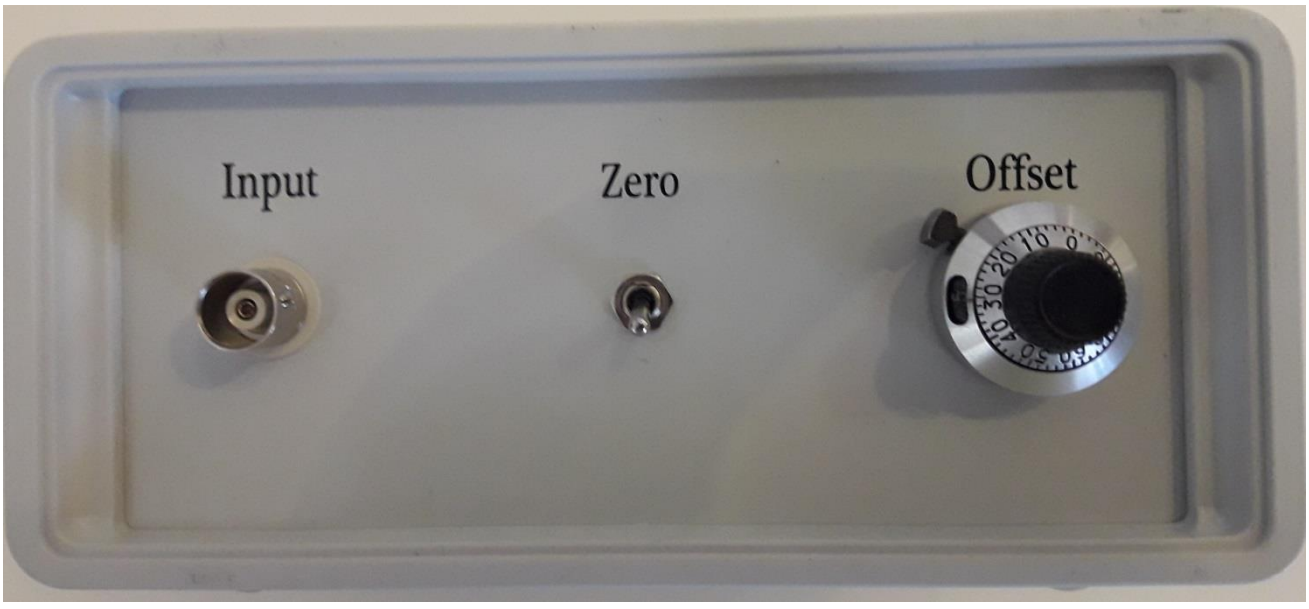
WIDE BAND CURRENT AMPLIFIER



1. Features

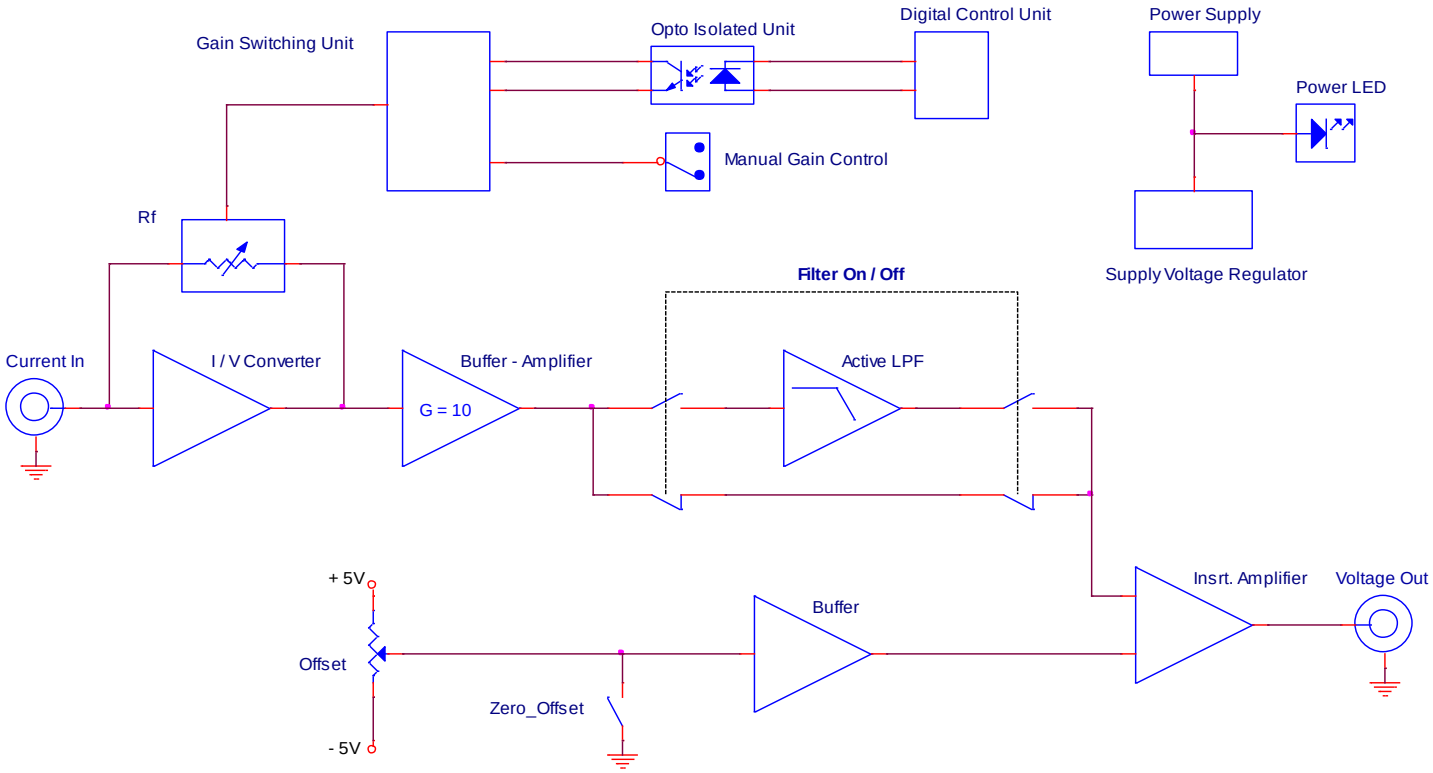
- Transimpedance Gain 10^6 to 10^9 V/A (switchable manually or from an external device)
- Bandwidth up to 1 MHz with the Gain = 10^9 V/A
- Adjustable output voltage offset
- Output Switchable (On/Off) 2-nd Order 20 kHz Low Pass Filter (LPF)

Note. LPF Passband Region can be changed according to customer requirement/ Examples of the amplifier response with different filters see below.

2. Applications

- Scanning probe microscopy
- Charge particle detection
- High speed photodetector amplifier
- Photomultiplier amplifier
- Spectroscopy, etc.

3. Block Diagram



4. Specifications

4.1. Test Conditions : Power Supply (see item 4.12) ; Ta = 25°C;
4.2. Gain (transimpedance) : 10^6 to 10^9 V/A; gain accuracy = ±1%
4.3. Maximum input current: 30μA pp;
4.4. DC input impedance: 50 Ω;
4.5. Output Voltage (@ 100 kΩ load): 3V pp;
4.6. Output offset voltage: ±1V (adjustable with the "OFFSET" potentiometer)
The output offset voltage can also be set to zero using the toggle switch “ZERO”;
4.7. Indicator LED: supply signaling (Power LED);
4.8. The output filter switching on / off is performed using the toggle switch "FILT_ON";

4.9. Measured dynamic parameters in the range up to 1 MHz at Gain = 10^9 V / A:

4.9.1. Without Filter

- Rise / Fall time (10% - 90%): ≤ 100 ns
- Nonlinear distortion: ≤ 0.1%
  - ❖ In the band 200 kHz:
- Input noise peak-to-peak current density : 324 fA pp / √Hz
- Input noise rms current density: 117 fA rms / √Hz

4.9.2. With 20 kHz Filter

- Rise / Fall time (10% - 90%): ≤ 100 ns
- Nonlinear distortion: ≤ 0.1%
  - ❖ In the band > 20 kHz up to 200 kHz:
- Input noise peak-to-peak current density: 160 fA pp / √Hz
- Input noise rms current density: 57 fA rms / √Hz

4.9.3. The minimum detectable input current (with a 20 kHz filter) is 10 pA pp.

4.10. Manual Gain Control is performed using the 5-position switch “GAIN” :

- 1-st position - Gain = 10^9 V/A
- 2-nd position - Gain = 10^8 V/A
- 3-rd position - Gain = 10^7 V/A
- 4-th position - Gain = 10^6 V/A
- 5-th position - Transition to Gain Control from an external device

4.11. Gain Control from the external device is performed by signals of level 0V (logical 0_LOW) / 5V (logical 1_HIGH) for three inputs (bits): Bit 1, Bit 2, Bit 3:

Gain (V/A)	Bit 1 (V)	Bit 2 (V)	Bit 3 (V)
10^9	0	0	0
10^8	5	0	0
10^7	0	5	0
10^6	0	0	5

4.12. Power Supply:

- Supply Voltage: 12VDC or 12AC (wall mount Power supply)

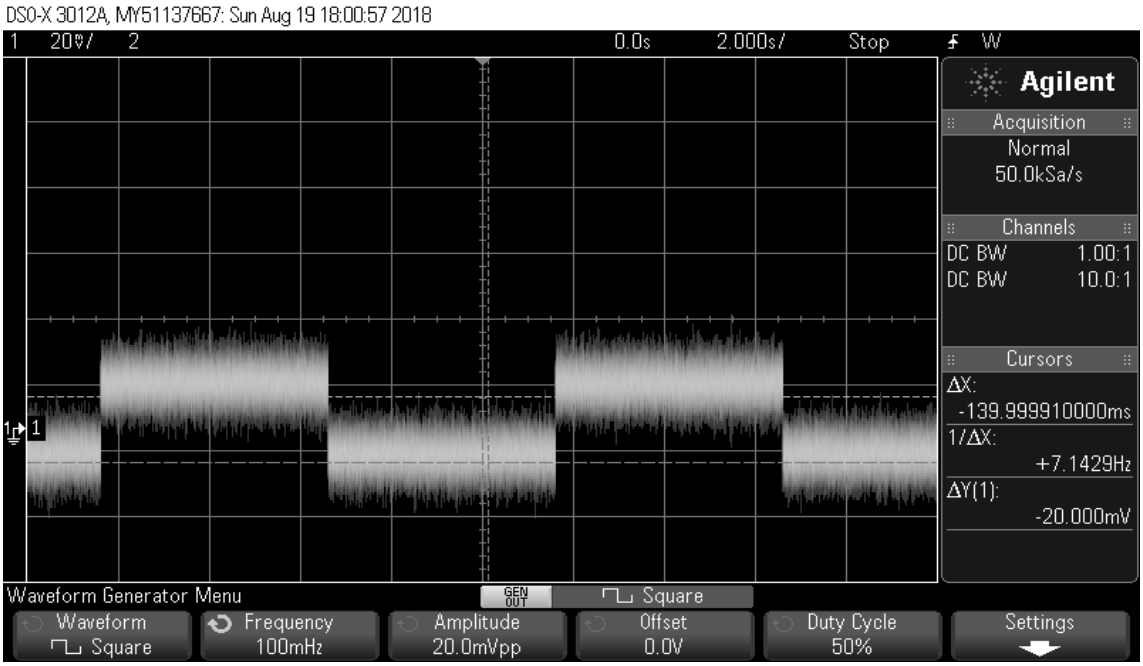
4.13. Temperature Range :

- Storage Temperature: -40°C … +100°C
- Operating Temperature: 0°C… +60°C

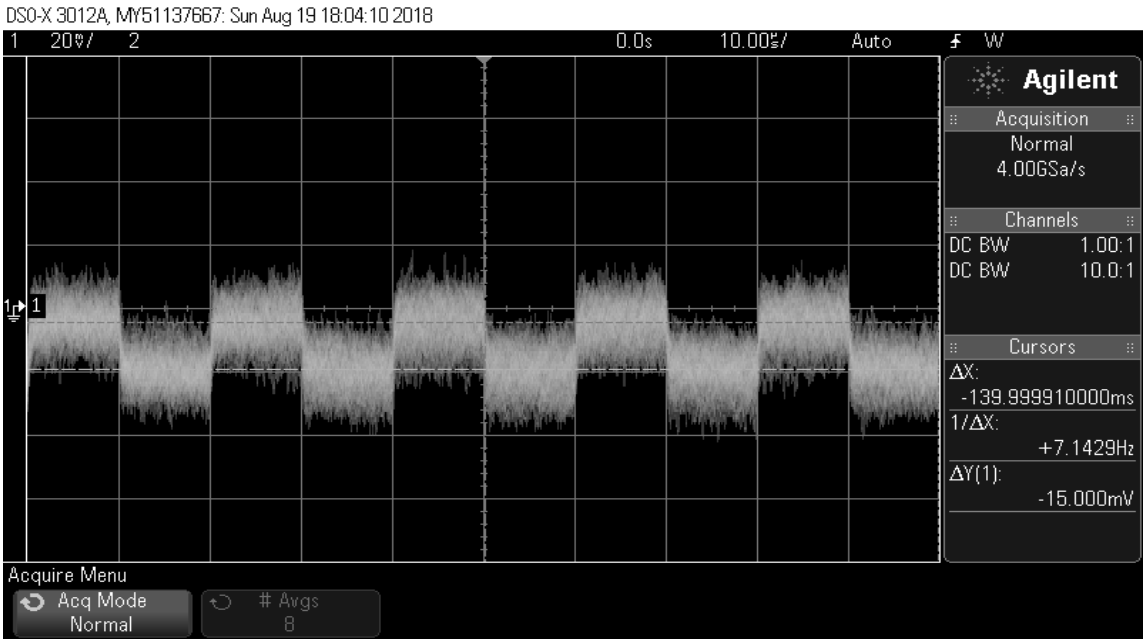
4.14. Dimensions : 140 mm x 90 mm x 85 mm (L x W x H)

4.15. Examples of the amplifier response (Square Waveform) :

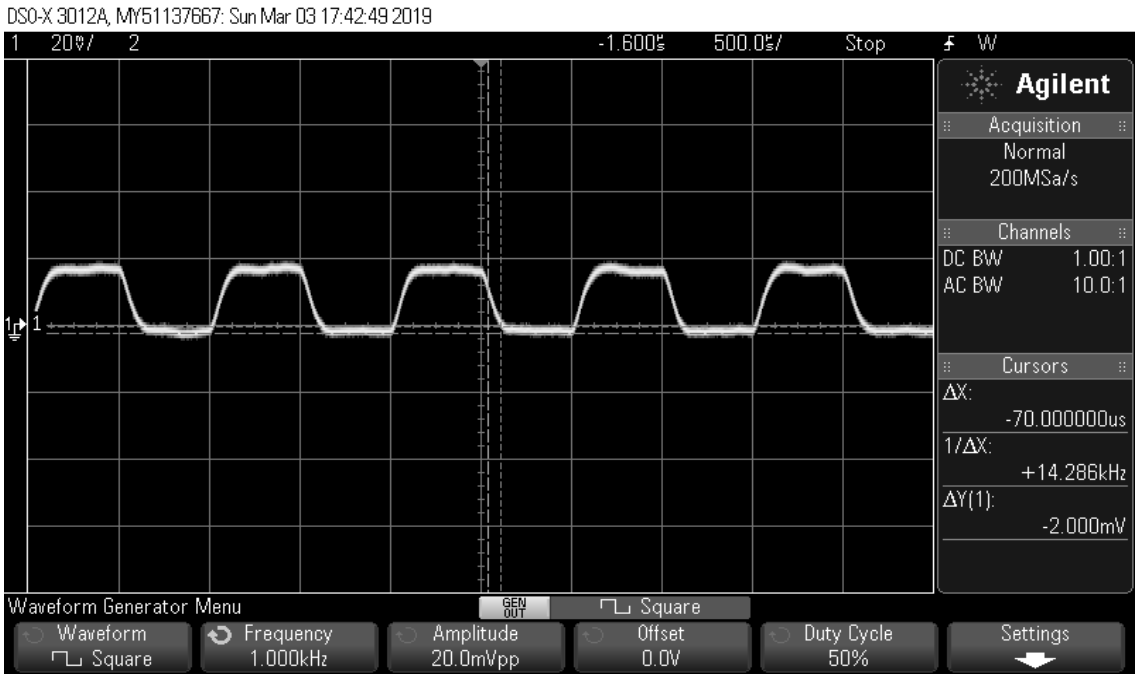
4.15.1. Input Current = 20pA, 100mHz , Gain =10^9 V/A, with Filter 20kHz



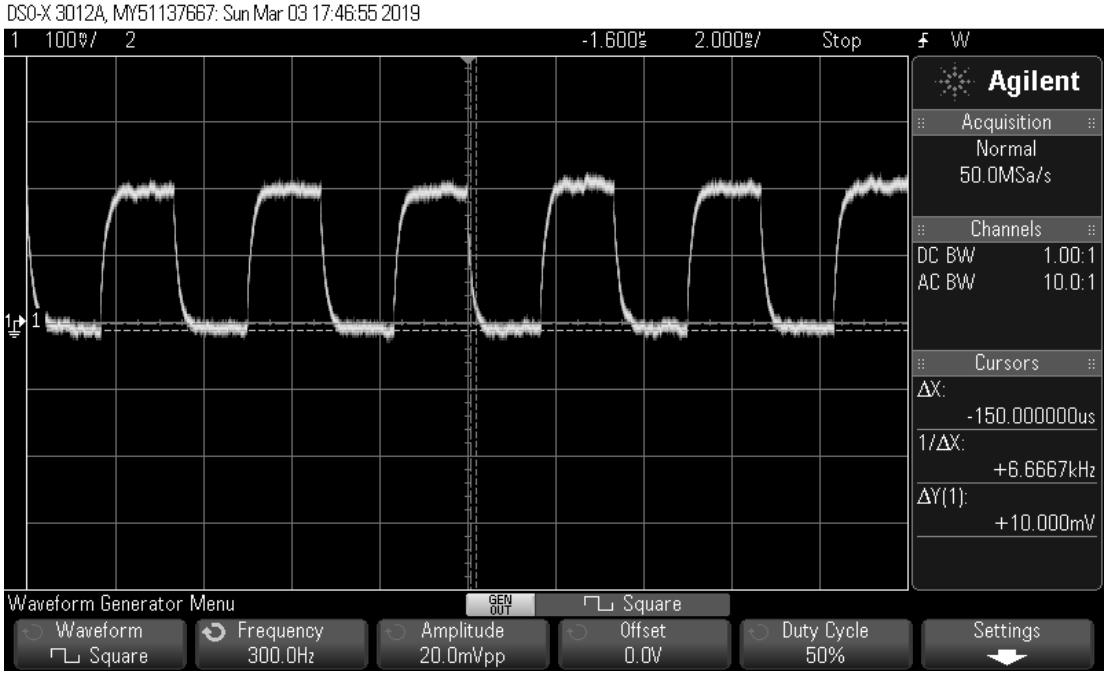
4.15.2. Input Current = 15pA, 50kHz , Gain =10^9 V/A, without Filter



4.15.3. Input Current = 200pA, 1kHz, Gain =10^8 V/A, with Filter 5kHz



4.15.4. Input Current = 200 pA, 300 Hz, Gain = 10^9 V/A without Filter



4.15.5. Input Current = 200 pA, 300 Hz, Gain = 10^9 V/A with Filter 5kHz