

Datasheet Pockels Cell Driver



Description:

A Pockels cell driver is used to apply high voltage to a Pockels cell (PC) in a few nanoseconds time at high frequencies. With careful adjustment of both the PC and the applied voltage, one can manipulate the polarization state or the phase of the light going through the PC. We sell drivers for KD*P, RTP, BBO and CdTe Pockels cells, but drivers can be manufactured for any other type of material as well. To suit medical applications all of our Pockels cell drivers are EMC tested and have a number of built in safety features.

General Specifications:

max. operating voltage	up to 22 kV ¹
max. repetition rate	15 MHz continuous, up to 50 MHz in burst mode ¹
optical rise- and falltime	200 ps – 15 ns ¹
output load	50 Ohm or Capacitive
pulsewidth	any (depending on switch type)
on / off - ratio	0 < 1
jitter, input to output	< 100 ps
trigger input impedance	50 Ohm
trigger input	3 – 10 V, width > 50 ns

¹ These specifications are mutually dependent, i.e. repetitionrates of 15MHz are achievable at switching voltages of 1kV, at 10kV repetitionrate may be limited to about 600kHz. Higher switching voltage tends to increase risetime. For a burst mode switch maximum average pulse frequency must be observed.

Pockels Cell Materials:

KD*P is most commonly used for applications where large apertures and high contrast ratios are needed. High frequency operation is limited to about 10 kHz as piezoelectric ringing deminishes the contrast ratio and ultimately can cause crystal damage.

BBO is one of the best materials for high power and high frequency operation. However, as the Pockels coefficients are rather small quarterwave voltages are pretty high. To reduce the quarterwave voltage it is possible to get double crystal Pockels cells which typically only have 2/3 of the quarterwave voltage compared to a single crystal one. Frequencies of up to 5MHz (continuous) have been realized to date.

RTP is often used in optical quantum physics as low halfwave voltages allow for high frequencies. Frequencies of up to 15MHz (continuous) have been realized to date.

	KD*P	BBO	RTP	CdTe
mode	longitudinal	transversal	transversal	transversal
max aperture	100 mm	8 mm	6 mm	8 mm
wavelength range	200 – 1600 nm	200 – 2200 nm	350 – 4500 nm	900 – 20000 nm
damage threshold ²	> 3 GW/cm ²	> 4.6GW/cm ²	> 600 MW/cm ²	not well known
10 ns pulses	@ 1064 nm	@ 1064 nm	@ 1064 nm	
transmission ²	> 98.5%	> 98.5%	> 98.5%	>90.0%
	@ 1064 nm	@ 1064 nm	@ 1064 nm	@ 10600nm
contrast ratio	> 1000:1	> 1000:1	> 100:1	> 100:1
λ/4 Voltage	3.5 kV @ 1.06 μm	3.5 kV @ 1.06 μm	1.0 kV @ 1.06 μm	2.5 kV @ 10.6 μm
crystal dimensions	Ø 10 x 20 mm ³	3x3x20 mm ³	6x6x20 mm ³	5x5x50 mm ³

² dependent on wavelength and coating type.

Typical Performances:

voltage	rise/fall-time (typ)	repetitionrate (with water-cooling)
1.0 kV	4 ns	15 MHz
1.5 kV	4 ns	12 MHz
2.0 kV	4 ns	10 MHz
3.0 kV	4 ns	3 MHz
3.0 kV	4 ns	5 MHz
4.0 kV	5 ns	2 MHz
4.0 kV	200 ps	1 kHz
6.0 kV	6 ns	1 MHz
8.0 kV	10 ns	900 kHz
8.0 kV	250 ps	100 Hz
10.0 kV	10 ns	700 kHz
12.0 kV	10 ns	450 kHz
15.0 kV	15 ns	10 kHz
18.0 kV	15 ns	2 kHz

Dimensions:

	small	medium	large
watercooled	310 x 80 x 108 mm ³	325 x 120 x 108 mm ³	345 x 180 x 110 mm ³
no cooling	235 x 80 x 108 mm ³	270 x 120 x 108 mm ³	

Housings can be built to any size and shape. Please contact us for more information.