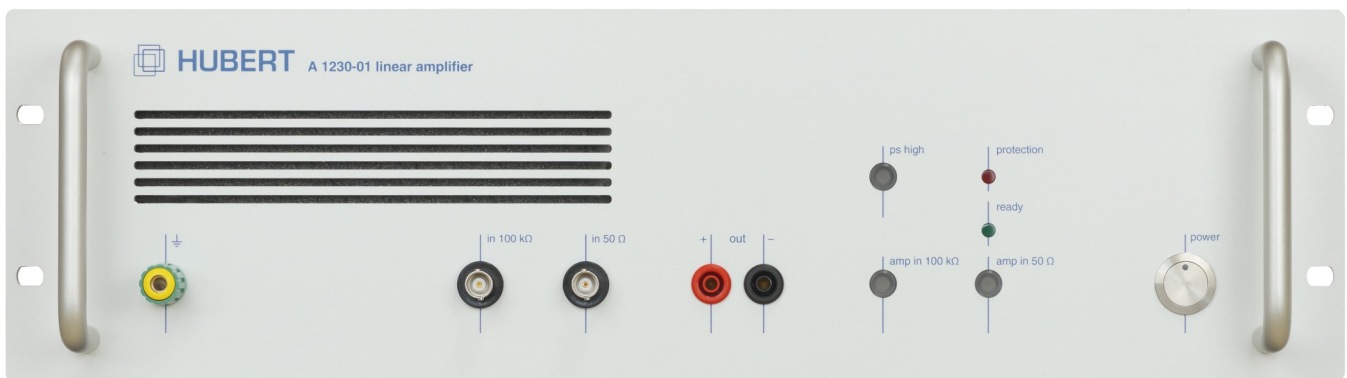




HUBERT

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Datasheet



A1230-01

DC – 7 MHz | 450 V/ μ s | 185 W (DC-source) | 68 W (DC-sink)



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MADE IN GERMANY

Revision 5.0
DS-12300010



1 Product Description

The A1230-01 is a linear, extreme broadband precision power amplifier. It is ideally suited for applications that require quickly changeable signals at optional resistive and complex loads.

The A1230-01 is equipped with two added inputs with 50 Ω and 100 k Ω input resistance, respectively; the 50 Ω input makes it the ideal downstream equipment for conventional function generators.

A switchable slew rate limiter allows the choice between maximum rise time and thus power bandwidth or clean square wave behavior.

There are two operating voltages available for optional selection: high-voltage / low-current or low-volt / high-current. Particularly for very low-ohm loads, selection of low operating voltage results in significant reduction of the dissipation loss and a higher output current.

If higher output voltages are required, the preamplifier output (bridge out) allows for simple bridge circuit structures with a second A1230-01 for doubling the output voltage.

The device is equipped with a low-noise, temperature-controlled fan. In addition to over temperature shut-down, a feature for dissipation power calculation ensures fast power monitoring for perfect short-circuit and overload protection.

Operation is performed via the control elements on the front panel of the amplifier. Moreover, the amplifier can be completely remote-controlled by means of a simple byte protocol via the USB interface.

If higher output voltages or higher output currents are needed, configurations with several A1230-01 devices connected in series or in parallel are possible.

Please find the latest release of this datasheet on our website:
www.drhubert.com



2 Features

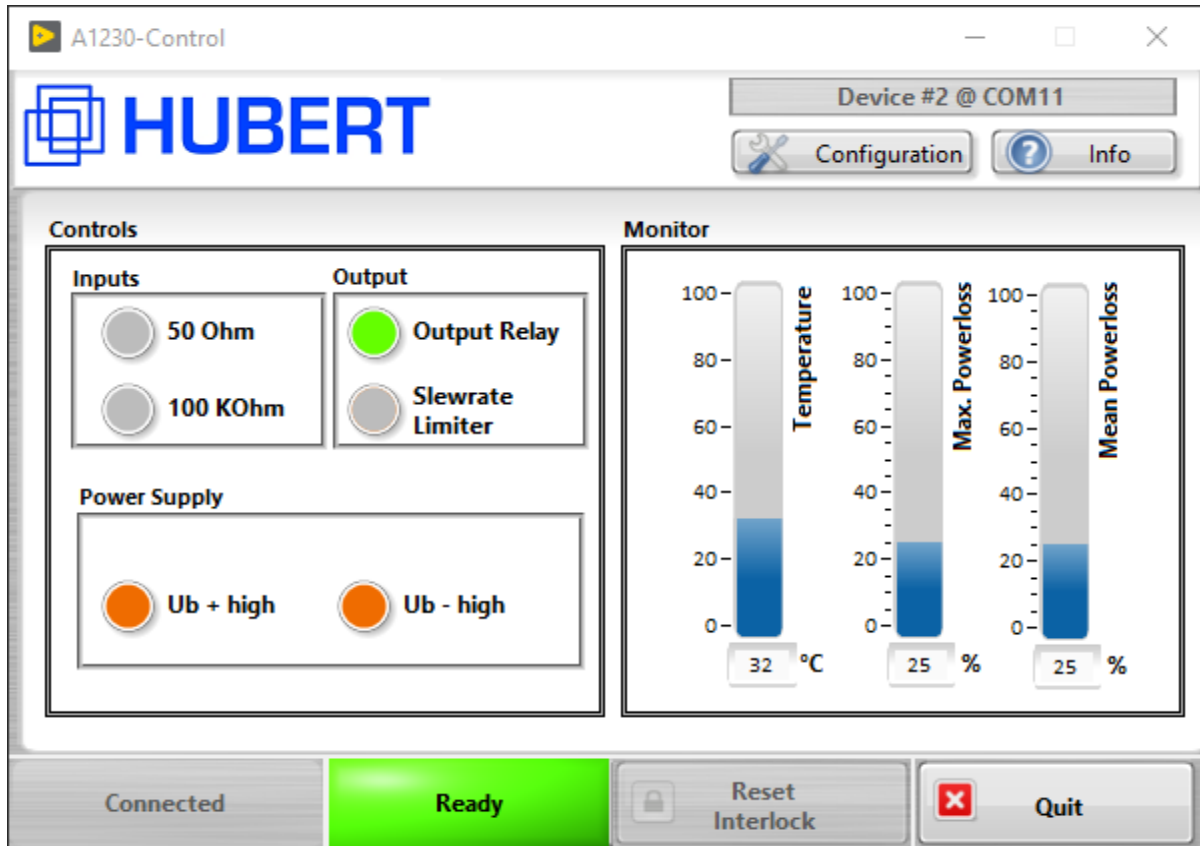
- Universally applicable broadband lab amplifier; ideally suited as downstream equipment for function generators
- Amplifier is stable with all inductive and capacitive loads
- Output voltages up to $75 V_{DC/peak}$
- Output current up to $5 A_{DC}$ / $10 A_{peak}$ (> 10 Hz) / $15 A_{peak}$ (< 5 ms)
- Two added inputs with 50Ω and $100 k\Omega$ input resistance, respectively
- Switchable slew rate limiter
- Preamplifier output (bridge out) allows for simple bridge circuit structures for doubling the output voltage
- Two supply voltages for ideal load adaption
- USB port (emulated COM port) and Ethernet (RJ45) as standard
- Interlock for safety shutdown

3 Applications

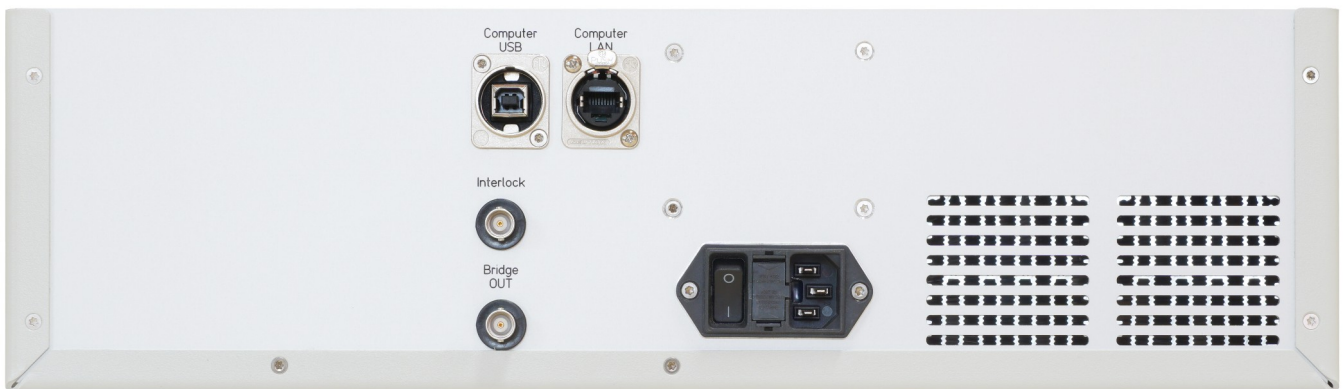
- General lab applications for research, development and testing
- EMC testing
- Material testing
- MRI
- Component tests
- Plunger coil drives
- Piezo actuation
- Ultrasonic transducers
- Generation of magnetic fields (e.g. with Helmholtz coils)
- Medical engineering
- Laser technology
- Plasma technology



4 Control Software



5 Rear Side





6 Specifications

Parameters	Specification	Conditions/Moments
		Mains: 230 V
		25° C ambient temperature
		Continuous operation
Input Impedance / Gain	50 Ω \pm 1% Gain: 20 \pm 1% (\pm 100ppm/°C)	
	100 k Ω \pm 1% Gain: 10 \pm 1% (\pm 100ppm/°C)	
Maximum Input Level	\pm 7,5 V	100 k Ω Input
	\pm 3,75 V	50 Ω Input
Maximum allowed Input Voltage	\pm 15 V	100 k Ω Input
	\pm 10 V	50 Ω Input
Small Signal Frequency Response		
	DC - 7 MHz	-3 dB, 100 mV _{rms} @ 50 Ω Load
	DC - 5 MHz	-1 dB, 100 mV _{rms} @ 50 Ω Load
Phase response	0, -5 degrees	DC – 120 kHz @ 50 Ω Load
Output Voltage (continuous)		Slew-rate-limiter off
50 Ω Load, < 1% THD+N	\pm 75 V _{peak}	< 900 kHz; High Voltage Mode
	\pm 70 V _{peak}	< 1 MHz; High Voltage Mode
	\pm 37.5 V _{peak}	< 1 MHz; Low Voltage Mode
Output Current (continuous)	\pm 2.5 A _{peak}	High Voltage Mode (DC...10 Hz)
	\pm 5 A _{peak}	Low Voltage Mode (DC ...10 Hz)
	\pm 5 A _{peak}	High Voltage Mode (Freq. > 10 Hz)
	\pm 10 A _{peak}	Low Voltage Mode (Freq. > 10 Hz)
Output Current (pulse < 5 ms)	\pm 7.5 A _{peak}	High Voltage Mode
	\pm 15 A _{peak}	Low Voltage Mode
Slew Rate	> 450 V/ μ Sec	50 Ω Load, Slew-rate-limiter off
Rise Time		\pm 60 V Rectangular @ 50 Ω Load



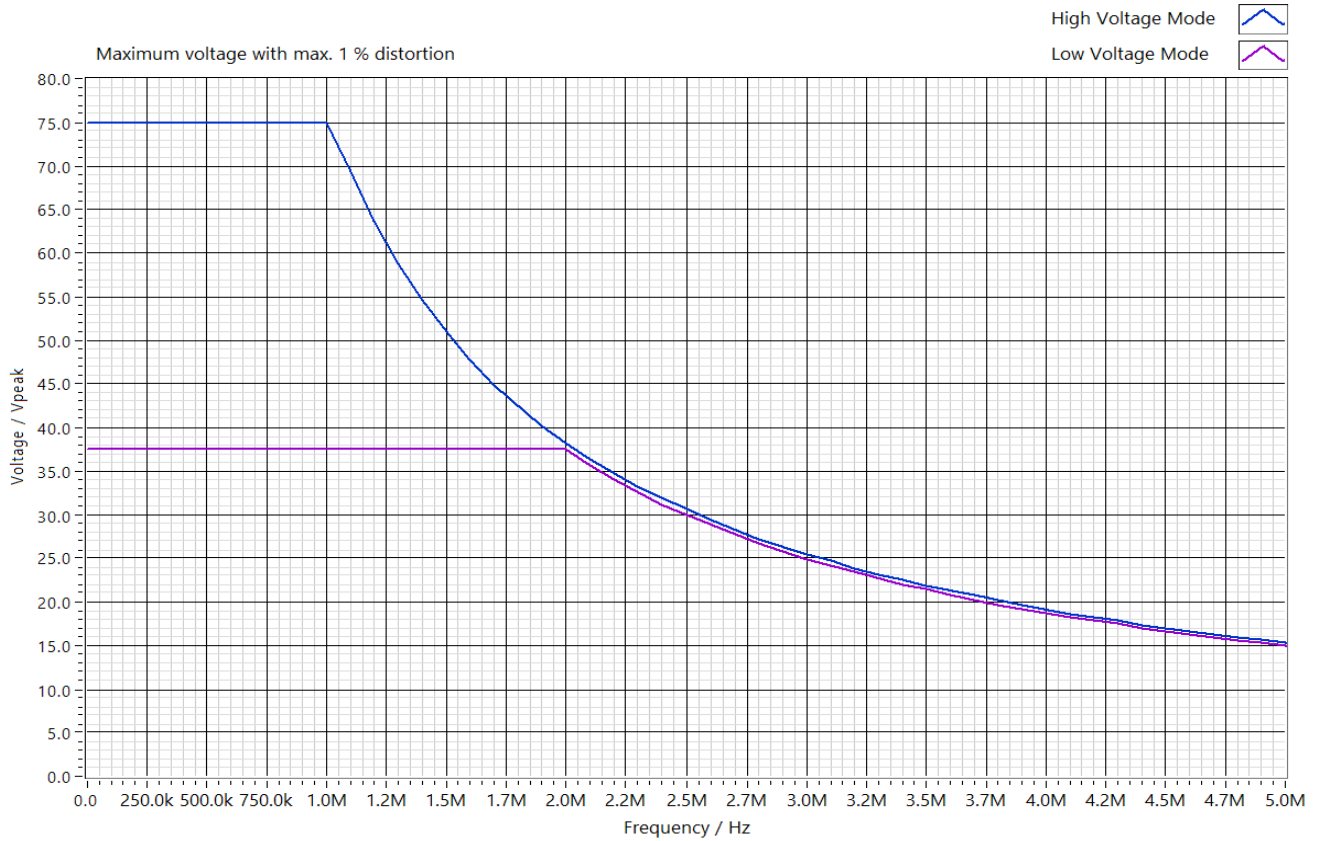
Parameters	Specification	Conditions/Moments
	< 200 ns	without slew rate limiter
	typ. 240 ns	with slew rate limiter
Noise		
20 Hz - 10 MHz	< 0.8 mV _{RMS}	Keysight 3458A AC random mode
DC - 20 MHz	~ 10 mV _{pp}	
THD+N		
100 kHz	< 0.1 %	53 V _{RMS} / 50 Ω Load
1 MHz	< 0.3 %	40 V _{RMS} / 50 Ω Load
Output Offset	± 2 mV typ.; ± 5 mV max. (± 0.1 mV/°C)	
Output Impedance	~ 50 mΩ + 0.32 μH	
Output Impedance Bridge Out	47 Ω	Load > 2 kΩ
Source Power, DC		
30 Ω	185 W	High Voltage Mode
7.5 Ω	185 W	Low Voltage Mode
Sink Power, DC	68 W	High/Low Voltage Mode
Remote control	USB, LAN	standard
Interlock	Closed with R < 1 kΩ	BNC inner to outer contact
Physical Characteristics		
AC Power	230 V _{AC} / 50...60 Hz	other on request
Operating Temperature	10 °C to 40 °C	
Humidity	80% or less at 40 °C	non-condensing
Cooling	Forced air	
Dimensions (W x H x D)	484 x 153 x 676 mm	
Weight	Approx. 23 kg	



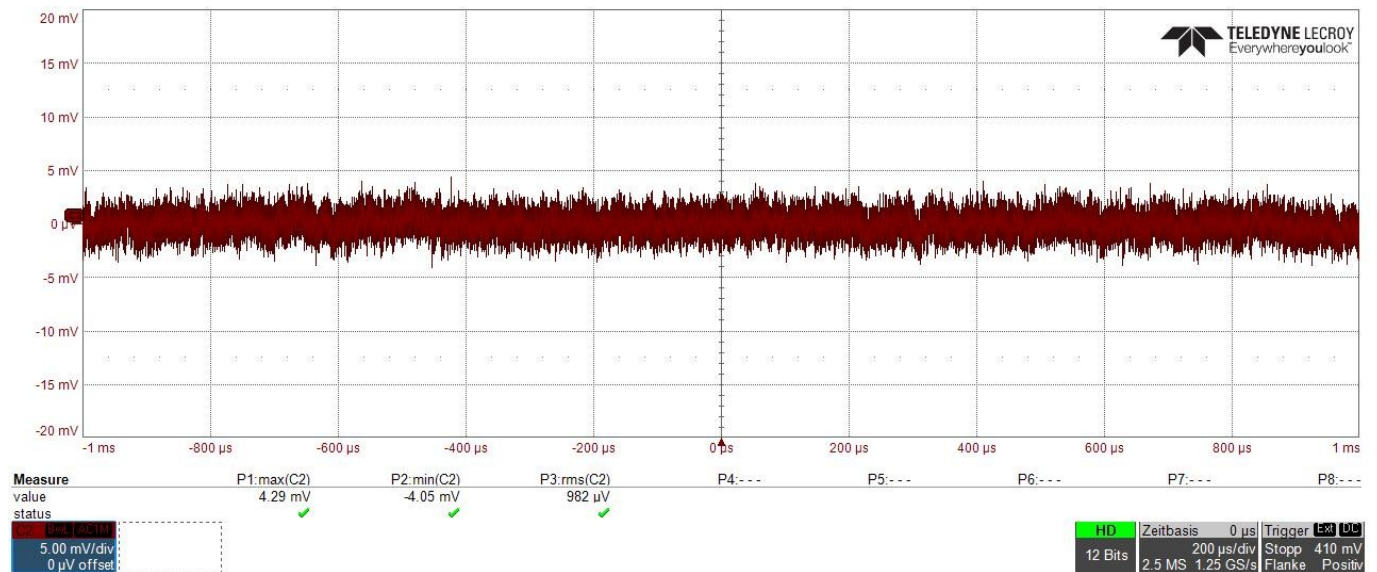
6.1 Output Voltage vs. Frequency (THD + N < 1%)

Blue: High Voltage Mode

Magenta: Low Voltage Mode

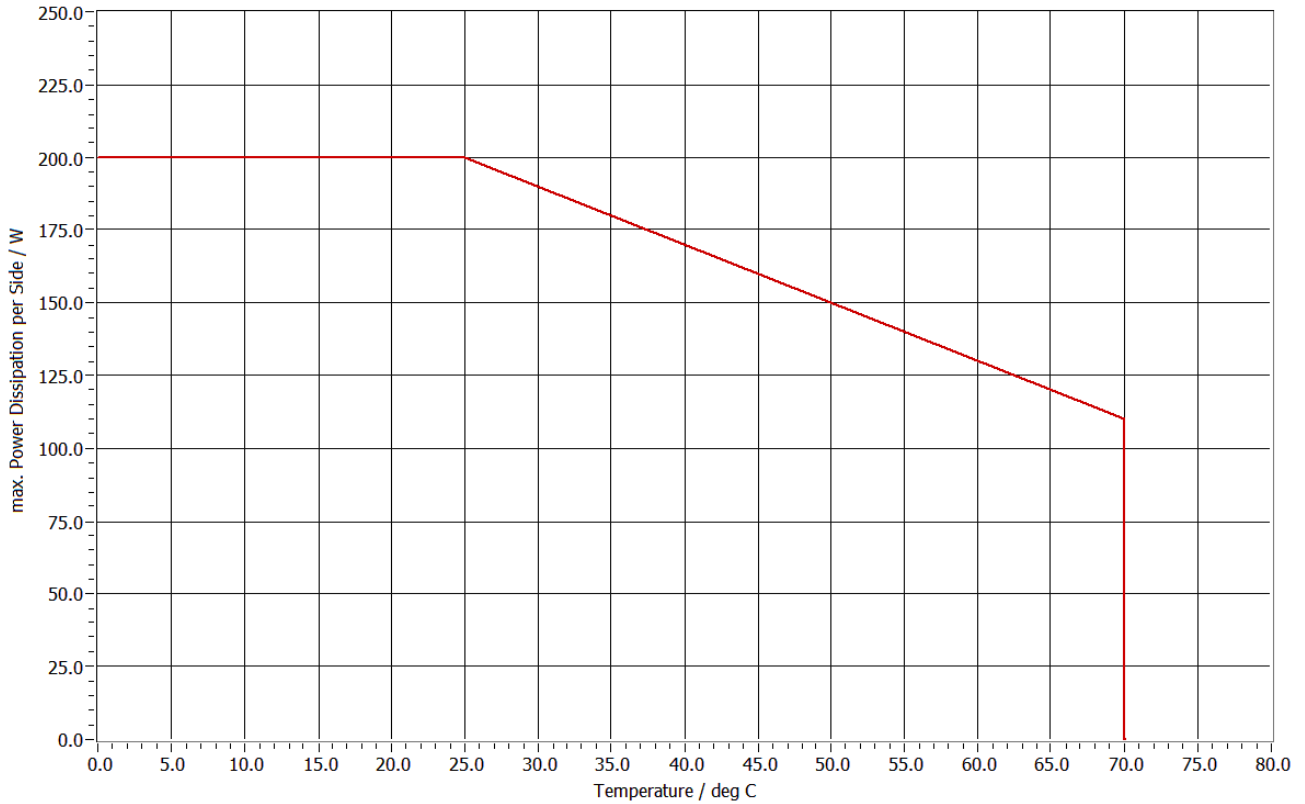


6.2 Output Noise, Bandwidth 20 MHz

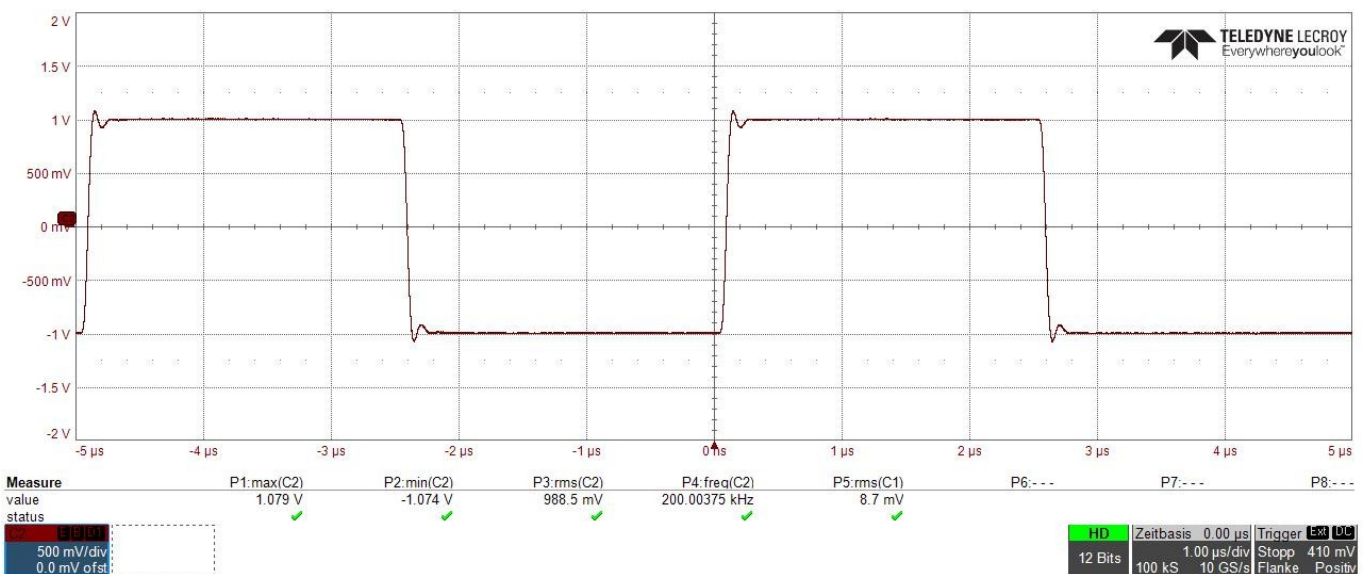




6.3 Power dissipation of each side depending on heat sink temperature

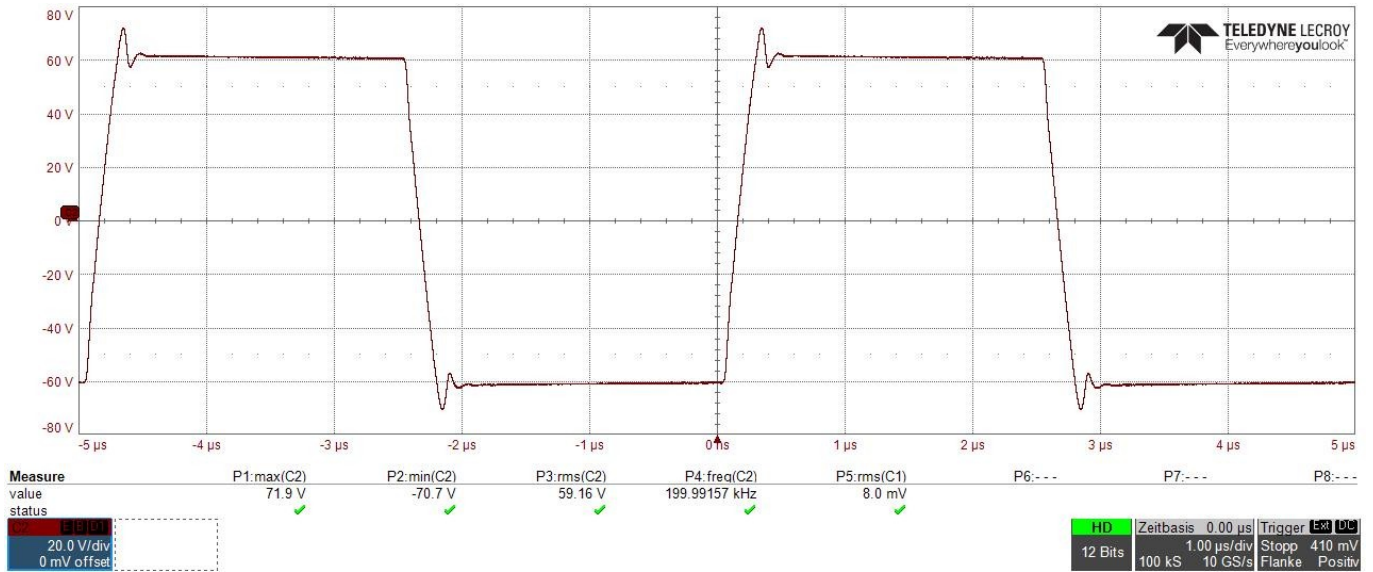


6.4 Square Wave at 200 kHz, 1 V Amplitude, Load 50 Ω

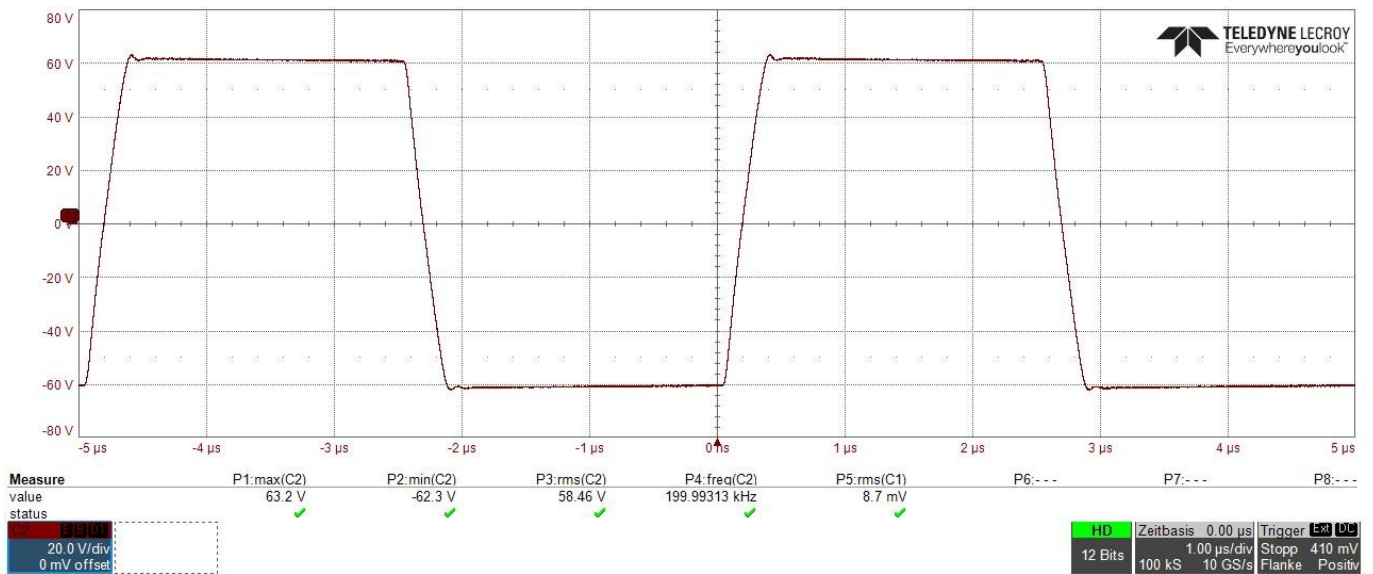




6.5 Wave at 200 kHz, 60 V Amplitude, Load 50 Ω, slew rate limiter off

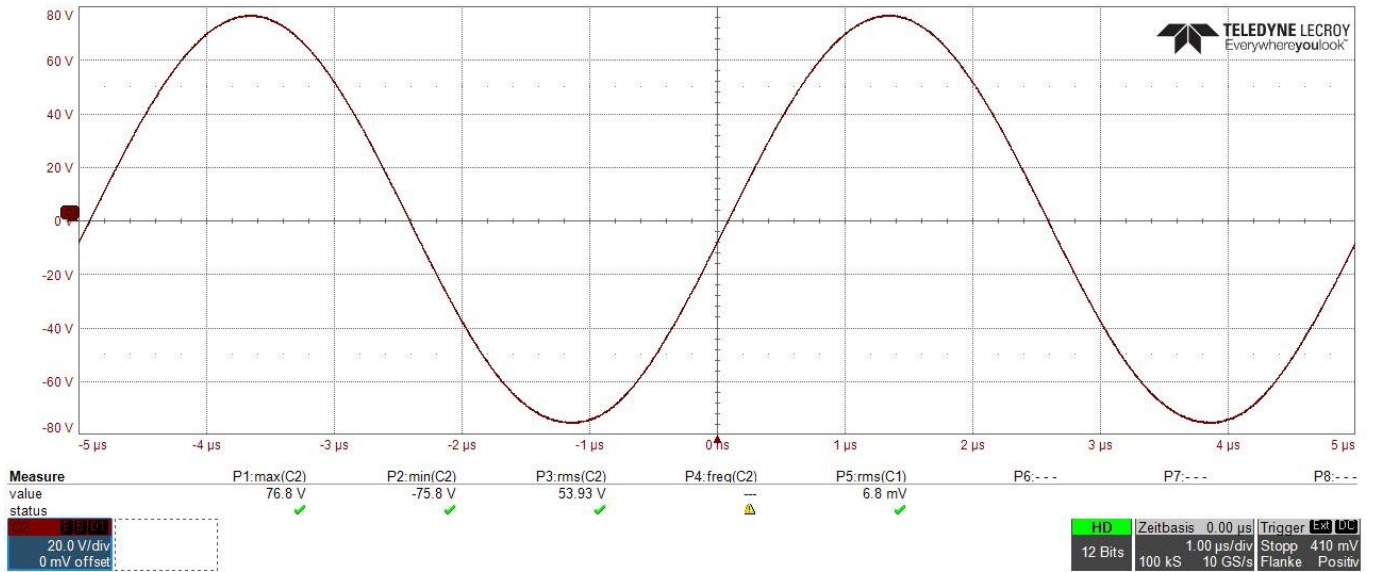


6.6 Square Wave at 200 kHz, 60 V Amplitude, Load 50 Ω, slew rate limiter on

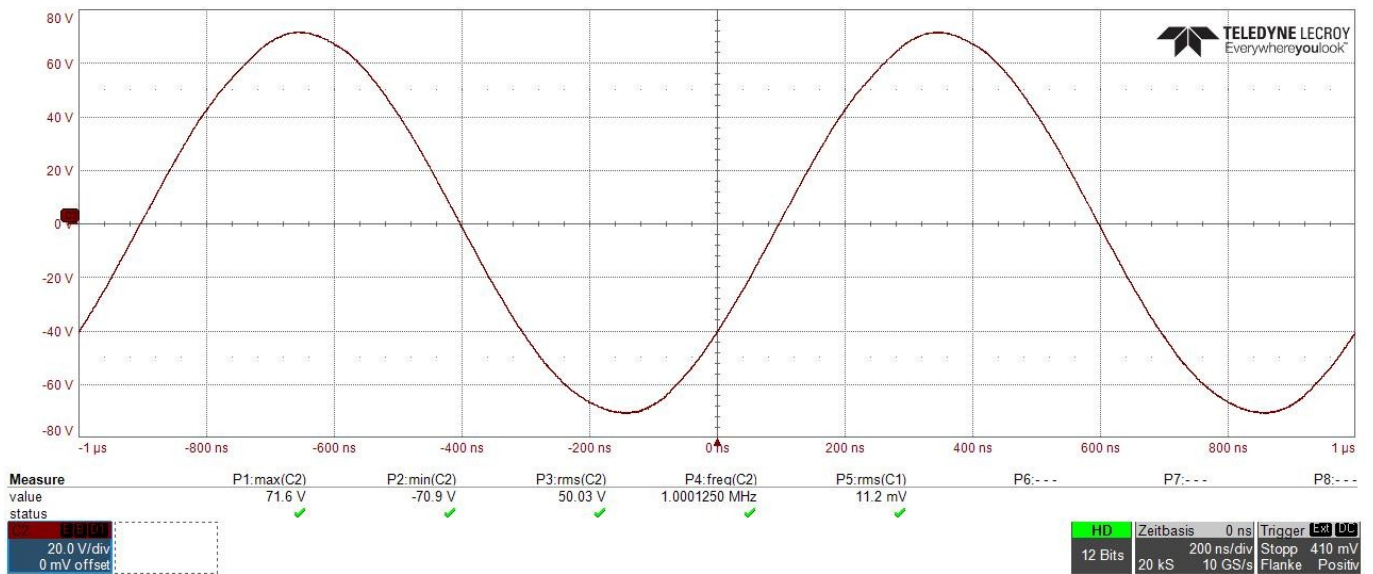




6.7 Sine Wave at 200 kHz, 75 V Amplitude

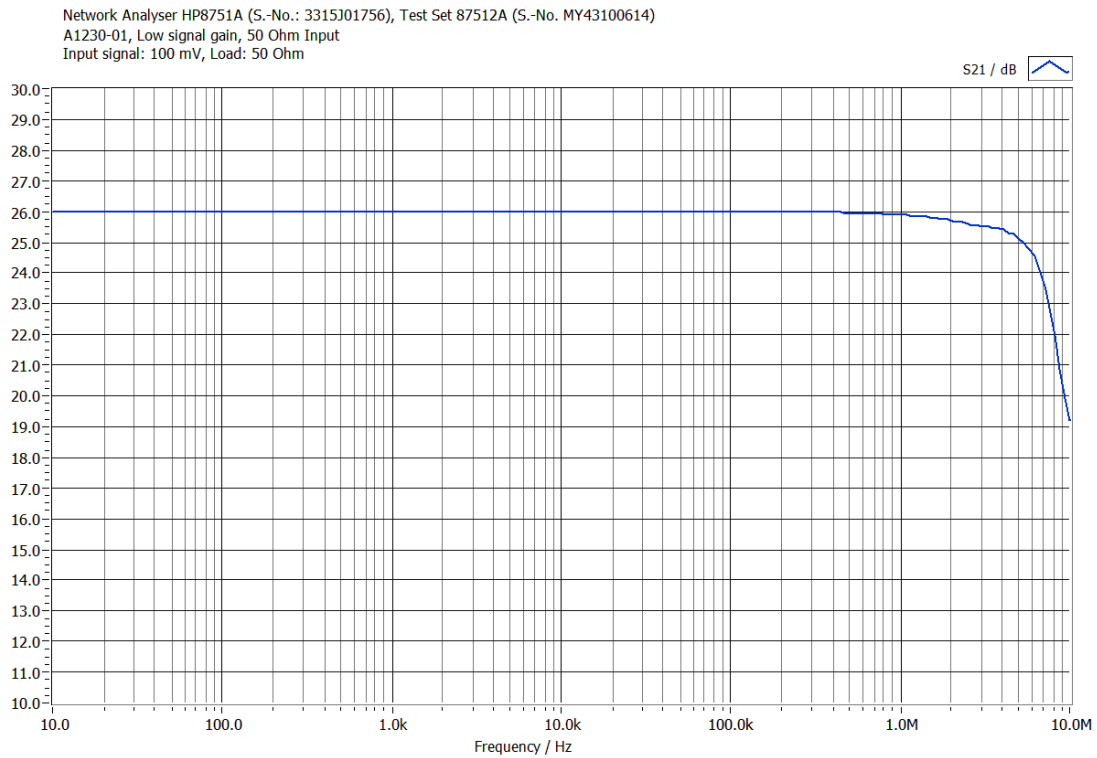


6.8 Sine Wave at 1 MHz, 50 V_{RMS}

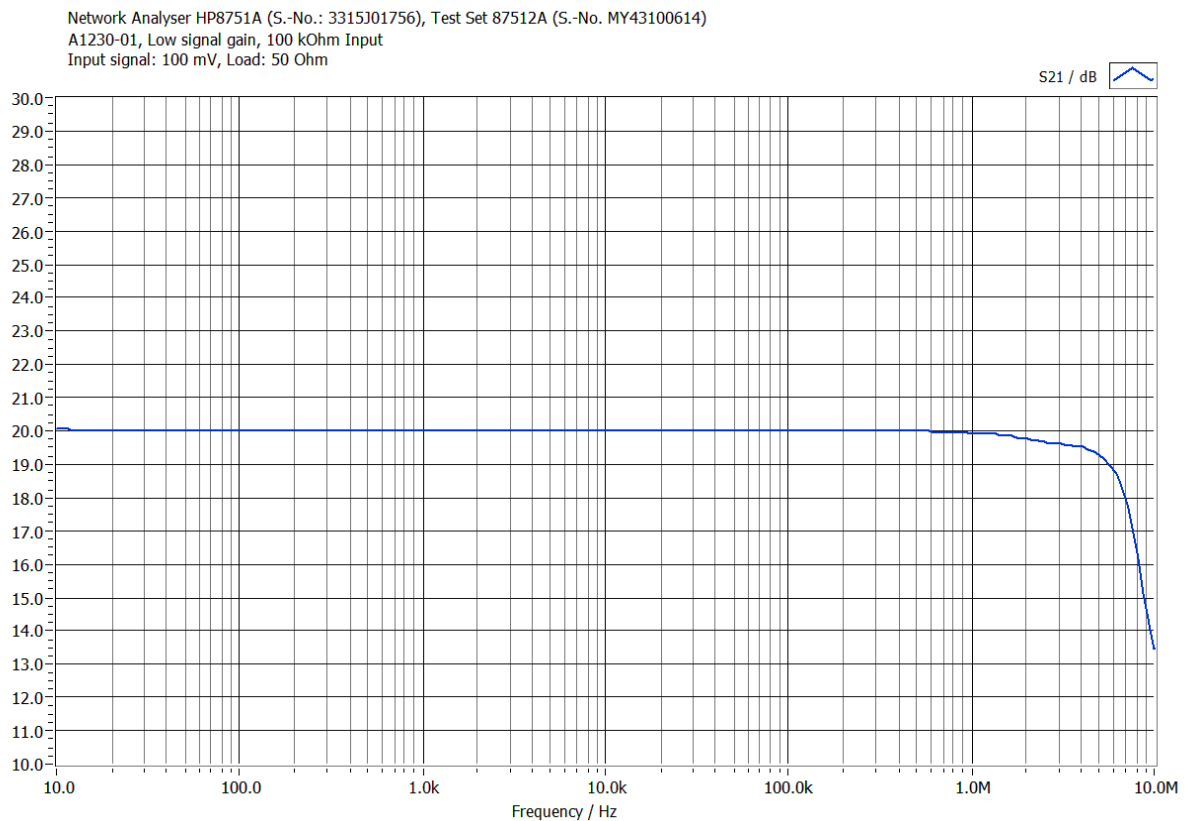




6.9 Gain 50 Ω Input



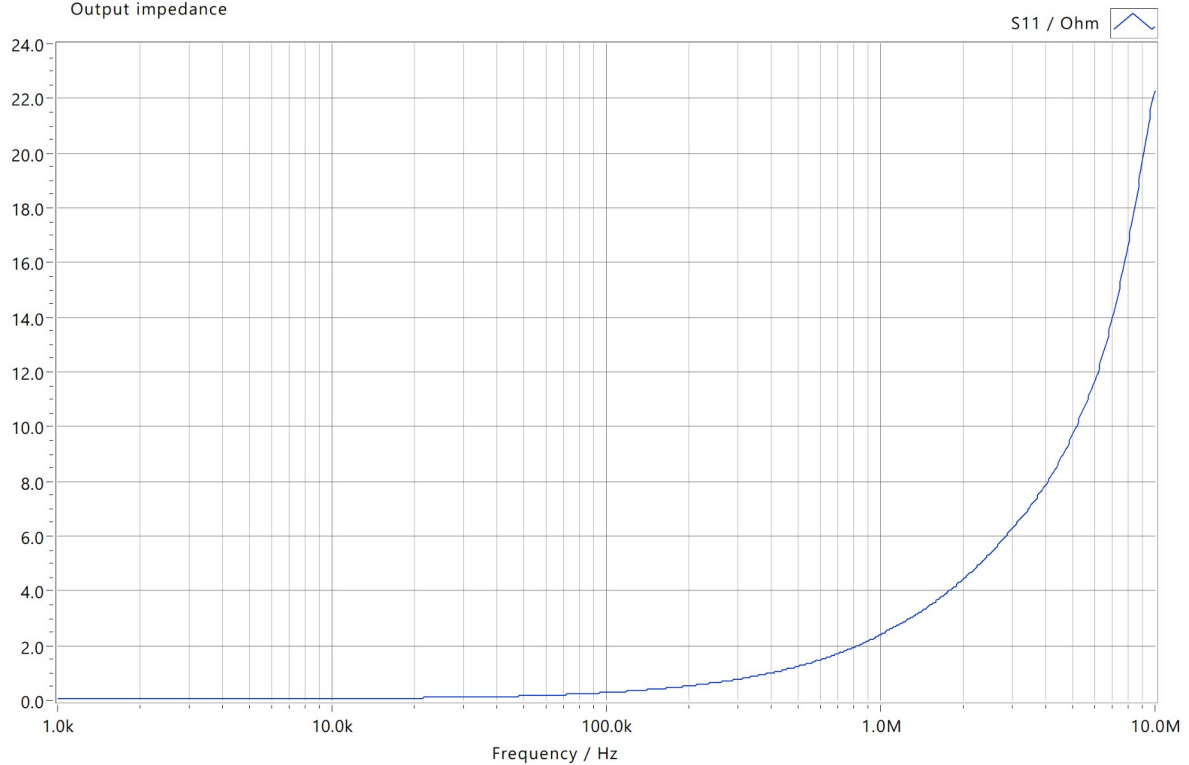
6.10 Gain 100 k Ω Input



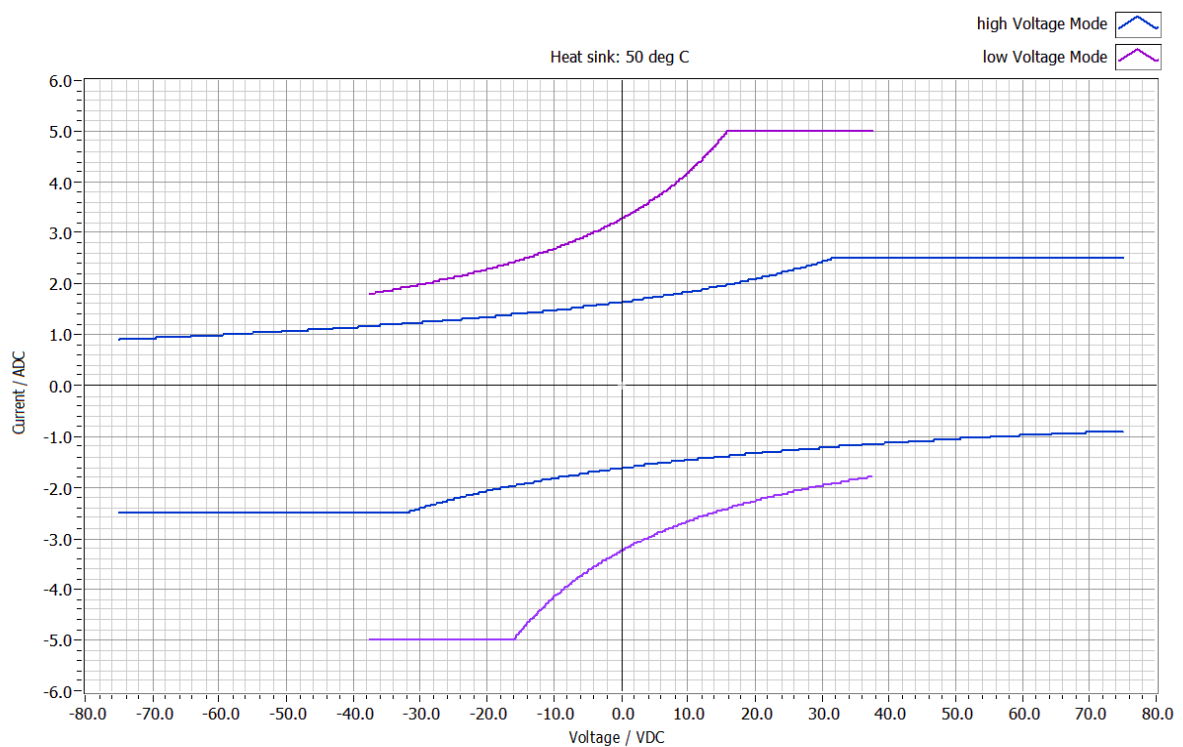


6.11 Output Impedance

Network Analyser HP8751A (S.-No.: 3315J01756)
A1230-02 Channel 1 or 2
Output impedance

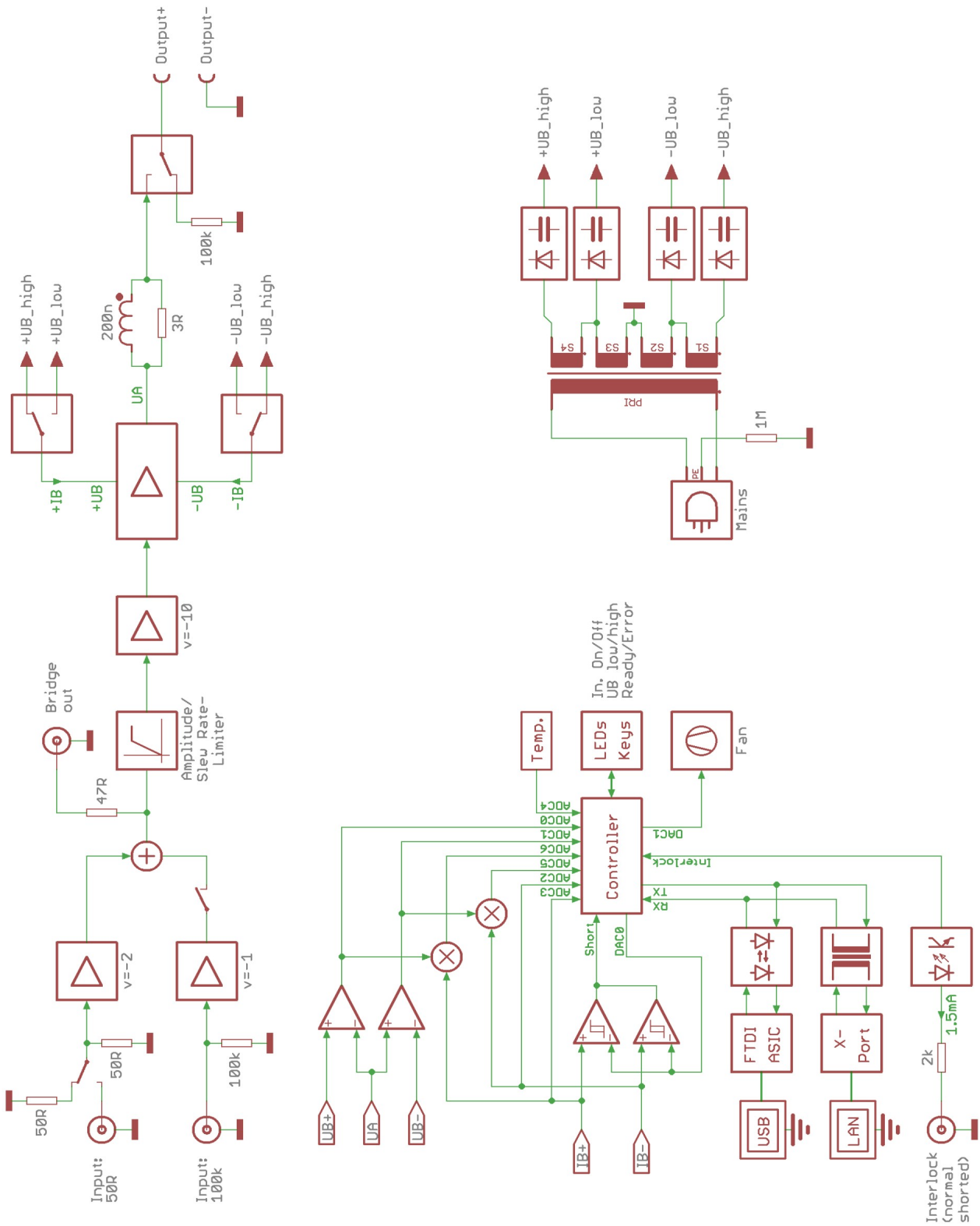


6.12 Output Current vs. Output Voltage DC Limit





7 Block Diagram





8 Contact

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9 Document History

Revision	Date	Changes
2.0	March 2020	First publication in new layout
3.0	May 2021	New housing
4.0	May 2022	New article number
5.0	October 2022	New hardware revision with slew rate limiter. Technical specifications adapted. LAN is now standard.
5.1	February 2024	Block diagram updated