ +12 V |
| | Overload output | Non active: +5 V, max. 1 mA, active: 0.8 V, max. –10 mA |
| Power Supply | Supply voltage | ±15 V (±14.5 V to ±16 V) |
| | Supply current | ±55 mA typ. (depends on operating conditions, recommended power supply capability min. ±150 mA) |

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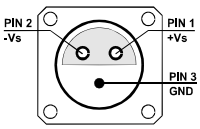
| | | |
|---|---|---|
| Specifications (continued) | | |
| Case | Weight | 0.32 kg (0.7 lbs) |
| | Material | AlMg4.5Mn, nickel-plated |
| Temperature Range | Storage temperature | –40 °C to +70 °C |
| | Operating temperature | 0 °C to +55 °C |
| Absolute Maximum Ratings | Power supply voltage | ±21 V |
| | Control input voltage | +16 V / –5 V |
| | Signal input voltage | ±4 V |
| | Overvoltage at the signal input can severely degrade the noise performance or destroy the amplifier! | |
| Connectors | Input | BNC jack (female) |
| | Output | BNC jack (female) |
| | Power supply | Lemo® series 1S, 3-pin fixed socket<br>(mating plug type: FFA.1S.303.CLAC52)<br>Pin 1: +15V<br>Pin 2: –15V<br>Pin 3: GND |
| | |  |
| | Control port | Sub-D 25-pin, female<br>Pin 1: +12 V (stabilized power supply output, max. 60 mA*)<br>Pin 2: –12 V (stabilized power supply output, max. 60 mA*)<br>Pin 3: AGND (analog ground)<br>Pin 4: +5 V (stabilized power supply output, max. 15 mA*)<br>Pin 5: digital output: overload<br>Pin 6: NC<br>Pin 7: NC<br>Pin 8: NC<br>Pin 9: DGND (ground f. digital control Pin 10 - 25)<br>Pin 10: NC<br>Pin 11: digital control input: gain, LSB<br>Pin 12: digital control input: gain, MSB<br>Pin 13: NC<br>Pin 14: digital control input: 100 kHz / 1 kHz<br>Pin 15 - 25: NC<br><br>*check power supply for maximum deliverable current |

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## Remote Control Operation

**General**

Remote control input bits are opto-isolated and connected by logical OR to local switch setting. For remote control set the corresponding local switch to “0 dB” and “1 kHz” and select the wanted setting via a bit-code at the corresponding digital inputs.
Mixed operation, e.g. local gain setting and remote controlled bandwidth setting, is also possible.

**Gain setting**

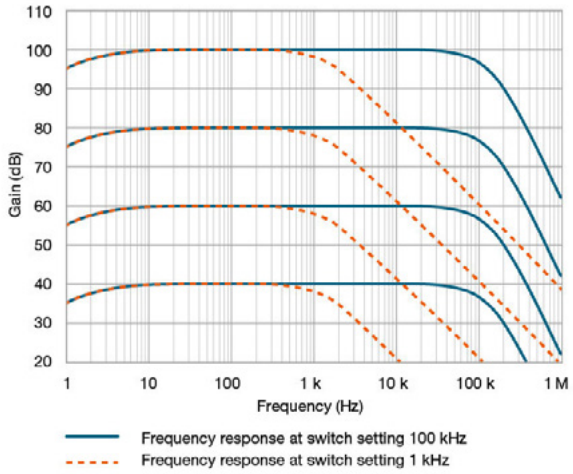
| Gain | Pin 11 | Pin 12 |
|---|---|---|
| 40 dB | low | low |
| 60 dB | high | low |
| 80 dB | low | high |
| 100 dB | high | high |

**Bandwidth setting**

| Bandwidth | Pin 14 |
|---|---|
| 1 kHz | low |
| 100 kHz | high |

## Typical Performance Characteristics

**Frequency response**

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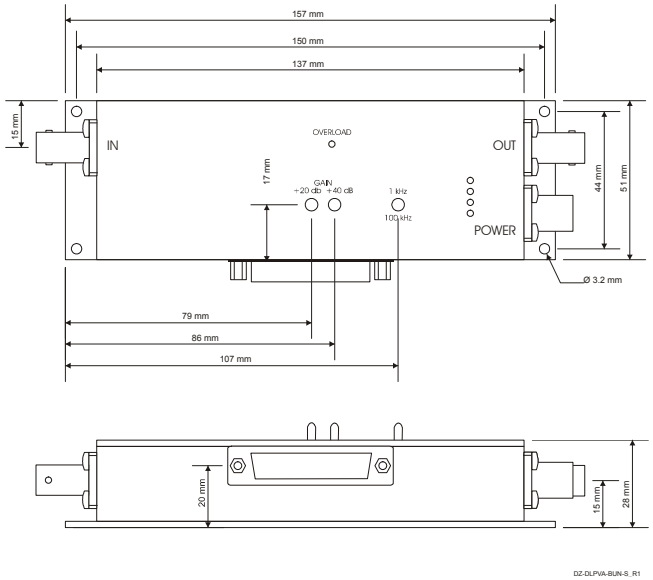
Dimensions



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