CHIRON SERIES

BBO Pockels Cell

PRODUCT DATASHEET

The Chiron Pockels cell series raise the bar for high repetition rate and high-average power applications.

Each Chiron Pockels cell utilizes a Beta Barium Borate (BBO), a high temperature growth material crystal that exhibits > 98% transmission from the UV to NIR wavelength range. Possessing low piezoelectric coupling coefficients, BBO allows the Chiron Pockels cell to operate high repetition rates up to 1 MHz with no threat of piezoelectric ringing. Furthermore, by employing dual crystal geometry of BBO, the Chiron series have a reduced driving quarter wave voltage while maintaining a voltage contrast ratio greater than 1000:1 at 1064 nm.

Chiron Pockels cells work in regenerative amplifiers, high pulse repetition rate micro-machining lasers, and high-average power lasers for material processing and metal annealing.

The standard configuration employs a broadband, high laser damage threshold coating for improved durability and performance.

All units are supplied with a QA inspection report and suggested alignment procedures. Superior connectors for high-voltage applications, the standard pin-type connectors provide quick connection for simplified system design and assembly. Conventional threaded connectors are available as an option, if needed.



Key Features

- Exceptional high pulse rate operation up to 1 MHz
- BBO crystal grown by G&H in the USA
- Typical transmission > 98% @ 1064 nm
- Intrinsic contrast ratio > 1000:1
- Voltage contrast ratio >1000:1
- < λ/6 transmitted wavefront distortion
- LIDT >10 J/cm^2 (1064 nm, 10 ns, 10 Hz)
- Premium UV-grade fused silica wedged/ plano windows
- Damage resistant ceramic apertures
- Reduced DC quarter wave voltage from dual crystal geometry
- Low acoustic noise
- Test documentation with each device

Options

- Triple BBO crystal Pockels cell for reduced DC quarter wave voltage available
- Conventional threaded connectors

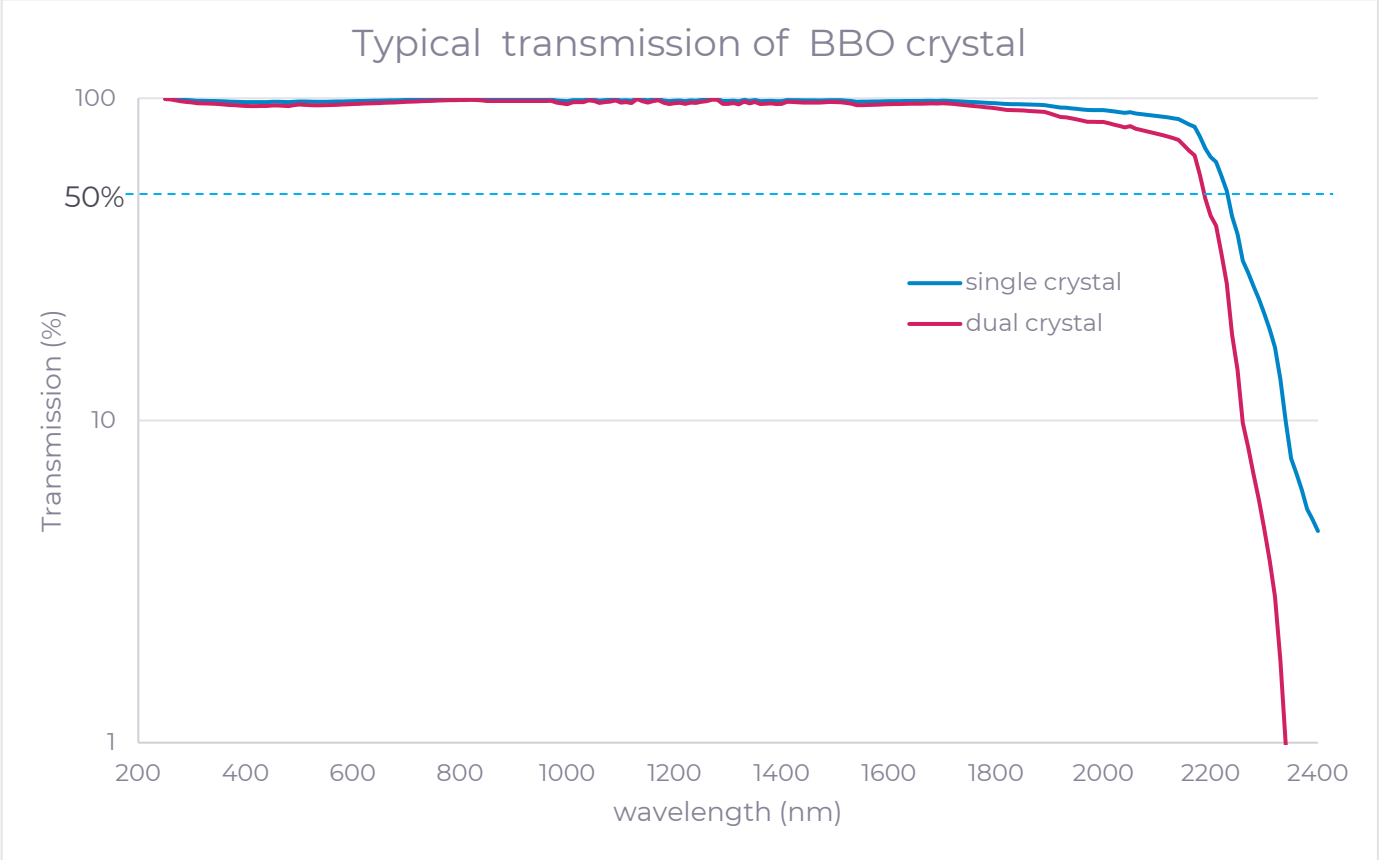
Applications

- Q-switching and regenerative amplification
- Machining
- Medical devices (e.g. ophthalmology)
- Military defense

Performance Data

Chiron Series: Typical Specifications BBO	Chiron 2.6	Chiron 3	Chiron 4	Chiron 5	Chiron 7
PHYSICAL					
Hard aperture diameter	2.6 mm	3.25 mm	4 mm	5.5 mm	7 mm
Single pass insertion loss @ 1064 nm	<1.5%, see figure 1				
Intrinsic contrast ratio (ICR) @ 1064 nm	>1000:1, see figure 2				
Voltage contrast ratio (VCR) @ 1064 nm (parallel polarizers)	>1000:1, see figure 3				
Single pass distortion @ 1064 nm	<λ/6				
ELECTRICAL					
Capacitance (DC)	~ 4 pF				
DC quarter wave voltage @ 1064 nm	2.0 kV	2.3 kV	3.0 kV	3.7 kV	4.7 kV
10-90% rise time (theoretical) into 50 Ω line	~1 ns				
Modulation frequency	<1 MHz				
Duty cycle (recommended)	<20%				
LASER DAMAGE THRESHOLD (LIDT)					
1064 nm, 10 ns, 10 Hz, 1 mm beam	>10 J/cm^2				
ENVIRONMENTAL CONDITIONS					
Operating conditions					
Temperature range	+15 C to +35 C				
Humidity	<85% RH (non-condensing)				
Storage conditions					
Temperature range	-50 C to +85 C				
Humidity	Non-condensing				

Typical transmission spectra of BBO crystal used in Chiron series



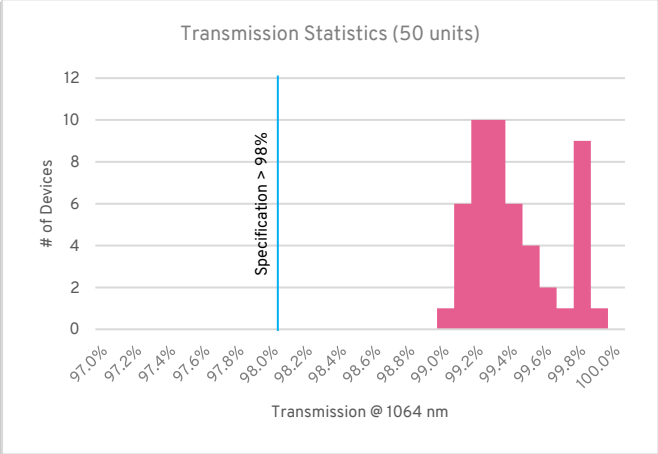


Figure 1 Single pass insertion loss

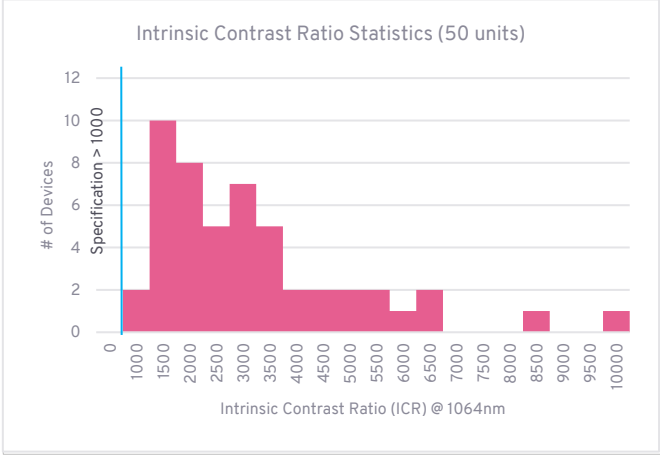


Figure 2 Intrinsic contrast ratio

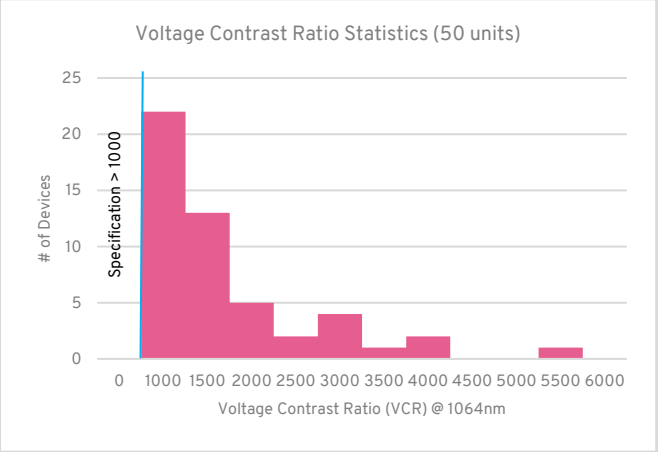
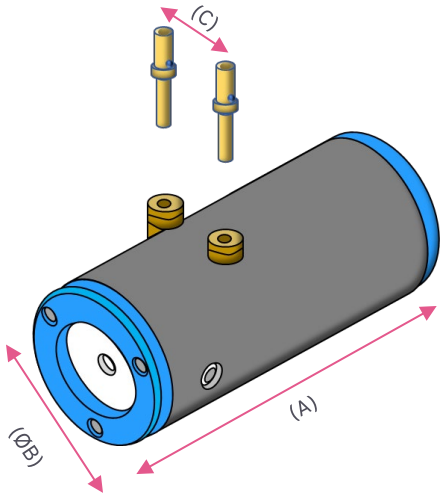
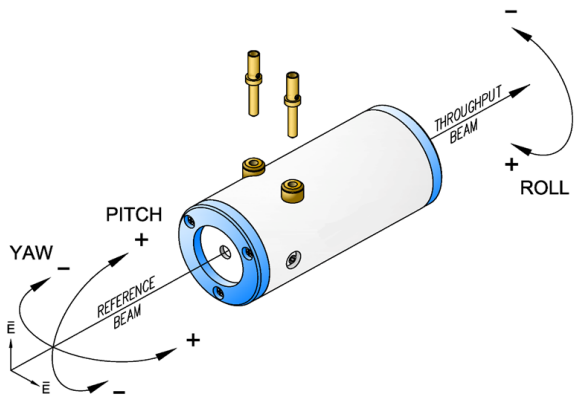


Figure 3 Voltage contrast ratio

CHIRON: DIMENSIONS (inches [mm])			
MODEL	DIM 'A'	DIM 'B'	DIM 'C'
CHIRON 2.6	2.255 [57.2]	0.998 [25.3]	0.472 [12.0]
CHIRON 3	2.255 [57.2]	0.998 [25.3]	0.472 [12.0]
CHIRON 4	2.255 [57.2]	0.998 [25.3]	0.472 [12.1]
CHIRON 5	2.255 [57.2]	0.998 [25.3]	0.472 [12.1]
CHIRON 7	2.982 [75.7]	1.375 [34.9]	0.633 [16.1]



Example of test data provided with each device



NOTES:

1: Definitions:
ICR: Intrinsic contrast ratio
VCR: Voltage dependent contrast ratio
TWE: Transmitted wavefront error/distortion
2: Inspection beam is HeNe, vertically polarized
3: Pockels cell is depicted in inspection orientation
4: Typical input polarization shown (parallel or perpendicular to electrodes
5: Pockels cell has sensitive optical surfaces: Remove from package and handle only in cleanroom environment
6: Do not attempt to clean optical surfaces: Doing so will void the warranty and/or shorten the lifetime of the cell
7: Do not attempt soldering operations on or near the cell
8: Refer to 'Pockels cell alignment' datasheet for additional information and precautions
9: Typical configuration shown: End cap and electrode may vary depending on configuration purchased

Chiron Series
BBO Pockels Cell Inspection Report

MODEL:	Chiron 3
CLEAR APERTURE (mm):	3.25
SERIAL NUMBER:	XXXX
PART NUMBER:	105-TA030-015-06-09
SHIP DATE:	9/16/2022
AR COATING (nm):	532
ICR[1] (@ 532 nm):	1478:1
VCR[1] (@ 532 nm):	900:1
λ/2 VOLTAGE (@ 532 nm):	2.16
LEAKAGE CURRENT @ λ/2 V (μA):	< 0.2
TRANSMISSION (%):	99.28
TYPICAL CAPACITANCE (pF):	4
YAW (MINUTES):	-1.80
PITCH (MINUTES):	-0.57
ROLL (DEGREES):	0.0 +/- 2.0
TWE[1] (@ λ=633nm):	0.087