

Pockels Cell Driver PCD-51B

POCKELS CELL CONTROL IN «PULSE PICKER» MODE
CONTINUOUS OR PULSED BIAS VOLTAGE
DIFFERENTIAL OUTPUT

DESCRIPTION

Generation of a continuous or pulsed bias voltage with nanosecond fall to voltage with reverse polarity for to control an electro-optical shutter in «pulse picker» mode as part of a solid-state laser.

FEATURES

- ✓ bipolar symmetrical voltage in the «pulse picker» mode;
- ✓ continuous or pulsed bipolar bias voltage;
- ✓ nanosecond pulse voltage fall time;
- ✓ trigger pulse jitter is less than 100 ps;
- ✓ low voltage power supply;
- ✓ built-in DC and pulsed high-voltage source;
- ✓ voltage adjustment by built-in trimmer or by external signal;
- ✓ additional output signal for measuring output voltage;
- ✓ logic input «Enable» to switch on bias voltage;
- ✓ SMA-connector (50 Ω) for triggering;
- ✓ compact design and light weight.

SPECIFICATION

• Bias voltage amplitude V_{BIAS} ¹	+ (2800 ÷ 3600) V
• Bias voltage wavefront	20 ÷ 50 μ s
• Bias voltage hold time ²	> 50 μ s
• Pulse voltage fall time ⁴	1 ÷ 2 ns
• Pulse voltage amplitude V_{PLS} ³	– (3000 ÷ 3800) V
• Pulse wavedecline time	10 ÷ 20 μ s
• Max HV pulse repetition rate	500 Hz
• Optimal load capacitance	3 ÷ 10 pF
• «ENABLE» input voltage	3.3 ÷ 5 V
• «ENABLE» input impedance	200 Ω
• Trigger voltage	3.3 ÷ 5 V
• Trigger input impedance	50 Ω
• Output pulse delay vs. trigger pulse ⁵	12 ÷ 16 ns
• Timing jitter of output HV pulse vs. trigger	< 100 ps
• Supply voltage	12 ÷ 24 V
• Current consumption at a pulse frequency of 100 Hz	≤ 350 mA & 12 V
• Operating temperature range	–40 ÷ +50 °C
• Dimensions	80 × 38 × 16 mm ³
• Mounting holes ($\varnothing$ 3.5 mm)	46 × 31 mm

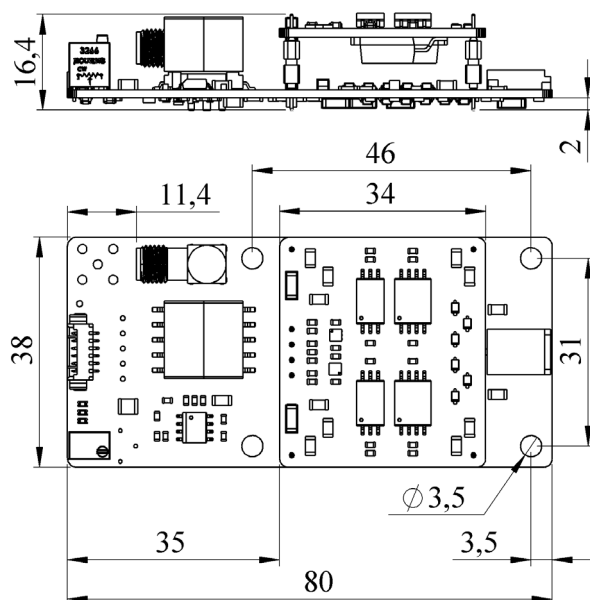
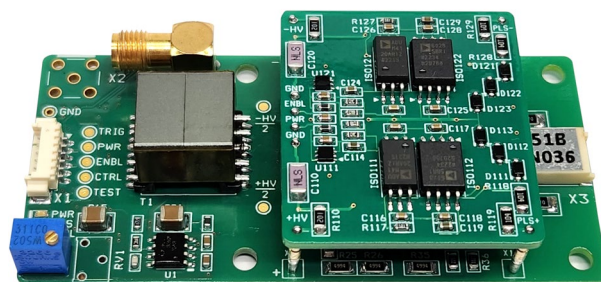
¹ Is set from the built-in potentiometer or remotely (X1 pin5).

² While the «Enable» (X1 pin3) is high.

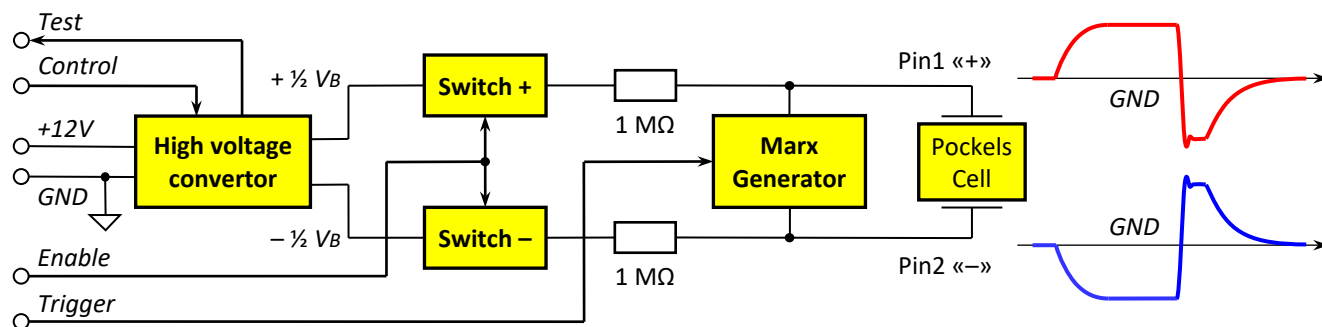
³ Approximately (105 ÷ 110) % of bias voltage V_{BIAS} . Factory preset.

⁴ Depends on load capacitance and output bias voltage amplitude.

⁵ Depends on the output bias voltage amplitude. The higher the amplitude is the shorter the delay.



Electrical Diagram



Connection Diagram

Connector X1 (input) – 53261-0671 (Molex) :

- Pin 1 (red) – power supply + 12 V & 500 mA;
- Pin 2 (black) – power supply GND;
- Pin 3 (yellow) – enable;
- Pin 4 (black) – enable GND;
- Pin 5 (blue) – control ^{NOTE 1};
- Pin 6 (green) – output voltage measure signal; DC voltage scale 1:10000.

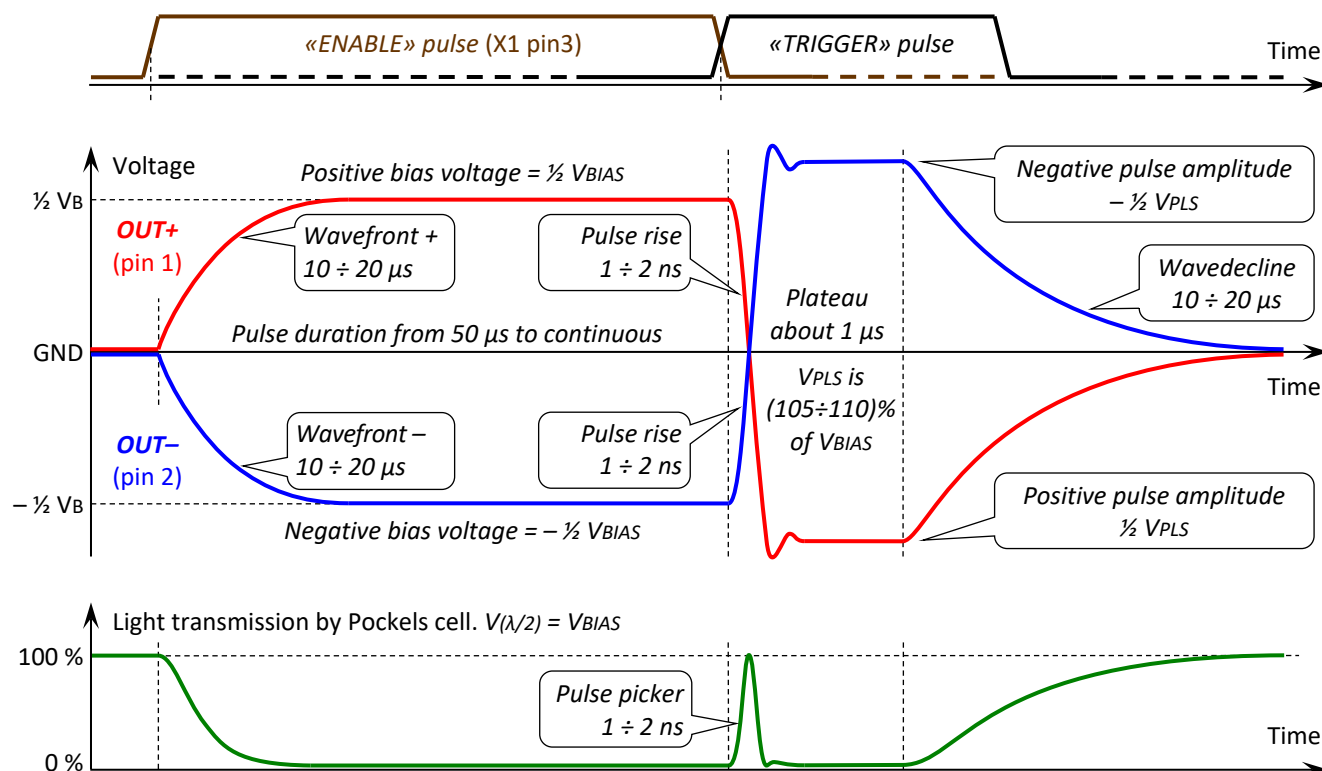
SMA Connector X2 (output) – 733910083 (Molex) :

Trigger input + (3 ÷ 8) V; R_{INPUT} = 50 Ohms; rising edge < 20 ns; duration > 20 ns.

Connector X3 (output) – SM02B-BHSS (JST) :

- Pin 1 (HV red) – positive high voltage output;
- Pin 2 (HV red) – negative high voltage output.

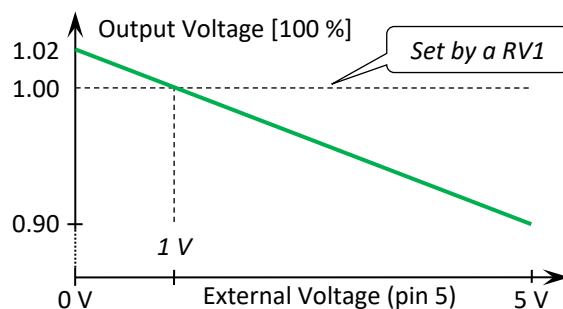
Output waveform of the Pockels cell driver PCD-51B



Note 1. Pin 5 (control) is used for remote adjustment of the output pulse amplitude in the range of approximately +2 % to -10 % (from value set by potentiometer RV1).

That is, if a voltage of 0 V from an external source is applied to pin 5 (or shorted to GND), the pulse amplitude will be 2 % higher than the set value. If 5 V is applied to pin 5, the pulse amplitude will be approximately 10 % lower.

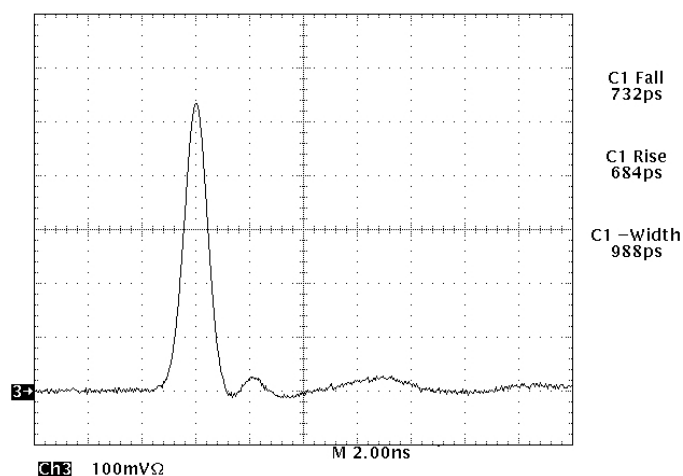
The input impedance of the pin 5 is 43 kOhms.



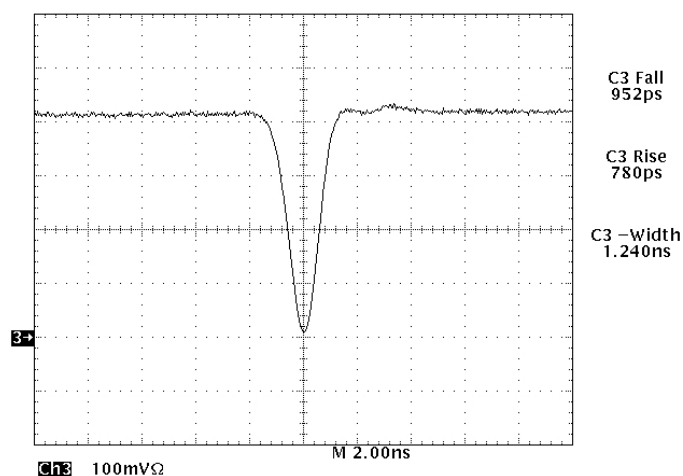
Pockels Cell transmission with a $\lambda/2$ voltage of 3600V ($\lambda=532\text{nm}$) at a pulsed voltage transition from +3600V to -3800V, scale 2ns per division.

Two oscillograms taken with the optical scheme normally open and normally closed, and with different tuning of the output electrical circuit.

Tek Run: 25.0GS/s



Tek Run: 25.0GS/s ET Average



Alternative the SMA connector and potentiometer placement.

