

# Resonant Free-Space Electro-Optical Modulator

(2mm aperture, 400nm to 2000nm, fixed frequency from 1 to 100MHz)



DATASHEET

BUY NOW



Our Free-space Electro-optic modulator (FEOM) in the resonant frequency is a electro-optical crystal based modulator which efficiently modify the phase, polarization or amplitude of a free-space laser. It is designed to be operated at a fixed frequency with narrow bandwidth. The resonance frequencies can be selected from 5 to 100 MHz. This resonant modulator can be conveniently driven by a standard laboratory function generator at the resonance frequency.

Custom versions are also available, with user-specified resonant frequencies from 10 to 100 MHz and a variety of optical AR coatings. Our unique design minimum piezo-effect and charge building-up.

The response is a sinusoidal wave shape for resonance devices.

## Applications

- Laser Modulation

## Specifications

Parameter	Min	Typical	Max	Unit
Wavelength Range	W1	400	600	nm
	W2	600	900	nm
	W3	900	1250	nm
	W4	1250	1650	nm
Halfwave Voltage @ non-resonance	225V @ 633nm			
Halfwave Voltage <sup>[1]</sup> , resonant	15V @ 633nm			
Extinction Ratio <sup>[2]</sup>	10			dB
Input impedance, resonant		50		ohms
Input capacitance @ non-resonance		14		pF
Aperture			3	mm
Max Optical Power Density	532nm		2	W/mm <sup>2</sup>
	1064nm		4	W/mm <sup>2</sup>
Temperature	-20		50	°C

### Notes:

[1]. Maximum modulation depth or  $\pi$  phase shift voltage. The halfwave voltage increases as the wavelength increases.

[2]. Characterized at 633nm.

**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](#):

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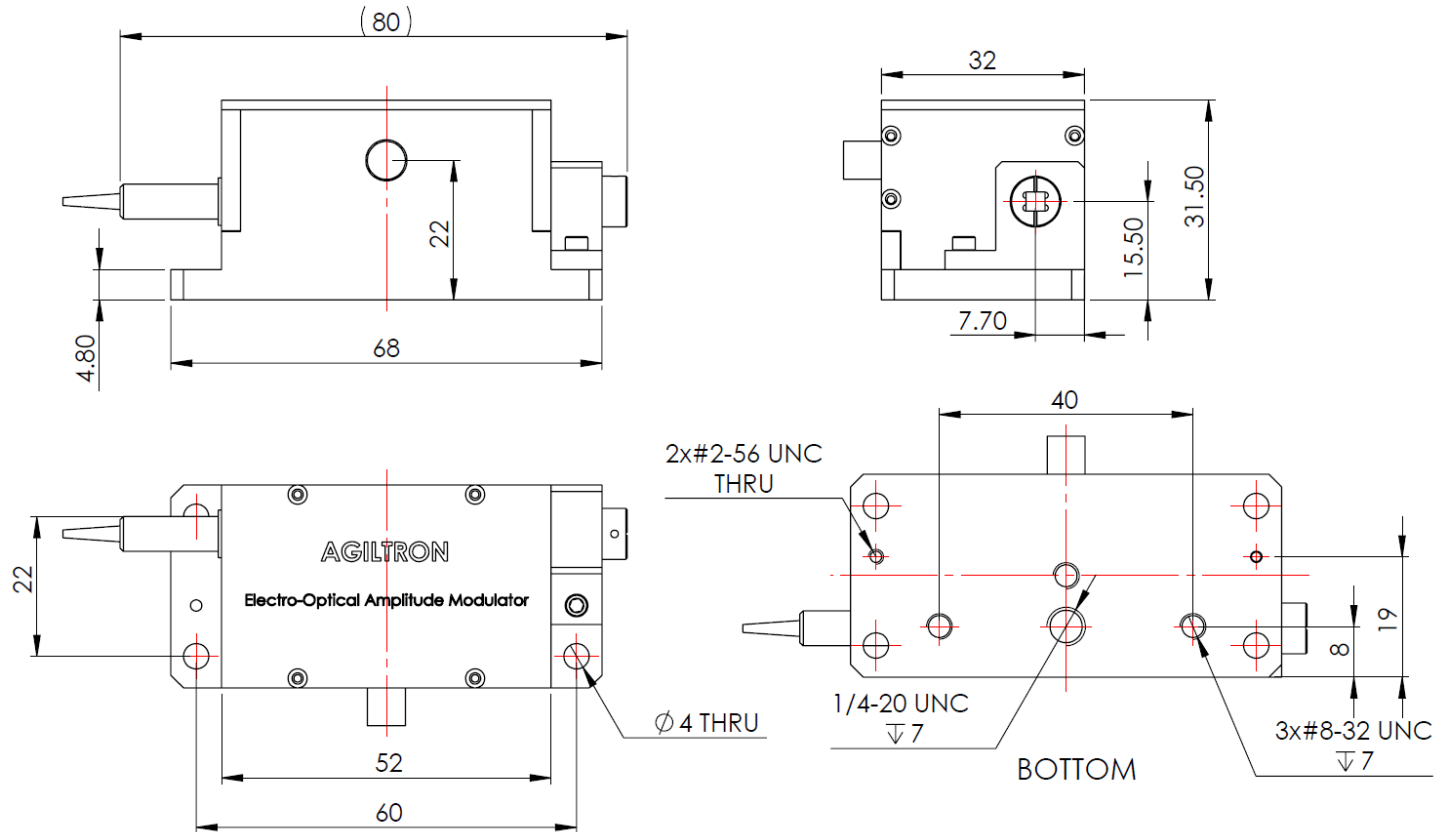
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### Mechanical Drawing



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

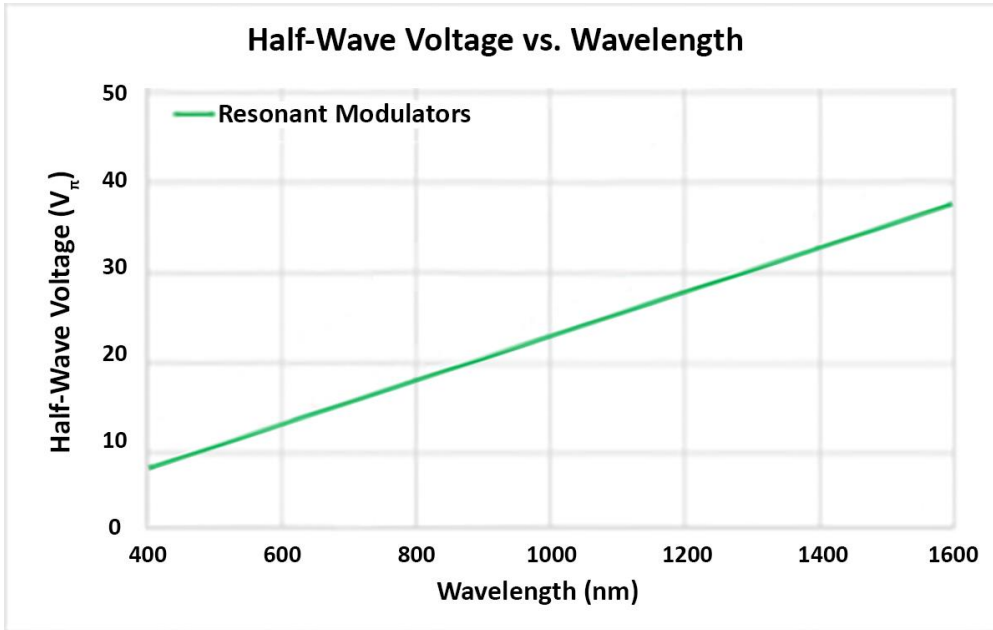
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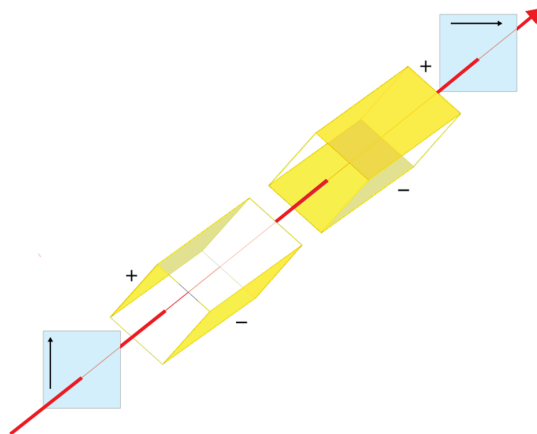


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### Resonant Modulator Half-Wave Voltage



### Amplitude Electro-Optic Crystal Configuration (yellow indicates electrode)



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### Ordering Information

Prefix	Type	Wavelength	Optical Power	Resonant frequency	Input Polarizer <sup>[1]</sup>	Output Polarizer <sup>[1]</sup>	F 1
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>FEOM-</b>	Amplitude = 1 Phase = 2	250~400nm = 03 400~600nm = 05 600~900nm = 07 900~1250nm = 10 1250~1650nm = 14	Regular = 1 2W=2 5W=5 10W=A 20W=B 50W=C	20 MHz = 2 5 MHz = 4 10 MHz = 1 30 MHz = 3 50 MHz = 5 80 MHz = 8 100 MHz = 9	No = 1 Polacore = 3 PBS = 4 Glan-Thompson = 5	No = 1 Polacore = 3 PBS = 4 Glan-Thompson = 5	Single resonant frequency version = F1

[1]. Polacore – CW 10W/cm<sup>2</sup>  
 PBS – CW 15W/cm<sup>2</sup>  
 Glan-Thompson – CW 2kW/cm<sup>2</sup>

#### Polarizer's prices:

Polacore	\$256
PBS	\$365
Glan Thompson	\$485

### Polarizer



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## Application Notes

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### Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

### Fiber Cleanliness

Fibers with smaller core diameters (<5  $\mu\text{m}$ ) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

### Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the handling by expanding the core side at the fiber ends.

## Operation Manual

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1. Connect a function generator that can output  $> \pm 10\text{V}$ .
2. Adjust the frequency (near the specified resonance frequency) of the function generator to reach a maximum attenuation or phase change
3. Adjust the voltage of the function generator to reach maximum attenuation or phase change (over the halfwave voltage will reduce the attenuation and phase change)