

DPS/DPD Series

CAVITY DUMPING & PULSE PICKING  
POCKELS CELL DRIVERS



Fig. 1. OEM version of DPS/DPD series Pockels cell driver



Fig. 2. Encased version of DPS/DPD series Pockels cell driver

- Fast HV rise/fall time <4 – 8 ns
- HV pulse amplitude up to 3.6 kV
- Pulse repetition rate up to 3.5 MHz

DPD series Pockels cell drivers are designed for wide range of applications and operating modes. Repetition rate can be up to 500 kHz for standard range of drivers, up to 1 MHz enhanced and up to 3.5 MHz high rate. Standard range of possible pulse durations is from 100 ns to 5  $\mu$ s. It can be extended to infinity using pulse regeneration technique. Connection diagram can be PUSH-PULL configuration using stand-alone driver, as well as FULL BRIDGE using two drivers for one Pockels cell. FULL BRIDGE configuration gives such advantages as repetition rate doubling to reach up to 7 MHz rate, pulse duration shortening down to zero or voltage doubling on pockels cell.

Most of DPS/DPD series units are available in two versions: „open frame“ which is ideal for OEM manufacturers incorporating drivers in their own systems and encased in aluminum housings. Encasing of Pockels cell driver in aluminum housing solves two problems: shields both humans and electronics from high voltage impact from operating Pockels cell driver, and protects driver itself from potentially harmful external contact – ensuring safe operation and driver longevity. The housed option is especially handy for researchers and custom product manufacturers who use these drivers during their own systems build-up.



Fig. 3. Control timing charts for two-pulses controlled drivers



Fig. 4. Control timing charts for single pulse controlled drivers

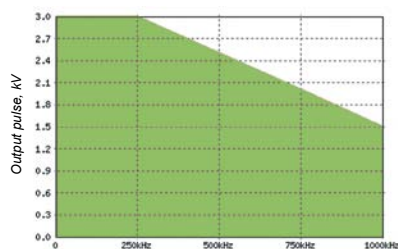


Fig. 5. Operating possibility chart for DPS/DPD standard and enhanced rate drivers. You may easy choose version of customized driver for inquiry within green area of chart

GENERAL SPECIFICATIONS TABLE FOR DPS/DPD SERIES DRIVERS <sup>1)</sup>

Driver model	DPS/DPD series
Maximal HV rated voltage (for testing only)	3.8 kV
Maximal HV operating voltage	<90 % from rated voltage
HV pulse rise time	< 4-8 ns (Fig. 7)
HV pulse fall time	< 4-8 ns (Fig. 8)
HV pulse duration for single driver	120 - 5000 ns
Max HV pulse duration for full-bridge configuration	0 - 5000 ns
Maximal HV pulse repetition rate	3.5 MHz
External triggering pulse duration requirement	>100 ns
External triggering pulse amplitude requirement	3-5 V (50 $\Omega$ load)
External triggering pulse rise & fall time	< 20 ns
Maximal length of leads to Pockels cell	10 cm
Control diagram options:	
– single triggering pulse control	Fig. 4
– two trigger pulses control	Fig. 3
HV pulse delay	40-50 ns
External powering requirements: <sup>2)</sup>	
– high voltage supply	depends on modification
– low voltage DC supply	12 $\pm$ 0.5 V, <150 mA 14 – 25 V, <150 mA, on request

<sup>1)</sup> Specifications are given for Pockels cell with capacity <6 pF. Not all combinations of parameters can be possible at the same time. Specifications are subject to changes without advance notice.

<sup>2)</sup> Driver needs to be mounted on the heatsink (excluding water cooled versions). Heat sink temperature needs to be lower than 35 °C (95 °F) in all regimes of operation.

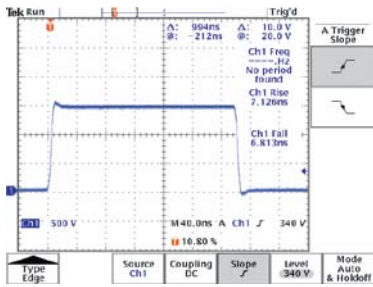


Fig. 6. Typical output pulse shape

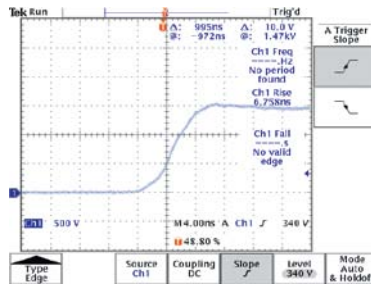


Fig. 7. Typical rising front of output pulse in detail

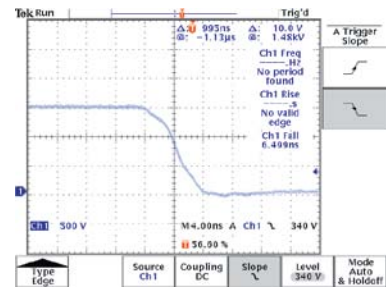


Fig. 8. Typical falling front of output pulse in detail

OEM version

CONFIGURATION SAMPLES OF OEM VERSION OF DPS/DPD SERIES DRIVERS

Catalogue Number of Driver	DPS-50-3.6 DPD-50-3.6	DPS-400-1.5 DPD-400-1.5	DPS-200-3.6 DPD-200-3.6	DPS-250-2.5 DPD-250-2.5	DPS-500-2.5 DPD-500-2.5	DPS-1000-1.8 DPD-1000-1.8
Maximal HV rated voltage	3.8 kV	1.6 kV	3.8 kV	2.6 kV	2.6 kV	2 kV
Maximal HV operating voltage	3.6 kV	1.5 kV	3.6 kV	2.5 kV	2.5 kV	1.8 kV
Maximal HV repetition rate	50 kHz	400 kHz	200 kHz	250 kHz	500 kHz	1000 kHz
Pulse duration	120-5000 ns	120-5000 ns	120-5000 ns	120-5000 ns	120-5000 ns	120-5000 ns
HV pulse rise time, typical	<7 ns	<5.5 ns	<7 ns	<6 ns	<6.5 ns	<6 ns
HV pulse fall time, typical	<7 ns	<5.5 ns	<7 ns	<6 ns	<6.5 ns	<6 ns
Output polarity	positive	positive	positive	positive	positive	positive
HV power consumption	<20 W	<20 W	<65 W	<40 W	<80 W	<80 W
12V/24V power consumption	1 W	5.5 W	4 W	4.5 W	6 W	9 W
Dimensions	see Fig. 13	see Fig. 12	see Fig. 12	see Fig. 12	see Fig. 12	see Fig. 12
Cooling	conductive	conductive or water	conductive or water	conductive or water	conductive or water	conductive or water

DPS in code indicates that driver is controlled by 1 sync pulse, DPD in code indicates that driver is controlled by 2 sync pulses.  
 HV output voltage to Pockels cell is equal to HV power supply voltage.  
 Heat sink temperature needs to be lower than 35 °C (95 °F) in all regimes of operation.



Fig. 10. OEM version of DPS/DPD series driver with general purpose pad



Fig. 11. OEM version of DPS/DPD series driver with conductive pad. Suitable for repetition rate up to 50 kHz

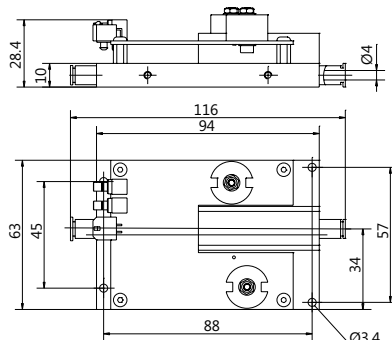


Fig. 12. Outline drawing of DPS/DPD series driver with general purpose pad

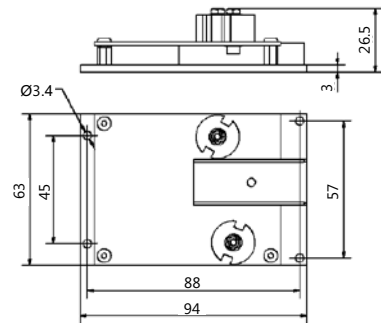


Fig. 13. Outline drawing of DPS/DPD series drivers with conductive pad

**ENCASED version (unipolar drivers)**

**CONFIGURATION SAMPLES OF ENCASED VERSION OF DPS/DPD SERIES UNIPOLAR DRIVERS**

Catalogue Number of Driver	DPS-200-3.6-AI DPD-200-3.6-AI	DPS-250-2.5-AI DPD-250-2.5-AI	DPS-500-2.5-AI DPD-500-2.5-AI	DPS-1000-1.8-AI DPD-1000-1.8-AI
Maximal HV rated voltage	3.8 kV	2.6 kV	2.6 kV	2 kV
Maximal HV operating voltage	3.6 kV	2.5 kV	2.5 kV	1.8 kV
Maximal HV repetition rate	200 kHz	250 kHz	500 kHz	1000 kHz
Pulse duration	120-5000 ns			
HV pulse rise time, typical	<7 ns	<6 ns	<6.5 ns	<6 ns
HV pulse fall time, typical	<7 ns	<6 ns	<6.5 ns	<6 ns
Output polarity	positive			
HV power consumption	<65 W	<40 W	<80 W	<80 W
12V/24V power consumption	4 W	4.5 W	6 W	9 W
Dimensions	see Fig. 15			
Cooling	water			



Fig. 14. Encased version of driver DPS/DPD models DPS/DPD-200-xx, DPS/DPD-250-xx, DPS/DPD-500-xx, DPS/DPD-1000-1.8

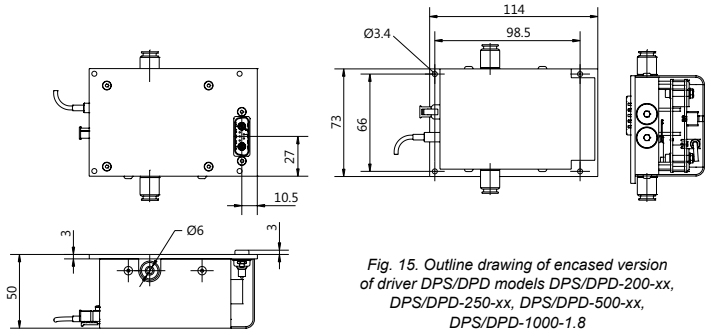


Fig. 15. Outline drawing of encased version of driver DPS/DPD models DPS/DPD-200-xx, DPS/DPD-250-xx, DPS/DPD-500-xx, DPS/DPD-1000-1.8

**ENCASED version (bipolar drivers)**

**CONFIGURATION SAMPLES OF ENCASED VERSION OF DPS/DPD SERIES BIPOLAR DRIVERS**

Catalogue Number of Driver	DPS-250-5.2-AI DPD-250-5.2-AI	DPS-300-4.6-AI DPD-300-4.6-AI	DPS-350-4-AI DPD-350-4-AI	DPS-1000-2.7-AI DPD-1000-2.7-AI
Maximal HV rated voltage	5.3 kV	4.8 kV	4.2 kV	2.8 kV
Maximal HV operating voltage	5.2 kV	4.6 kV	4.0 kV	2.7 kV
Maximal HV repetition rate	250 kHz	300 kHz	350 kHz	1000 kHz
Pulse duration	120 – 5000 ns			
HV pulse rise time, typical	<8.2 ns	<7.5 ns	<7 ns	<7.5 ns
HV pulse fall time, typical	<8.2 ns	<7.5 ns	<7 ns	<7.5 ns
Output polarity	bipolar			
HV power consumption	<100 W			
12V/24V power consumption	9 W			
Dimensions	see Fig. 17			
Cooling	conductive or water			

Driver needs to be mounted on the heatsink (excluding water cooled versions). Heat sink temperature needs to be lower than 35 °C (95 °F) in all regimes of operation.

HV output voltage to Pockels cell is equal to HV power supply voltage i.e. sum of positive and negative HV values. Please specify working voltage and required tuning range by ordering.

\* Bipolar HV power supply HV2x60Wm is specifically designed for these drivers.



Fig. 16. Encased version of driver DPS/DPD models. Water cooled version

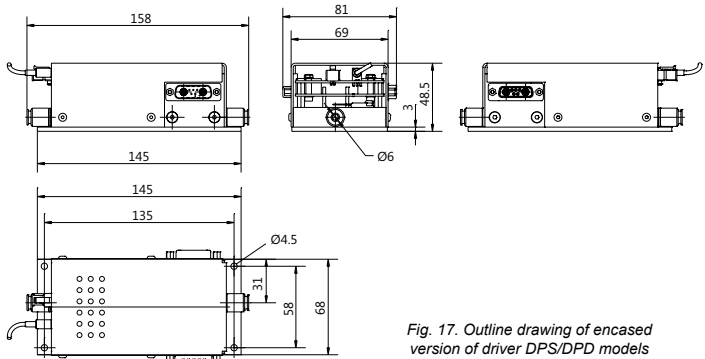


Fig. 17. Outline drawing of encased version of driver DPS/DPD models

**FULL-BRIDGE version**

**CONFIGURATION EXAMPLES OF FULL-BRIDGE CONFIGURATION DRIVERS**

Catalogue Number of Full-Bridge Driver	2DPS-1000-2.5-AI 2DPD-1000-2.5-AI	2DPS-2000-1.6-AI 2DPD-2000-1.6-AI
Base driver	DPS-500-2.5 DPD-500-2.5	DPS-1000-1.6 DPD-1000-1.6
Maximal HV operating voltage, kV	2.5	1.6
Maximal HV repetition rate, kHz	1000	2000
HV pulse duration range	0 – 5000 ns	0 – 5000 ns
HV pulse rise time, ns	<6.5	<6
HV pulse fall time, ns	<6.5	<6
Maximal capacitance of Pockels cell, pF		<6
HV power consumption, W	<160	<160
Case	see Fig. 21	
Cooling	water	

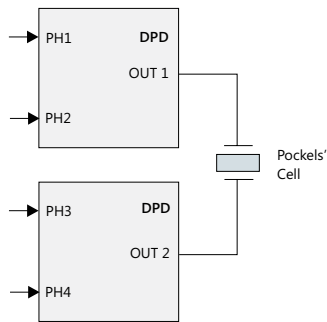


Fig. 18. Diagram of Pockels cell full-bridge connection to driver



Fig. 19. External view of full-bridge driver

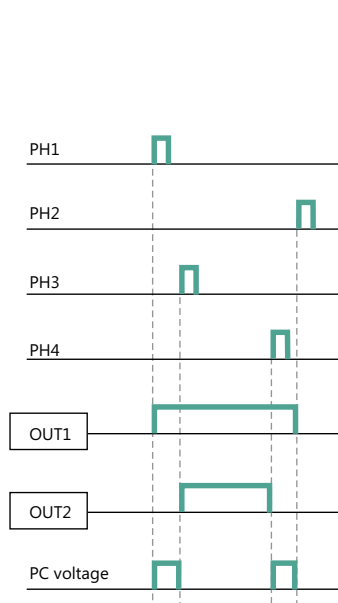


Fig. 20. Principle of 4-phase control of full-bridge driver configuration

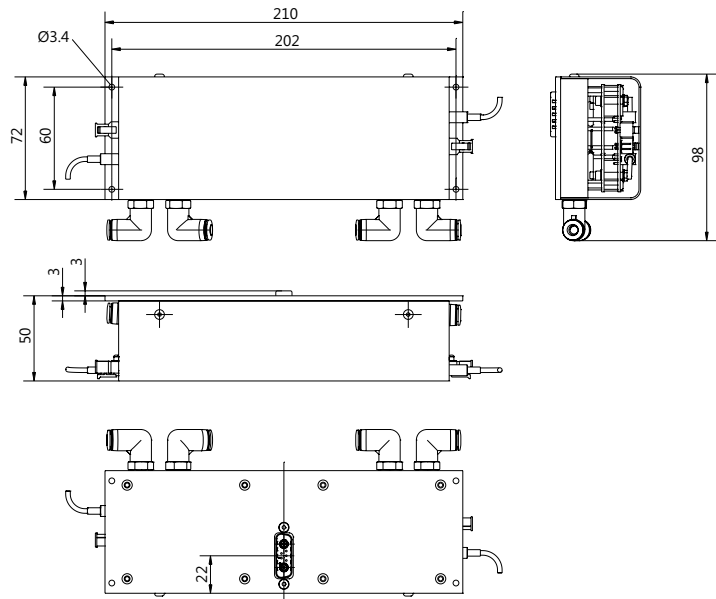


Fig. 21. Outline drawing of case for full-bridge drivers

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