

**High Voltage Pulse Amplifier
Compact PCB Module**

Features

- Compact: 60 x 92 x 19 mm
- Pulse Amplitude up to 200 V
- 100 ns Rise Time into 2 nF Load
- Integrated DC-DC Converter

The A119-003 is a high voltage pulser optimized for dominantly capacitive piezo-electric transducers like that are used in ultrasonic sensing.

It offers a high peak current of up to 4 A capable of charging or discharging a 2 nF load in less than 100 ns.

Applications

- Driver for Piezoelectric Ultrasonic Transmitters

The A119-003 is controlled via a TTL compatible logic trigger input. Output is a square wave signal with an amplitude of 30 to 200 V, controlled by an on-board 20-turn potentiometer. The output driver gets its HV from the 12 V supply of the module by an integrated DC-DC converter.

Characteristics	
Output Pulse Amplitude Range (adjusted by a 20-turn Trimpot)	30 – 200 Vpp min. 25 – 230 Vpp typ.
Rise and Fall Time (symmetric)	< 100 ns (10% to 90%, max 2 nF Load)
Input	TTL compatible, 22 kΩ pull down resistor
Input to Output Pulse Propagation Delay	typ. 100 ns (symmetric on to off, off to on)
Output Impedance	< 10 Ω
Typ. Output Current	4 Ap (2 nF Load, 200 V pulse amplitude)
DC Monitor Out (independent of trigger signal)	Peak Pulse Voltage ÷ 20 ± 2%
Pulse Monitor Out (attenuated copy of output)	Output Pulse Waveform ÷ 20 ± 10%
Recommended Trigger Waveform	Bursts with up to 20 high pulses of max. 500 kHz, min. 1 ms break between bursts, normally low

All characteristics are for +12 V power supply and 25 °C ambient temperature.

Characteristics (continued)	
Power Supply Voltage	+12 V nom. , 11 – 13 V Operating Range
Power Supply Current	20 mA (typ., no signal), 120 mA (max.)
Shield	Tin-Plated Steel
Weight	60 gr.
Storage Temperature	-20 .. +70 °C
Operating Temperature	10 .. 40 °C

Absolute Maximum Ratings	
Trigger Input Voltage	± 10 V
Power Supply Voltage	15 V

Connections	
Trigger Input	BNC Connector
Pulse Output	BNC Connector
DC Monitor	BNC Connector
Pulse Monitor	BNC Connector
Power Supply	2 Pin Header (2.54 mm Pitch): Pin 1 = Ground Pin 2 = +12 V DC

Functional Description

The A119-003 Pulse Amplifier consists of a MOSFET half bridge acting as a fast electronic switch and a DC-DC converter to power the bridge with high voltage up to 200 V. A HV capacitor of typical 200 nF provides energy storage to the bridge. The switch is controlled by a TTL level trigger input with non-inverting logic. The amplifier is designed to rest in an idle state of low input signal. Then the output is switched to ground. The idle state can last indefinite.

On high input signal the bridge hard switches the output to the HV capacitor, carrying the peak voltage of nominal 30 – 200 V controlled by the 20-turn trimpot. This on state is limited to about 1 ms. Alternatively high frequency bursts can be applied to the trigger input, but no more than about 20 pulses with 2 nF load. Depending on the load, this draws energy from the storage capacitor, decreasing the pulse amplitude. To let the DC-DC converter recharge the HV capacitor, a break of minimal 1 ms low is recommended before the next burst is applied.

The HV output current of the DC-DC converter is limited to about 20 mA, making it short circuit proof.

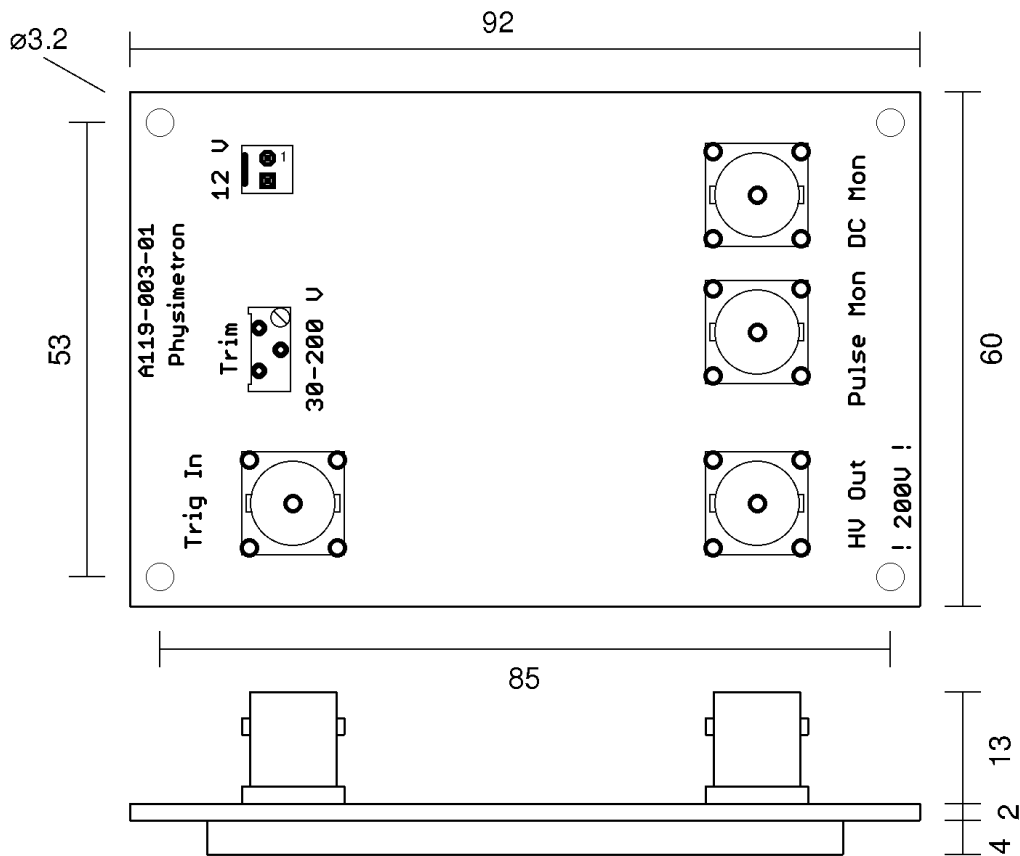
The DC Monitor Output is the bridge HV capacitor voltage attenuated $20 \div 1$, intended to be connected to a multimeter or so. It helps to adjust the desired peak amplitude by the 20-turn trim-pot and is present whether the control input is high or low.

The Pulse Monitor Output is a $20 \div 1$ attenuated image of the output pulse, intended to be connected to an oscilloscope or fast ADC. It provides a time reference for trigger and delay measurement purposes. To give accurate amplitude readings, the oscilloscope has to have 1 M Ω input impedance and the BNC cable used for connection should be no longer than 1m.

As there are up to 20 mJ of up to 250 Volt High Voltage energy stored inside this module, greatest care is to be observed not to touch the output of the module or any circuitry connected to it!

This High Voltage Pulse Amplifier is to be used and operated by qualified personnel only, if incorporated into a system all applicable rules of electric security are to be observed!

Dimensions



A119-003 Dimensions are in mm

The module can be fastened by means of four M3 screws.
 The power supply header 2 pin 2.54 mm pitch with friction lock is Molex KK compatible.