

PQSD-3MS

Piezo Q-Switch Driver

PQSD-3MS provides three synchronized pulses of microsecond duration with magnitude of hundreds of volts. It can be used to control piezoelements of Frustrated Total Internal Reflection (FTIR) shutters.

Features

- 3 high voltage pulsed outputs;
- Adjustable pulses amplitude V and width T ;
- Adjustable delay between the pulses Δ ;
- Adjustable delay S from external trigger;
- 12 V power supply;
- Built-in high-voltage source;
- Compact size.

Specifications

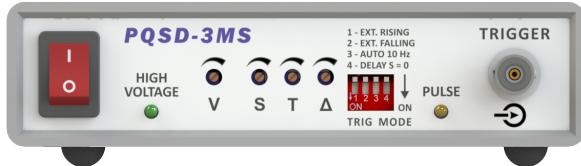
Max load capacity per channel, C	10 nF
Peak current per channel	4 A
Output voltage amplitude, V^*	90 ÷ 220 V
Pulses width, T	1 ÷ 5 μ s
Delay between pulses, Δ	200 ÷ 800 ns
Leading edge width measured at levels 0.33-0.97 V_{max} , t_r^{**}	$\leq 0.2 \mu$ s
Falling edge width, t_f^{**}	$\leq 0.2 \mu$ s
Max repetition rate, F_{max}	100 Hz
Triggering pulse amplitude, V_{trig}	5 V \pm 20%
Typical triggering pulse duration	> 10 μ s
Min triggering pulse duration	100 ns
Delay to trigger, S	50 ÷ 1050 μ s
External power voltage, V_{PWR}	5 ÷ 12 V
Max load power, P_{max}	5 W
Operating temperature range	-40 ÷ +60 °C
Dimensions	140 × 110 × 35 mm ³

* The amplitude up to 450 V is available with proper readjustment under request of the same PCB type.

** Depends on the load parameters (capacity etc.).

PQSD-3MS Interface

Front panel:



TRIGGER (BNC) connector for input of external trigger signal.

TRIG MODE (DIP) switch provides controlling of internal and external triggering modes.

Pin functions of **TRIG MODE** switch:

1 Pin 1 – EXT. RISING

Used for triggering from rising edge of external positive or negative pulse. Triggering pulse amplitude is of 4÷5 V, pulse width >10 μ s. DIP SWITCH positions: 1-ON, 2,3-OFF.

2 Pin 2 – EXT. FALLING

Used for triggering from falling edge of external positive or negative pulse. Triggering pulse amplitude is of 4÷5 V, pulse width >10 μ s. DIP SWITCH positions: 1,3-OFF, 2-ON.

3 Pin 3 – AUTO 10 Hz

Internal triggering. DIP SWITCH positions: 1,2-OFF, 3-ON. Repetition rate is of 10 Hz.

4 Pin 4 – DELAY S = 0

Delay S can be set to zero by switching this pin into the ON position (S=0).

LED '**PULSE**' (yellow) indicates both internal and external triggering.

LED '**HIGH VOLTAGE**' (green) indicates HV signal at output.

ADJUSTMENTS: HV pulses magnitude V, width T, delay between the pulses Δ (pulses spacing) and general delay S are adjusted by the variable resistors placed at the front panel of the driver.

Back panel:



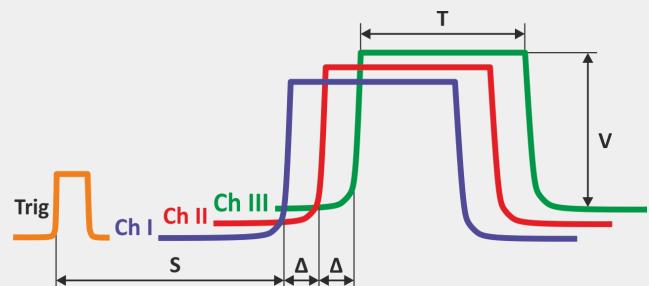
SHUTTER (D-SUB) connector is used for HV pulses output. Connector pinout:

- channel 1 output - pin 3;
- channel 2 output - pin 4;
- channel 3 output - pin 5;
- GND – pins 7, 8, 9.

DC 5 ÷ 12V (5.5/2.1) – the connector for external power supply.

SYNC OUT (BNC) connector for triggering of external devices and measurements of the HV pulses amplitude with ratio 1:100. The pulse coincides in time with HV pulse of *Ch I*.

Timing diagram



HV output pulses: V - pulses amplitude, T - pulses width, S - delay between triggering pulse and 1-st output HV pulse, Δ - delay between output pulses

Rising edges of the *Ch II* and *Ch III* output pulses are delayed from the *Ch I* rising edge by Δ and 2Δ correspondingly. The speed of the voltage changes on the connected piezoelement V/t_F depends on the piezoelement capacity C and the current I of the driver that reaches more than 100 amperes:

$$V/t_F = I/C$$

Connecting and switching the driver PQSD-3MS on

- 1 Connect the FTIR shutter to the connector '**SHUTTER**' located on the back panel of PQSD-3MS.
- 2 Make choice of triggering operation mode and desirable value of delay **S** (zero or variable) with help of DIP switch '**TRIG MODE**'. **S** value is adjusted manually with '**S**' potentiometer.
- 3 For triggering from the external source connect proper cable to the connector '**TRIGGER**' on the front panel of the device.
- 4 Connect DC power supply to socket '**DC 5 ÷ 12V**' accordingly to the polarity shown on the panel.
- 5 Put the switch 'I/0' in 'I' position. LED '**HIGH VOLTAGE**' (green) indicates switching internal HV power supply on. The LED '**PULSE**' (yellow) shows if the device is running with chosen repetition rate of triggering
- 6 If necessary check out the delay **S** value and 1-st channel output pulse magnitude connecting oscilloscope to the BNC connector '**SYNC OUT**', placed on the back panel of the device. The signal ratio to HV pulse magnitude is of 1:100.

Note

The driver has optron junction for external input trigger. DC power circuit (12 V) and output signals have common ground connection (GND).

Switching the driver PQSD-3MS off

- 1 Put the switch 'I/0' in 'I' position.

Electrical safety rules

Make sure that all power cables are reliably isolated and not damaged. The top cover of the power supply may be opened only by qualified personnel.

! Attention!

To prevent electrical shock, when opening the cover and/or installing FTIR shutter, disconnect the device from the mains! There is High Voltage inside the driver and at the outputs of the device. After switching the device off wait for a few seconds to discharge output capacities before remove the cover or disconnect FTIR-shutter.

! Attention!

Long term operation on the short circuit load is not allowed!



Leading the light

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