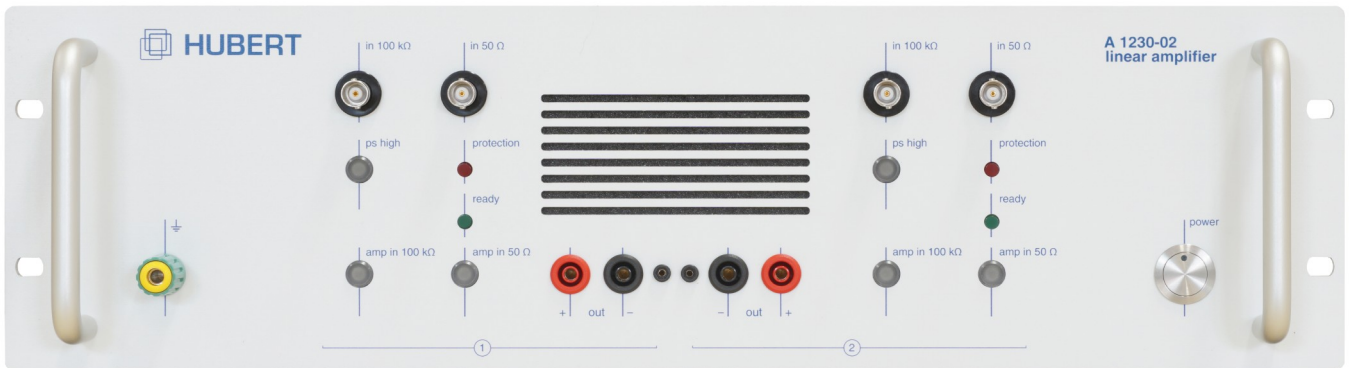


HUBERT

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Datasheet



A1230-02

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



1 Product Description

The A1230-02 is a linear, extremely broadband precision power amplifier. It is predestined for all applications that require rapidly changing signals at any resistive and complex loads.

The A1230-02 has two addable inputs with 50 Ω and 100 k Ω input resistance; 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.

Two selectable operating voltages are available for high voltage / low current or low voltage / high current applications. Especially for very low impedance loads the choice of the low operating voltage leads to a considerable reduction of power dissipation and a higher output current.

If higher output voltages are required, the preamplifier output (bridge out) allows easy construction of a bridge circuit with the second channel of the A1230-02 to double the output voltage. The rise time is also doubled of course.

If more current is required, the two channels can be easily connected in parallel via a plug-in parallel switch box. In this case both channels must be operated with the identical output signal.

The device is equipped with a quiet, temperature-controlled fan. In addition to overtemperature shutdown, a temperature-dependent power loss calculation and fast current monitoring ensure perfect short-circuit and overload protection.

The unit is operated via the controls on the front panel of the amplifier. In addition, the amplifier can be completely remote controlled via the USB interface using a simple byte protocol.

If higher output voltages or higher output currents are required, configurations with series or parallel connections of several A1230-02 are possible.

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2 Features

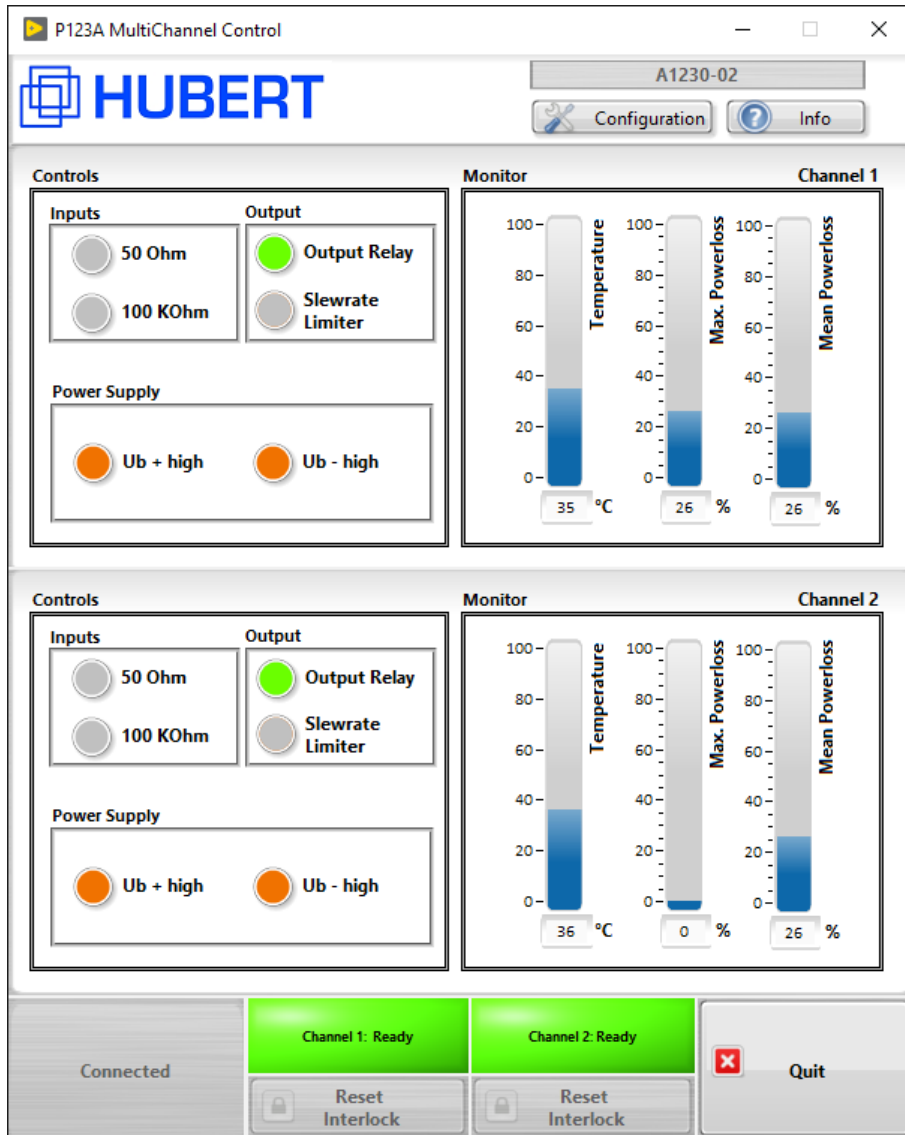
- Universally applicable broadband lab amplifier; ideally suited as downstream equipment for function generators
- Amplifier is stable with all inductive and capacitive loads
- Output voltages up to $75 V_{DC/peak}$
- Output current up to $5 A_{DC} / 10 A_{peak} (> 10 \text{ Hz}) / 15 A_{peak} (< 5 \text{ ms})$
- Two added inputs with 50Ω and $100 \text{ k}\Omega$ 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

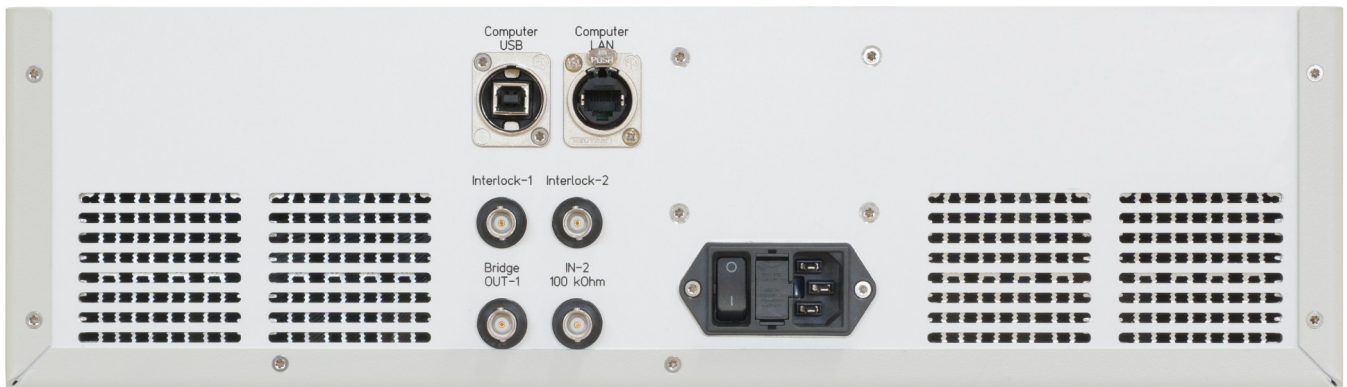
- General lab applications for research, development and testing
- EMC testing
- Material testing
- MRI
- Component tests
- Plunger coil drives
- Piezo actuation
- Ultrasonic transducers
- Generation of magnetic fields (e.g. with Helmholtz coils)
- Medical engineering
- Laser technology
- Plasma technology



4 Control Software



5 Rear Side





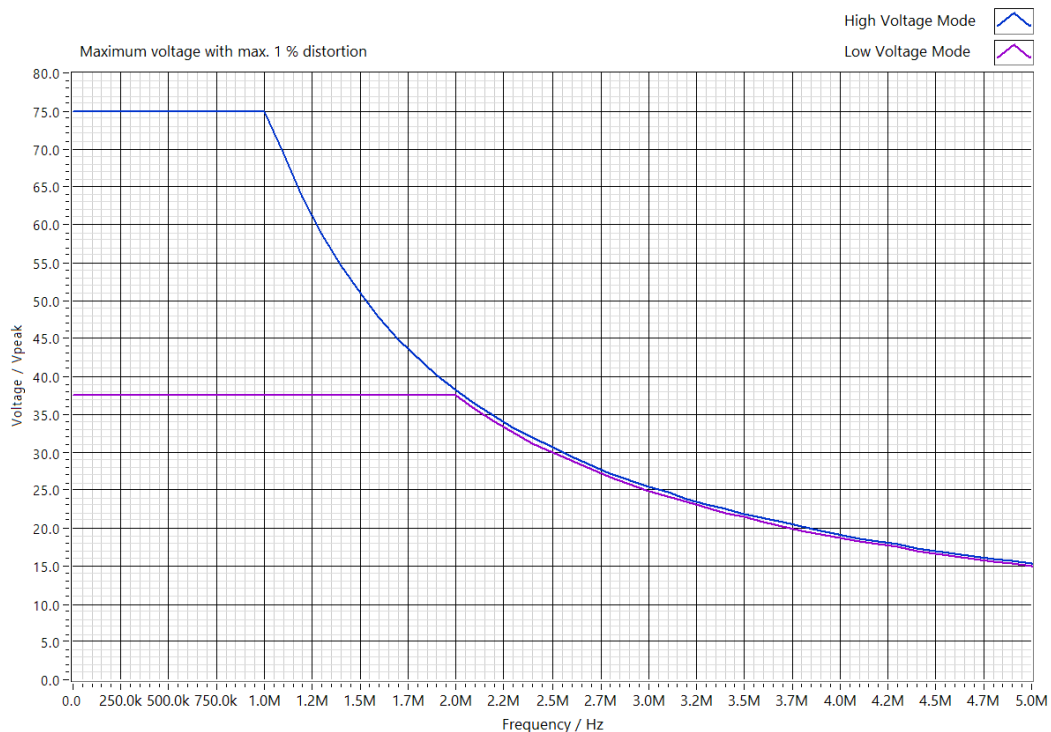
6 Specifications

Parameter	Specification	Conditions/Moments
		Mains: 230 V
		25° C ambient temperature
		Continuous operation
Input Impedance / Gain	50 Ω ± 1% Gain: 20 ± 1% (±100ppm/°C)	
	100 kΩ ± 1% Gain: 10 ± 1% (±100ppm/°C)	
Maximum Input Level	± 7,5 V	
	± 3,75 V	50 Ω Input
Maximum allowed Input Voltage	± 15 V	100 kΩ Input
	± 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)		
50 Ω Load, < 1% THD+N	± 75 V _{peak}	< 900 kHz; High Voltage Mode
	± 70 V _{peak}	< 1 MHz; High Voltage Mode
	± 37.5 V _{peak}	< 1 MHz; Low Voltage Mode
Output Current continuous	± 2.5 A _{peak}	High Voltage Mode (DC...10 Hz)
	± 5 A _{peak}	Low Voltage Mode (DC ...10 Hz)
	± 5 A _{peak}	High Voltage Mode (Freq. > 10 Hz)
	± 10 A _{peak}	Low Voltage Mode (Freq. > 10 Hz)
Output Current (pulse < 5 ms)	± 7.5 A _{peak}	High Voltage Mode
	± 15 A _{peak}	Low Voltage Mode
Slew Rate	450 V/uSec	50 Ω Load
Rise Time		± 60 V Rectangular @ 50 Ω Load
	< 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)	



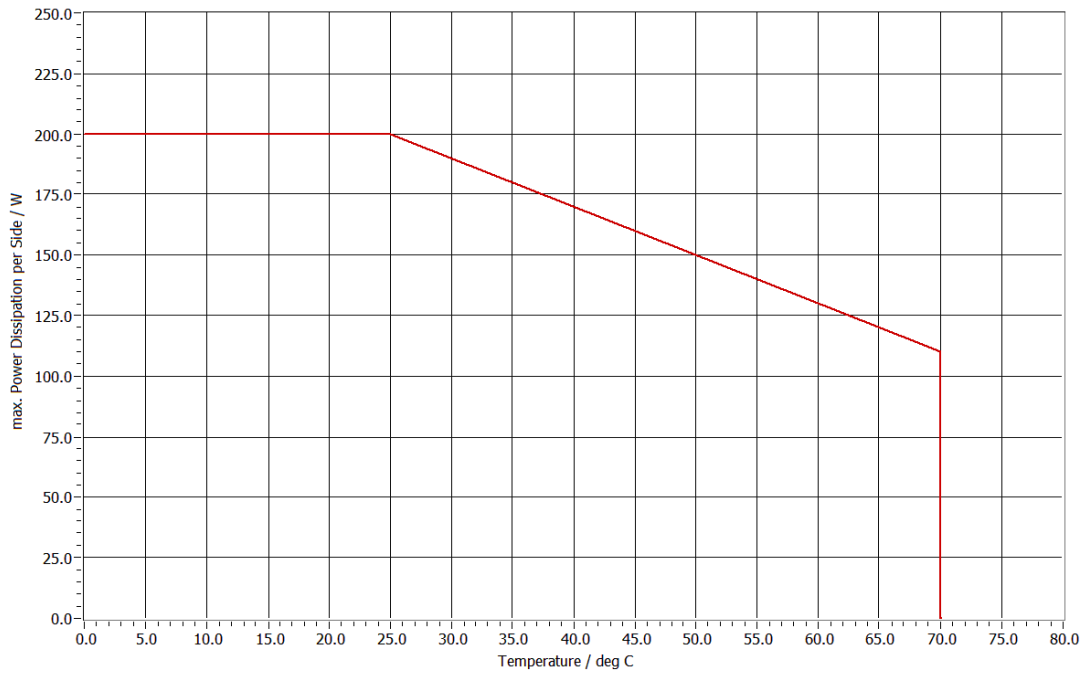
Parameter	Specification	Conditions/Moments
Output Impedance	~ 50 mΩ + 0.32 μH	
Output Impedance Bridge Out	47 Ω	Load > 2 kΩ
Source Power, DC		
30 Ω	185 W	High Voltage Mode
7.5 Ω	185 W	Low Voltage Mode
Sink Power, DC	68 W	High/Low Voltage Mode
Remote control	USB, LAN	standard
Interlock	Closed with R < 1 kΩ	BNC inner to outer contact
Physical Characteristics		
AC Power	230 V _{AC} / 50...60 Hz	
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. 30 kg	

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

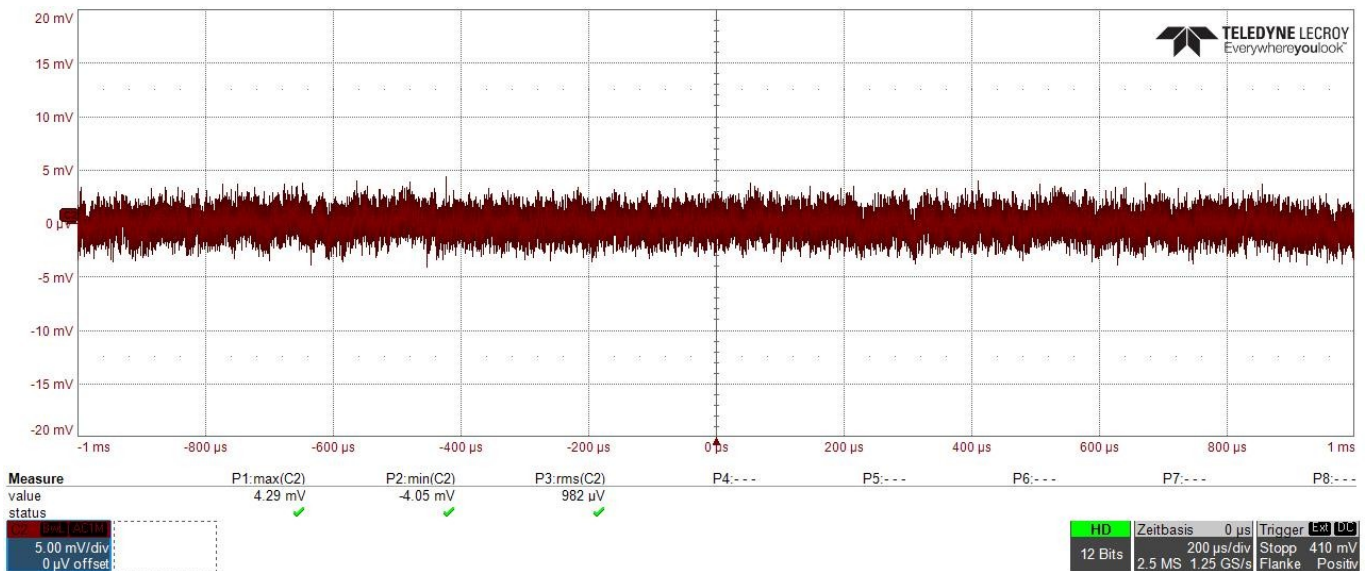




6.2 Power dissipation of each side depending on heat sink temperature

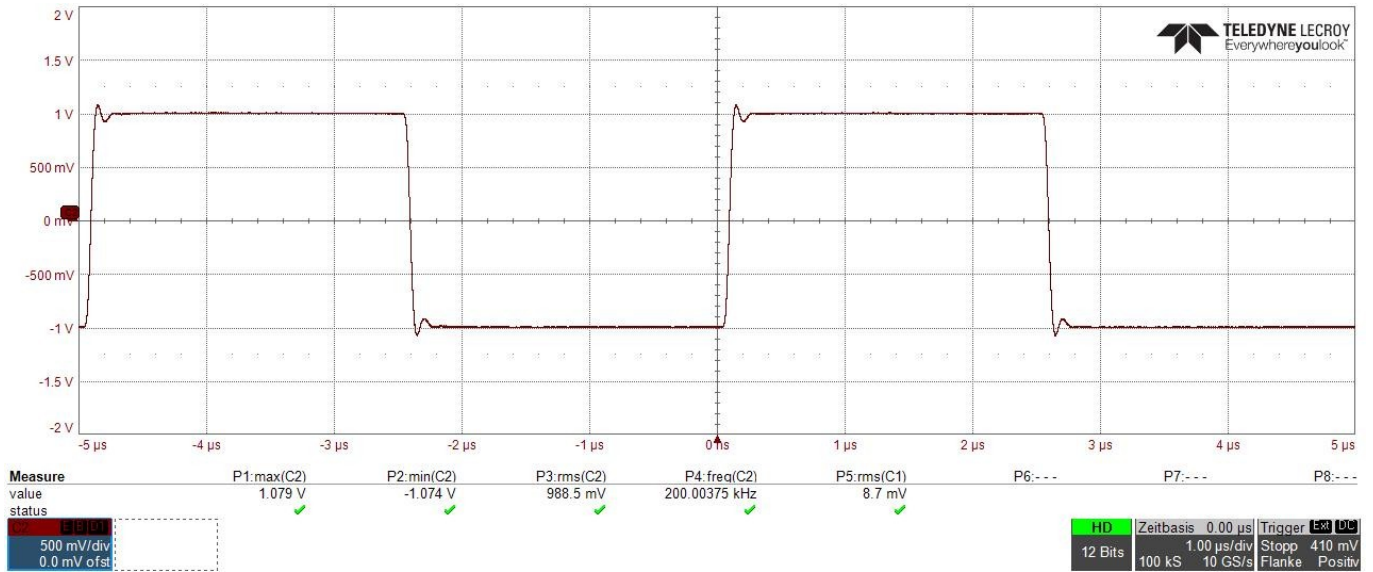


6.3 Output Noise, Bandwidth 20 MHz

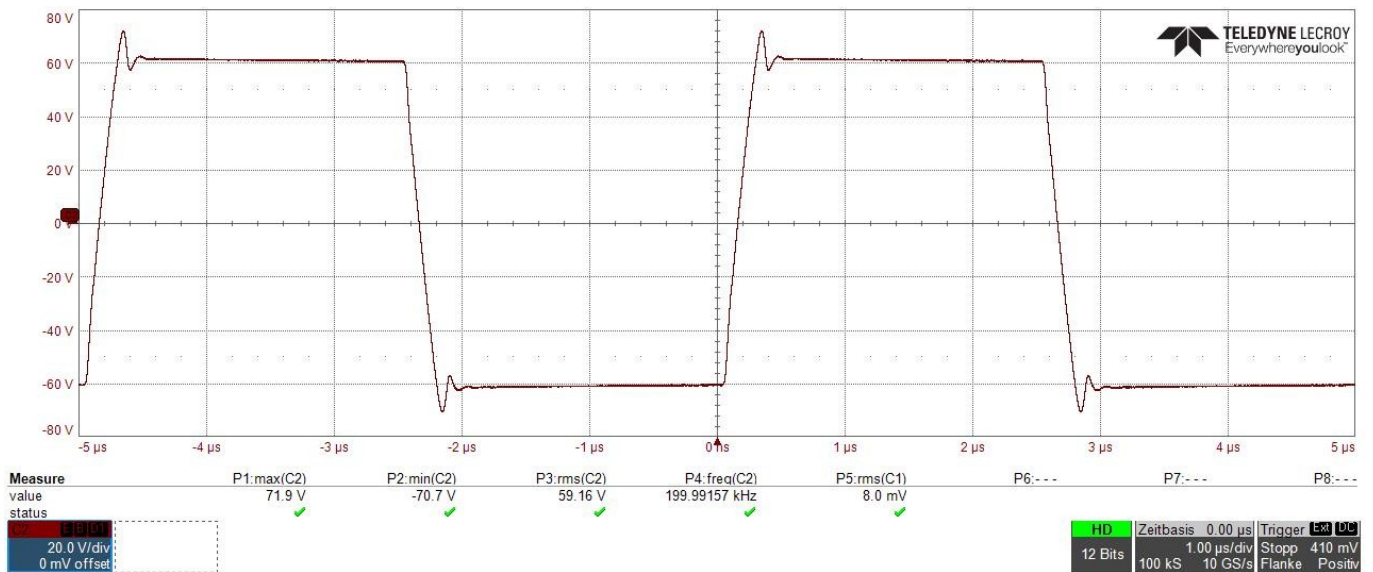




6.4 Square Wave at 200 kHz, 1 V Amplitude, Load 50 Ω

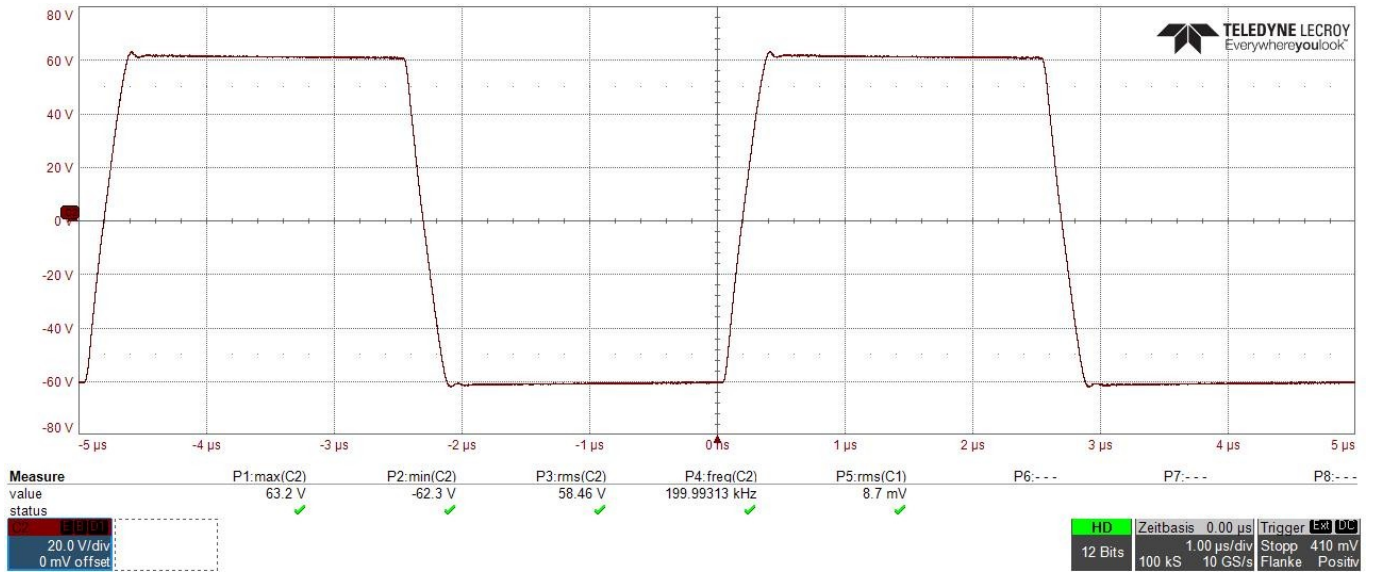


6.5 Wave at 200 kHz, 60 V Amplitude, Load 50 Ω, slew rate limiter off

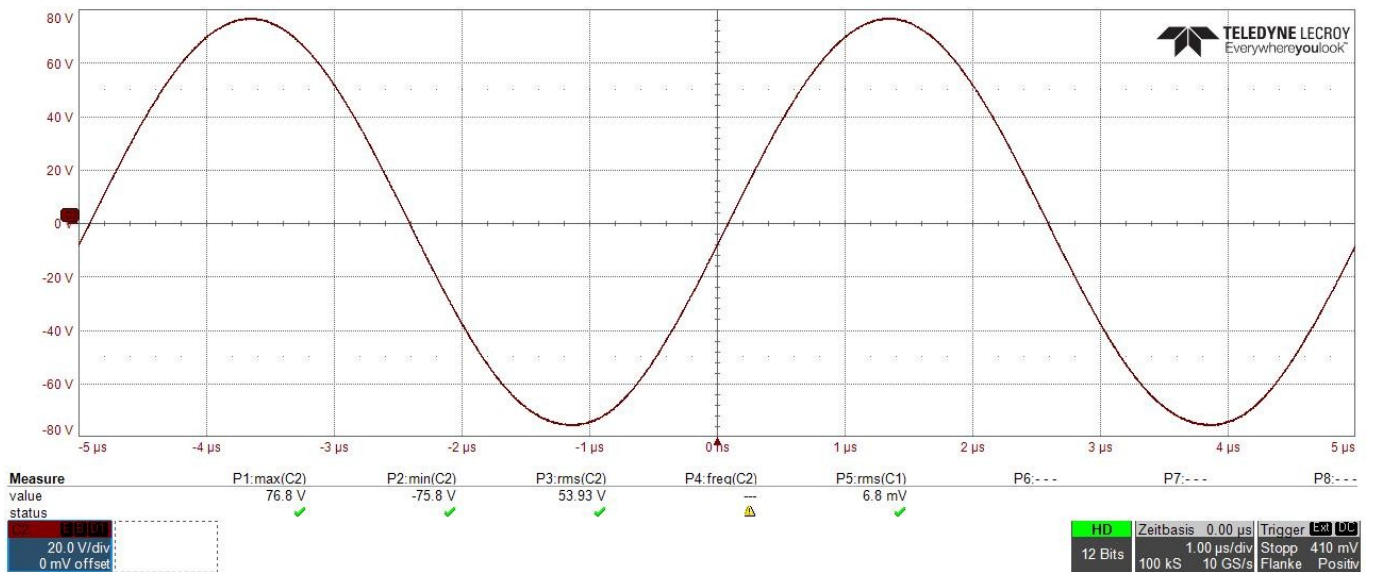




6.6 Square Wave at 200 kHz, 60 V Amplitude, Load 50 Ω, slew rate limiter on

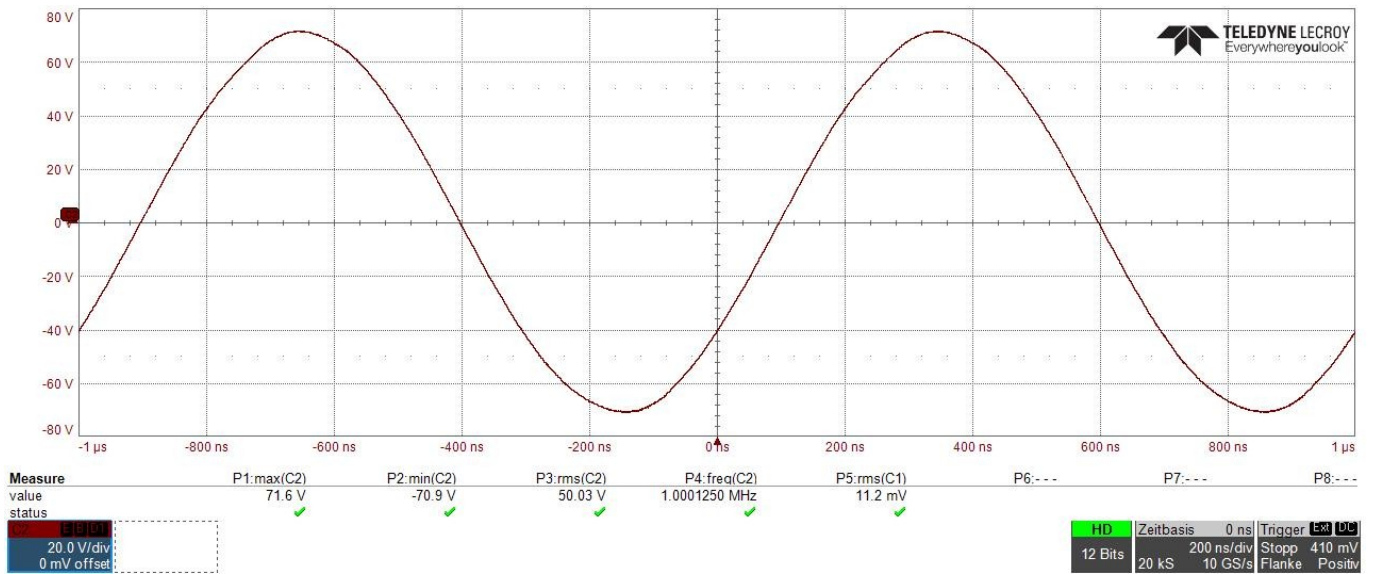


6.7 Sine Wave at 200 kHz, 75 V Amplitude

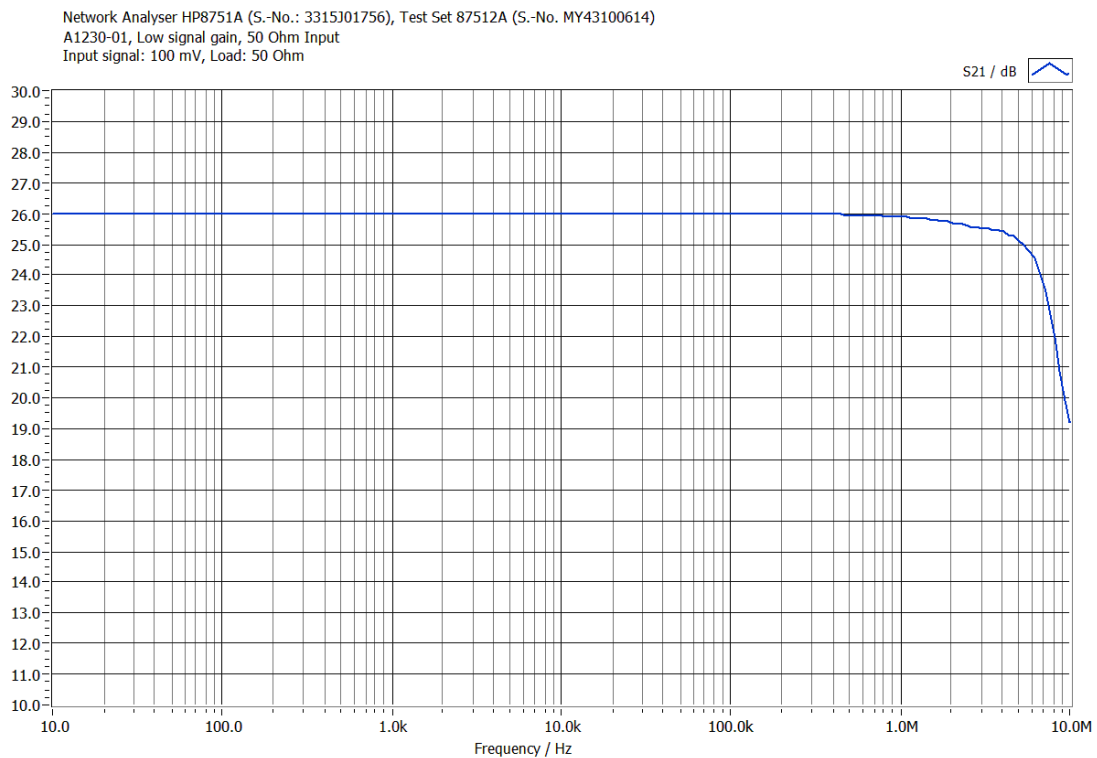




6.8 Sine Wave at 1 MHz, 50 V_{RMS}

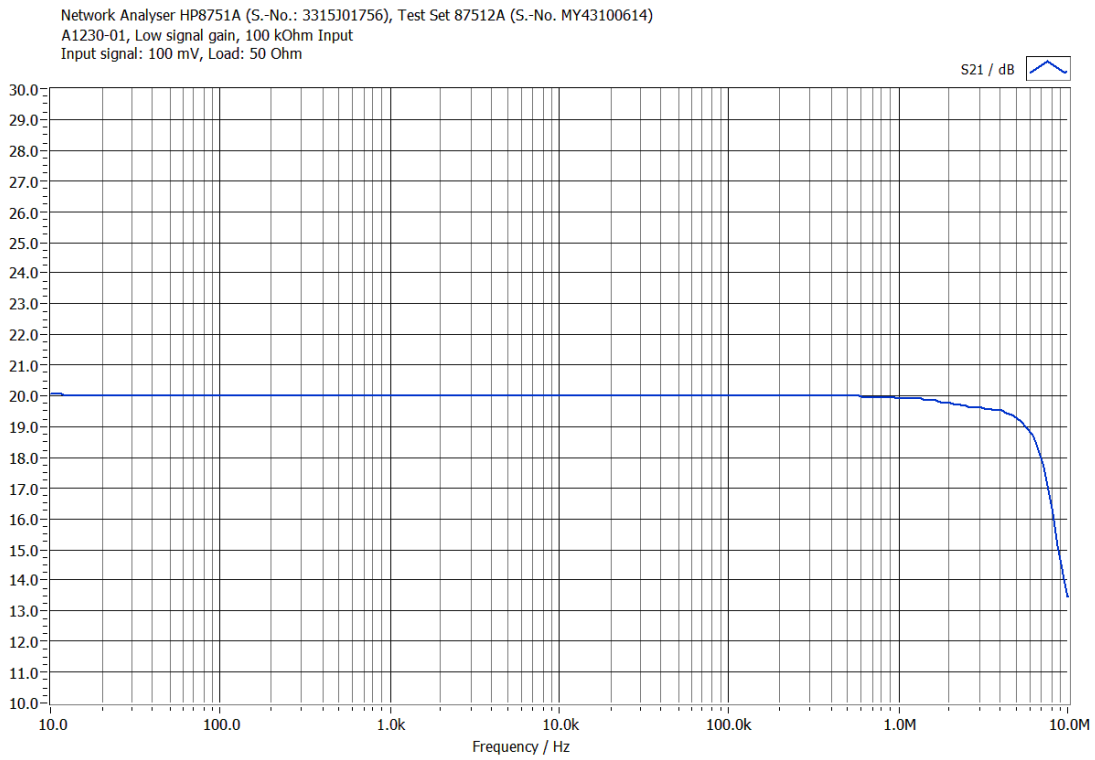


6.9 Gain 50 Ω Input

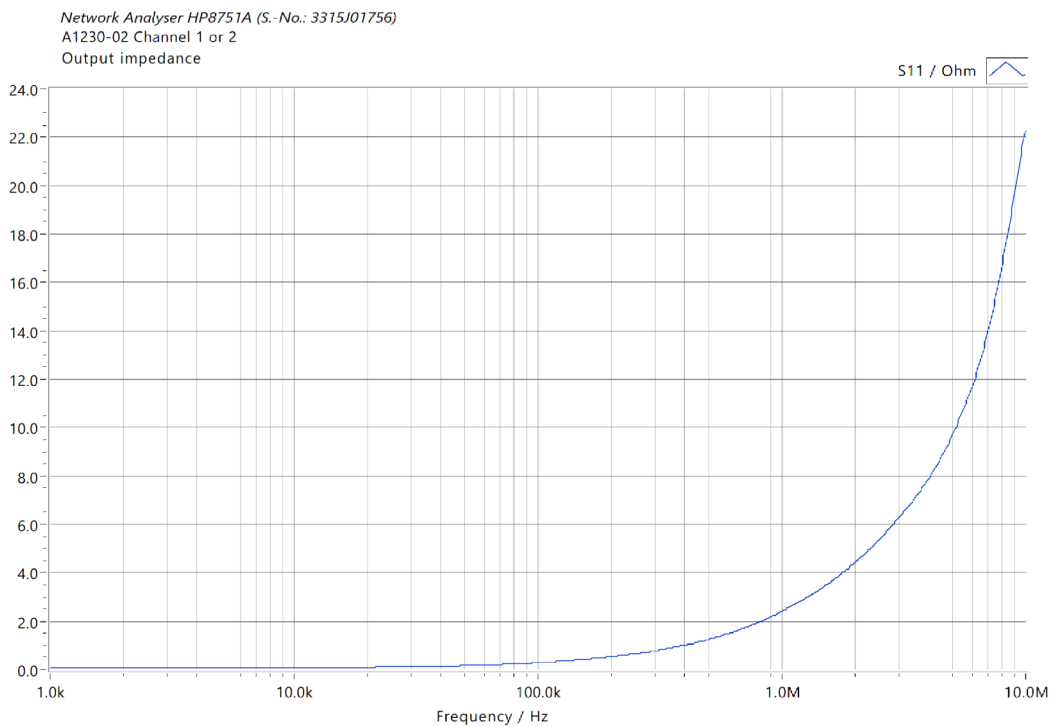




6.10 Gain 100 k Ω Input

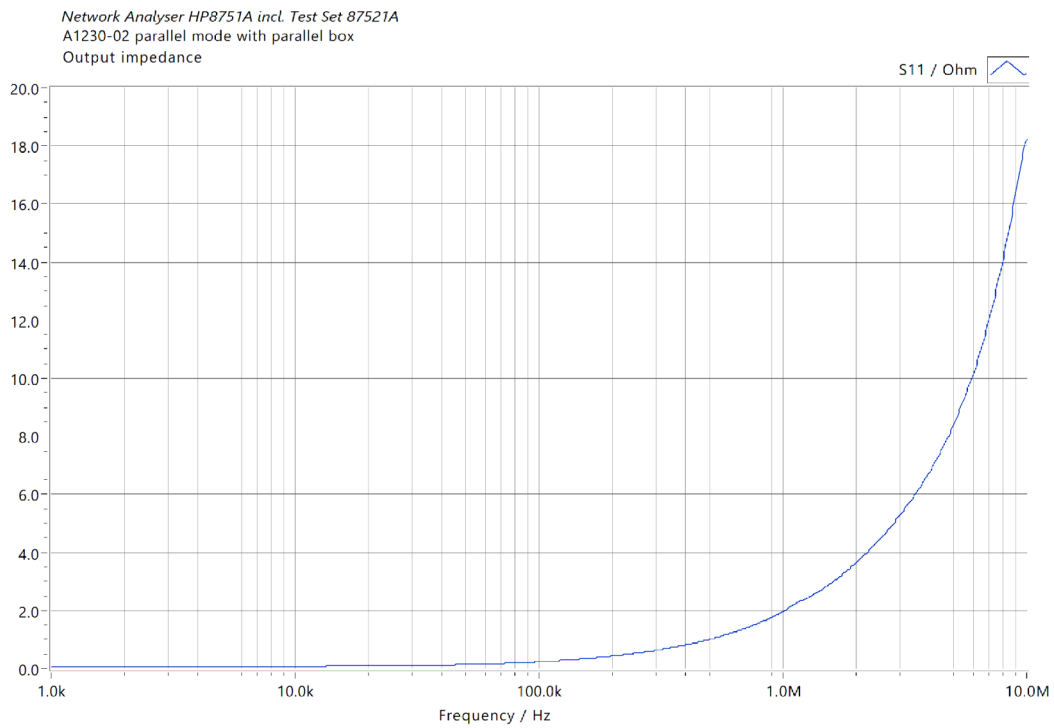


6.11 Output Impedance channel 1 or 2 alone

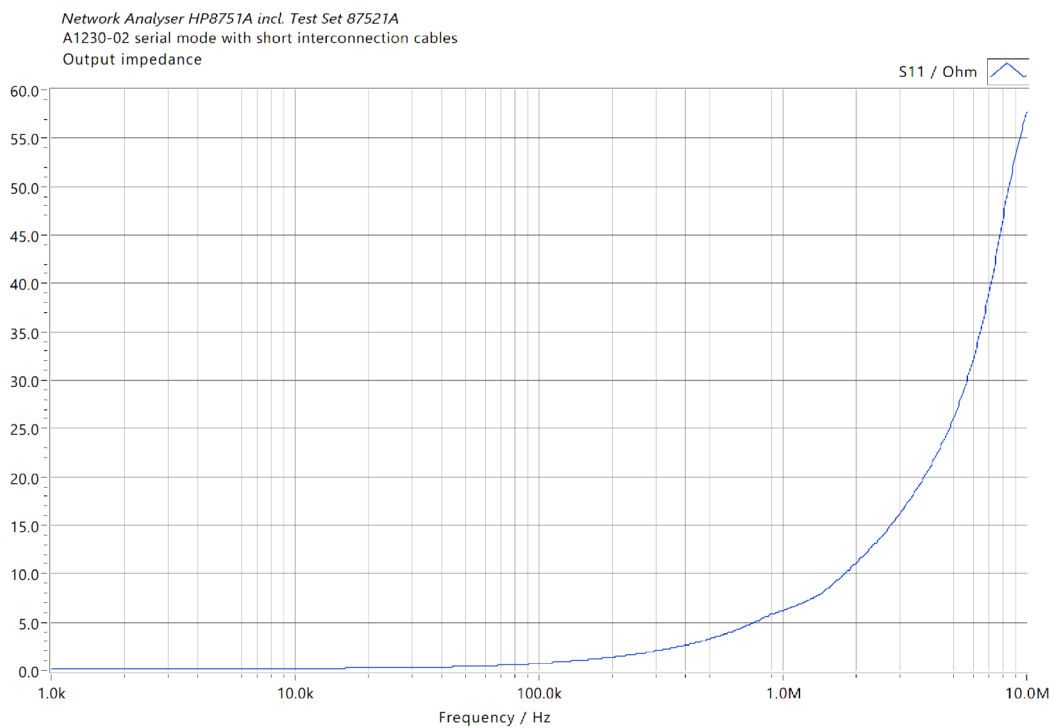




6.12 Output Impedance parallel mode with parallel box



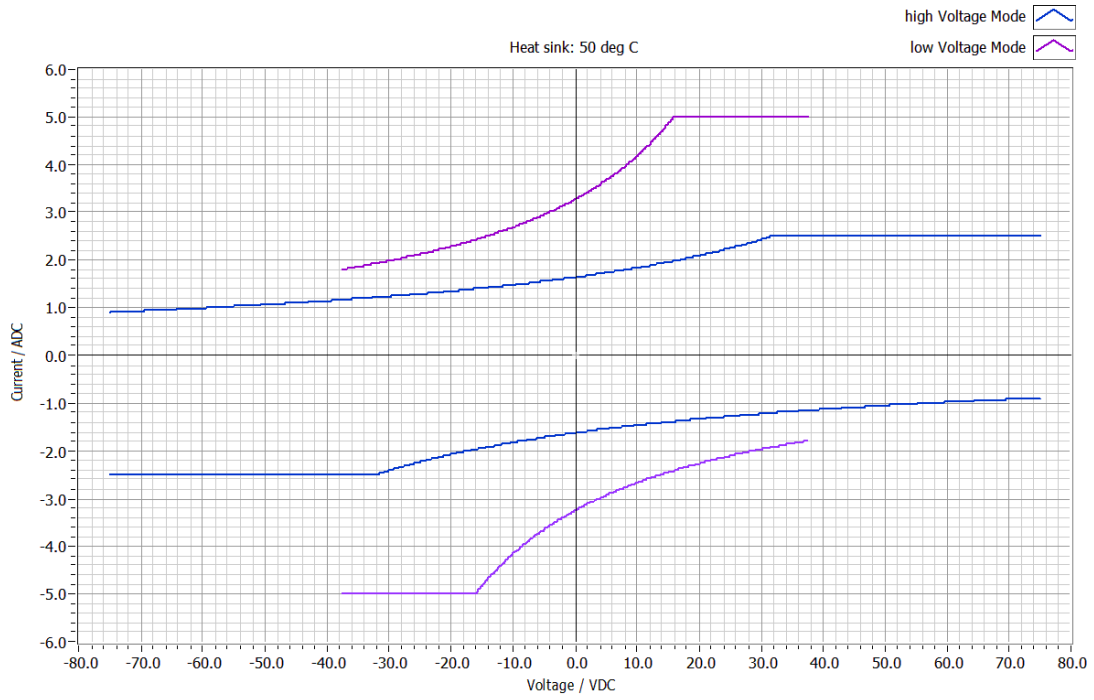
6.13 Output Impedance bridge mode





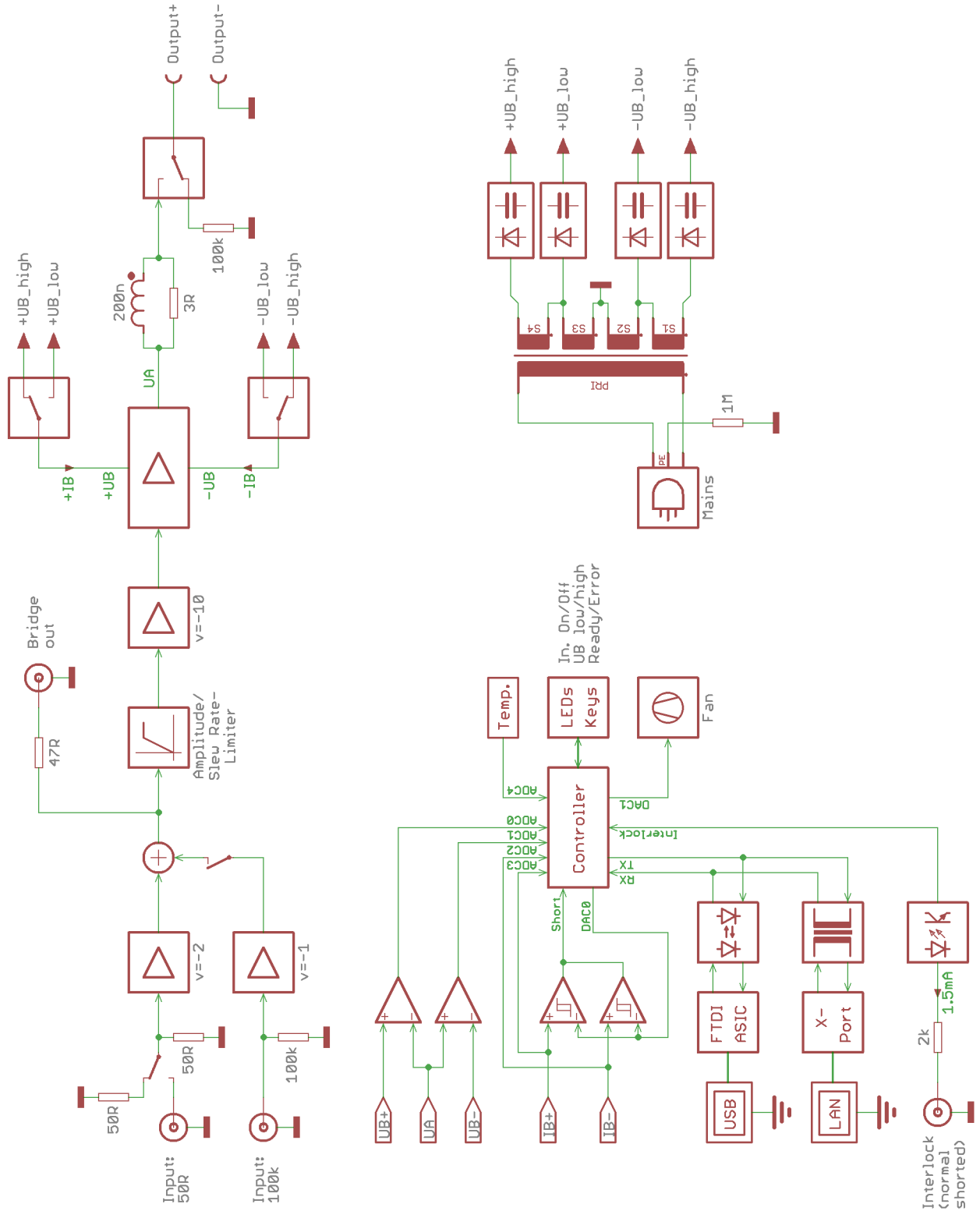
6.14 Output Current vs. Output Voltage

DC Limit





7 Block Diagram





8 Contact

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9 Document History

Revision	Date	Changes
2.0	March 2020	Initial publication in new layout
3.0	April 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.