Free-Space RTP Electro-Optical Modulator

(2, 4, 6, 8mm aperture, 400nm to 2000nm)

DATASHEET

Return to the Webpage

Made with the highest quality rubidium titanyle phosphate (RTP), the FRTP series Pockels cells provide the industry's best free space electro-optic modulation performance. FRTP offers salient benefits of high optical damage threshold, short wavelength durability, low distortion, low driving voltage, fast modulation rates, minimal, and exceptional stability. RTP is a unique electro-optical material that is free of the deficiencies associated with other electro-optic materials, including charge build-up induced degrading and photorefractive induced defects when passing shortwave or high optical power light through it, also piezoelectric induced ringing to the signals. Our RTP Pockels cells are made using a matched pair of crystals to counteract RTP's index refraction thermal drift, enhancing the device's environmental stability. RTP Pockels cells have the electric field applied perpendicular to the direction of the light path, resulting in uniform electro-optic response with minimum distortion to the laser's optical mold properties, and low driving voltage. We offer four aperture sizes of 2mm, 4mm, 6mm, and 8mm. Polarization cubes can be aligned and installed at both input and output ports to form an intensity modulator.

Features

- High Power Damage Threshold
- Short Wave Operation High Stability
- Low Driving Voltage
- No Piezoelectric Ringing
- High Speed
- High Transparency
- Wide Wavelength Range
- Non-Hygroscopic

Applications

- Q-Switch
- Phase/Power Modulation
- Pulse Picker

Specifications

Parameter		Min	Typical	Max	Unit
Wavelength Range [1]		350		450	nm
		400		600	
		600		900	
		900		1250	
		1250		1650	
Clear Aperture [2]		2		8	mm
Halfwave Voltage[3]	532nm	400		4000	V
	1064nm	800		8000	
Material Purity		99.8			%
Transmission		98			%
Extinction (on/off) [4]		20		35	dB
Rise/Fall Time (10-90%)		0.5		1.1	ns
Angle Tolerance (perpendicularity)			± 0.15		degree
Parallelism		5			"
Humidity (non-condensing)				80	%
Capacitance (dielectric constant e~13)			14		pF
Damage Threshold	532nm			1	MW/cm²
	1064nm			600	
Surface Scratch/Dig			20/10		mm
Operation Temperature		-40		80	°C
Material Density			3.6		g/cm³
Material Hardness			5		Mohs
Material Melting Point			1000		°C
Ferroelectric Transition Temperature			810		°C
Thermal Optical Coefficients			-0.029		nm/°C
Electrooptic Coefficients		r23=12.5	r33=35	R51=38.5	pm/V
Material Electrical Resistivity			10^{11}		Ω·cm

[1]: These are standard AR coatings, custom AR coating is available with narrower band for lower loss
[2]: These are standard sizes, custom size is available with max length up to 25mm for lower driving voltage
[3]: This relates to crystal size; the smaller the aperture, and the longer the length, the lower the driving voltage
[4]: Measure at DC using two crossed polarizers

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link]:

Warning: Do not use it, if you are not well trained. Do not clean the optical surfaces. Dot not solder on crystals causing cracks. High voltage on the electrodes is extremely dangerous.

Rev 11/22/24

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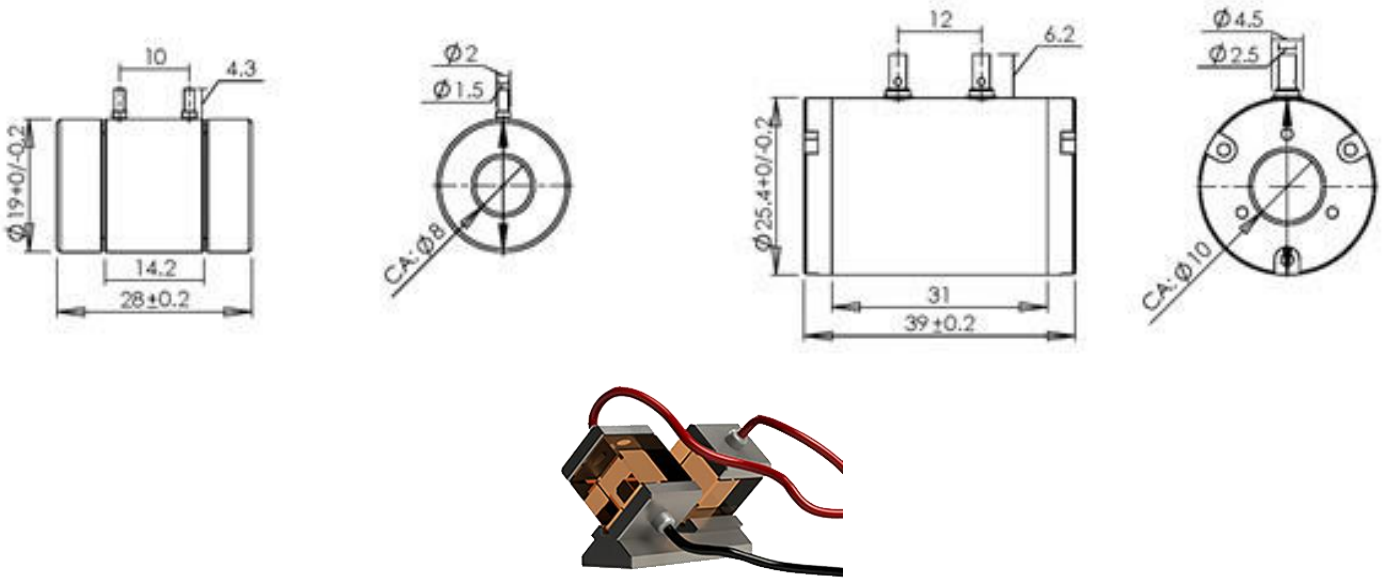
- Dort not use it, if you are not well trained.
- Do not look at. Even indirect exposure to high power laser light can cause eye damage.
- Do not touch it. The driving high voltage can cause serious injury.
- Do not clean the optical surfaces that cause damages
- Do not solder to the crystal that causes cracks inside.

Mechanical Drawing (mm) – (It is related to the crystal size)



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Ordering Information

	☐☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Wavelength**	**Aperture**	**Length**	**Grade [1]**	**Input Cube [2]**	**Output Cube [2]**	**Package**	**Driver**
RTPM-	400~600nm = 05 600~900nm = 07 900~1250nm = 09 1250~1650nm = 14 1800~2500nm = 15 350~450nm = 04	2mm = 2 4mm = 4 6mm = 6 8mm = 8	5mm = 5 8mm = 8 10mm = A 20mm = B 25mm = C	Standard = S Premium = P Ultra = U	No = 1 Polacore = 3 PBS = 4 Glan-Thompson = 5	No = 1 Polacore = 3 PBS = 4 Glan-Thompson = 5	Naked = 1 Tube = 2	Non = 0 Yes = 1

[1]. **Affect Intrisic Contrast Ratio, Electro-Optic Effect Uniformity, Defect Density (**related to the material selection from an as-grown crystal boule in which near center is the best**)**

[2]. **Polacore** (mounted on the crystal surfaces inside the package) (1060nm)– CW 10W/cm^2
PBS (mounted on the crystal surfaces outside the package) (1060nm) – CW 15W/cm^2
Glan-Thompson (mounted on the crystal surfaces outside the package) (1060nm) – CW 2kW/cm^2

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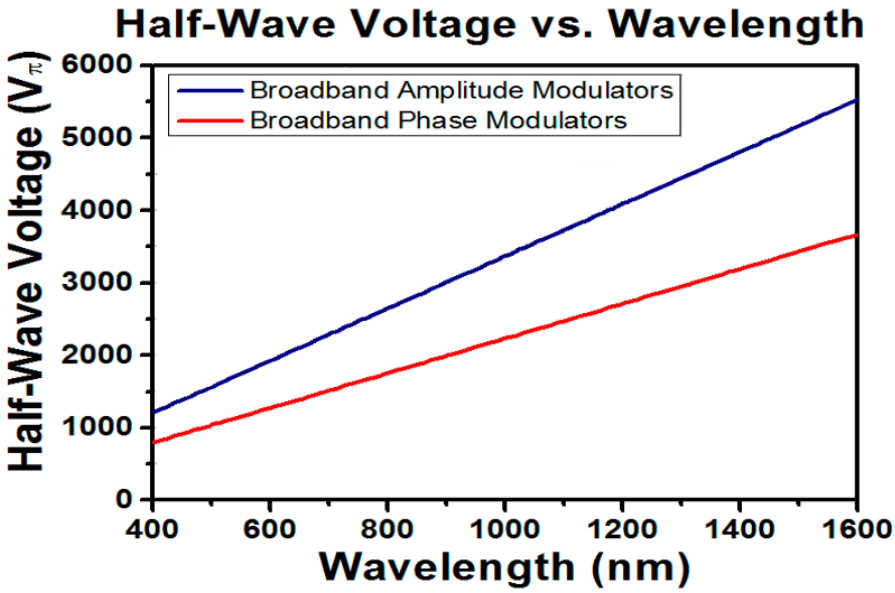
Modulator Half-Wave Voltage (example size)



Application Notes (Q-switch alignment)