

Resonant Free-Space Electro-Optical Modulator

(3mm aperture, 400nm to 2000nm, fixed frequency from 1 to 100MHz)



DATASHEET

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The FEOM Free-Space Electro-Optic Modulator is a crystal-based resonant modulator engineered to operate at a fixed resonance frequency, allowing low-voltage drive for phase, polarization, or amplitude modulation of lasers. Resonance frequencies are selectable from 5 to 20 MHz. We offer both a standard version and a high-power version using RTP crystals to accommodate different application requirements. The standard unit uses a single crystal pair, while wavelengths above 1000 nm require two pairs to achieve full modulation depth. The design minimizes piezo-electric effects and charge buildup, producing the characteristic sinusoidal response of resonance-driven devices. For amplitude modulation, polarized input light is required because the modulation process depends on controlling intensity through the polarization state. With input and output polarizers, the device achieves a significantly enhanced extinction ratio (ER).

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 ^[1] , resonant	15V @ 633nm			
Extinction Ratio ^[2]	10			dB
Input impedance, resonant		50		ohms
Input capacitance @ non-resonance		14		pF
Aperture			3	mm
Max Optical Power Density ^[3]	Standard	2	4	W/mm ²
	High Power	1	500	MW/mm ²
Temperature	-20		50	°C

Notes:

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

[2]. Characterized at 633nm.

[3]. Wavelength dependent, typical is for 550nm, max is for 1060nm.

Features

- Low loss
- Ease to use
- Low cost

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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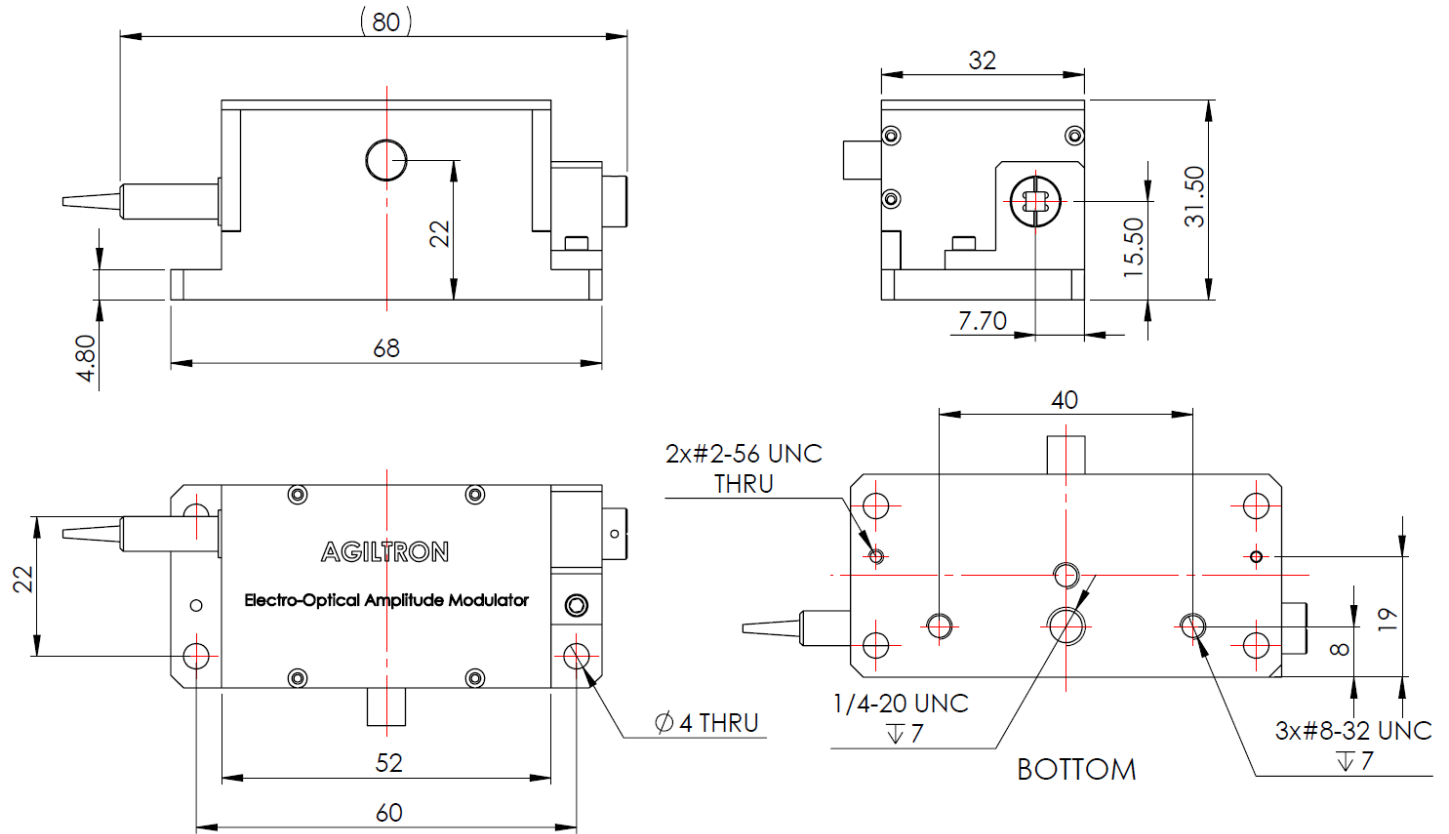
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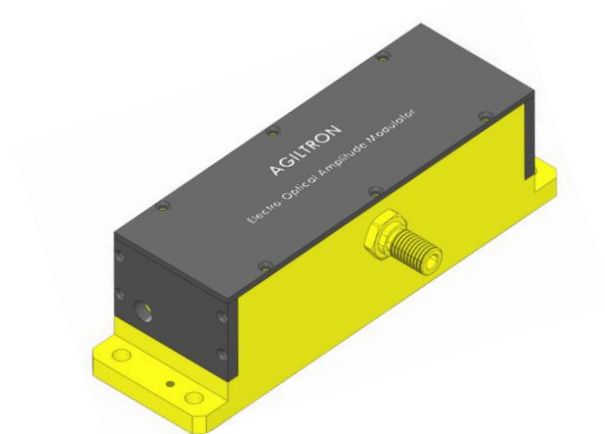


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Mechanical Drawing (1 pair)



Mechanical Drawing (2 pair)



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

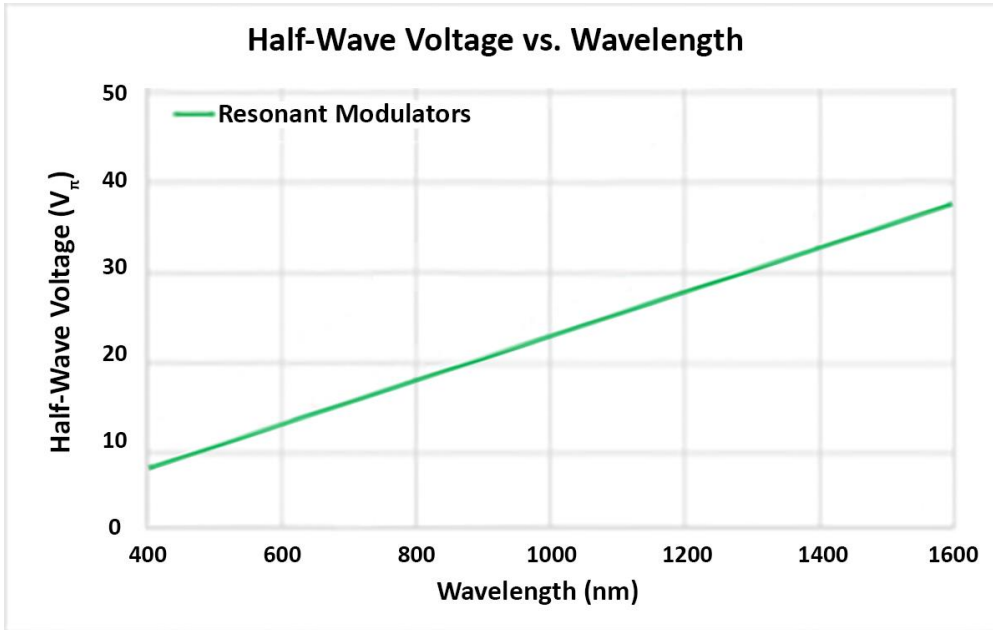
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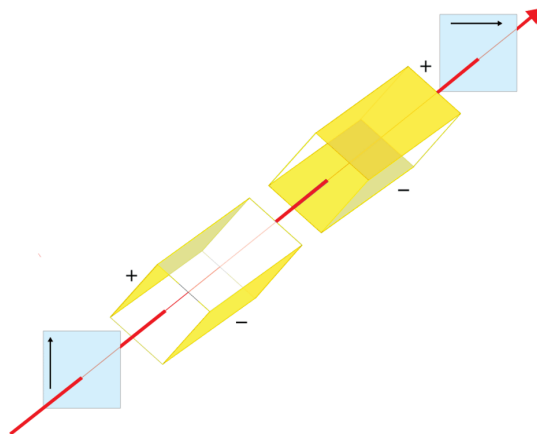


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Resonant Modulator Half-Wave Voltage



Amplitude Electro-Optic Crystal Configuration (yellow indicates electrode)



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Ordering Information (Part Number)

Prefix	Type	Wavelength	Optical Power	Resonant frequency	Input Polarizer ^[1]	Output Polarizer ^[1]	F 1
FEOM-	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 100W = D 300W = E	20 MHz = 2 5 MHz = 4 10 MHz = 1 30 MHz = 3 50 MHz = 5	No = 1 PBS = 4 Glan-Thompson = 5	No = 1 PBS = 4 Glan-Thompson = 5	Single resonant frequency version = F1

[1]. **PBS** – CW 15W/cm²
Glan-Thompson – CW 2kW/cm²

Polarizer's prices:

PBS	\$245
Glan Thompson	\$435

Polarizer

