

# CASTECH<sup>®</sup>

## LASER COMPONENTS



# Modulators

- An acousto-optic modulator (AOM) uses sound waves within a crystal to create a diffraction grating. As the power of the applied RF signal is varied, the amount of diffracted light varies proportionally. Acousto-optic modulators can be used like a shutter (cycling light on and off at a set frequency), or as a variable attenuator (controlling the intensity of transmitted light dynamically).
- The most important factor in selecting an acousto-optic modulator (AOM) is the required speed. This influences the choice of material, AOM design, and RF driver to be used. The speed of an acousto-optic modulator is described by the rise time, which determines how quickly the acousto-optic modulator can respond to the applied RF driver, and limits the modulation rate. Rise time is proportional to the time required for the acoustic wave to traverse the optical beam and for this reason is influenced by the beam diameter within the AOM.
- Acousto-optic modulators fall into two general categories as regards speed. Very fast modulators can provide modulation frequencies up to ~70 MHz and can have a rise time as low as 4 ns. The input beam must be focused very tightly into the acousto-optic modulator to achieve this speed. Lower frequency modulators do not have this constraint, however, and can accept larger input beams. Their rise time is usually specified relative to the input beam diameter, in ns/mm.
- Most applications require high contrast between the “on” and “off” states of the modulator, and thus make use of the first order diffracted beam. This results in extinction ratios of 40 dB and higher, but results in lower throughput of the deflected beam (typically 85-90%). In some applications such as intensity leveling, transmission is more important and a contrast ratio of ~10 dB is acceptable. This allows the undiffracted 0th order beam to be used, typically resulting in > 99% light throughput.

## Family Products

Operating Frequency	Model	Wave-length	Active Aperture	Optical Material	Cooling
100 MHz	CAOM-f-al-TEt-w-c	1064nm	0.5,1,1.5,2,...mm	Tellurium dioxide	Conduction-cooled

## Model Number

CAQS — f — al — mt — w — c

f	Frequency	a	Aperture	l	Length	m	Material	t	Acoustic mode	w	Wave-length	c	Connector
80	80MHz	005	0.5mm	A	A,B,C... represents different crystal lengths.	TE	Tellurium dioxide	L	Longitudinal	1064	1064nm	AF	SMA-F
100	100MHz	010	1.0mm	B		CQ	Crystal quartz	S	Shear	...		AM	SMA-M
110	120MHz	015	1.5mm	C		GE	Germanium	C	Compressional			NF	BNC-F
200	200MHz	020	2mm	...		...						NM	BNC-M
...		HI	fiber transmission									CF	SMC-F
		...										CM	SMC-M
												...	

## CAOM-f-al-TEt-1064-c

### Features

- ▶ Compact package
- ▶ Condition through baseplate
- ▶ High damage threshold
- ▶ High efficiency

### Applications

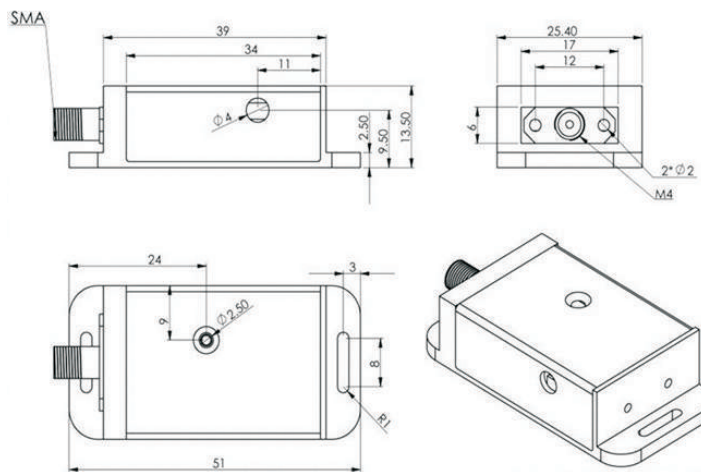
- ▶ Material processing
- ▶ Medical
- ▶ Scientific



### Specifications

Material	TeO <sub>2</sub>
Wavelength	1064 nm
Transmission ( Single pass )	≥97%
Damage Threshold	> 1GW/cm <sup>2</sup>
Diffraction Efficiency	Nom > 80%
Polarization	Random
Aperture	0.5,1,1.5,2,...mm
Crystal Length	A, B
Operating Mode	Bragg
Diffraction Angle	25.2 mrad
RF Frequency	100,120,200,...MHz
RF Power Rating ( Maximum )	2.5 W
RF Connector	SMA,SMC,BNC,...
Rise Time	< 120 ns
Input Impedance	50 Ω
VSWR	< 1.2:1
Operating Temperature	10°C~40°C
Storage Temperature	0°C~50°C

### Dimensions



Unit: mm  
Tolerance: ±0.1mm

Isolators &  
Faraday Rotators


Pockels Cells

Acousto-Optic  
Devices

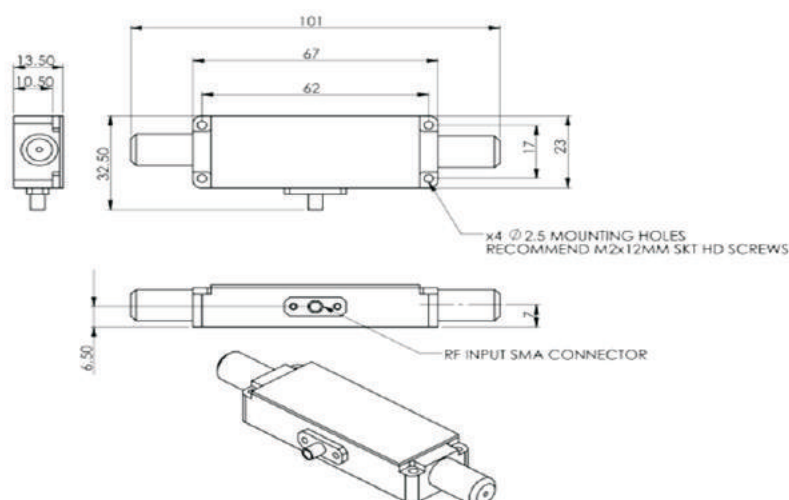
Laser Optics  
Devices

Laser Seed  
Sources

# CAOM-100-HI-TEL-1064-AF

Features	Applications	
▶ Compact package	▶ Material processing	
▶ Condition through baseplate	▶ Medical	
▶ High damage threshold	▶ Scientific	
▶ High efficiency		
Specifications		
Material	TeO <sub>2</sub>	
Wavelength	1064 nm	
Transmission ( Single pass )	≥97%	
Average Optical Power Handling	5W	
Peak Optical Power Handling	30KW	
Insertion Loss	< 3dB	
Polarization Dependent Loss	< 0.5 dB	
Extinction Ratio	> 50 dB	
Rise-Time/Fall-Time: (10% - 90%)	50 ns	
Frequency	100,120,200,...MHz	
RF Power Rating ( Maximum )	2 W	
RF Connector	SMA	
Rise Time	< 120 ns	
Input Impedance	50 Ω	
VSWR	< 1.2:1	
Fiber Type	HI1060	
Fiber Length	1.5 m	
Fiber Termination	Bare fiber	

## Dimensions





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