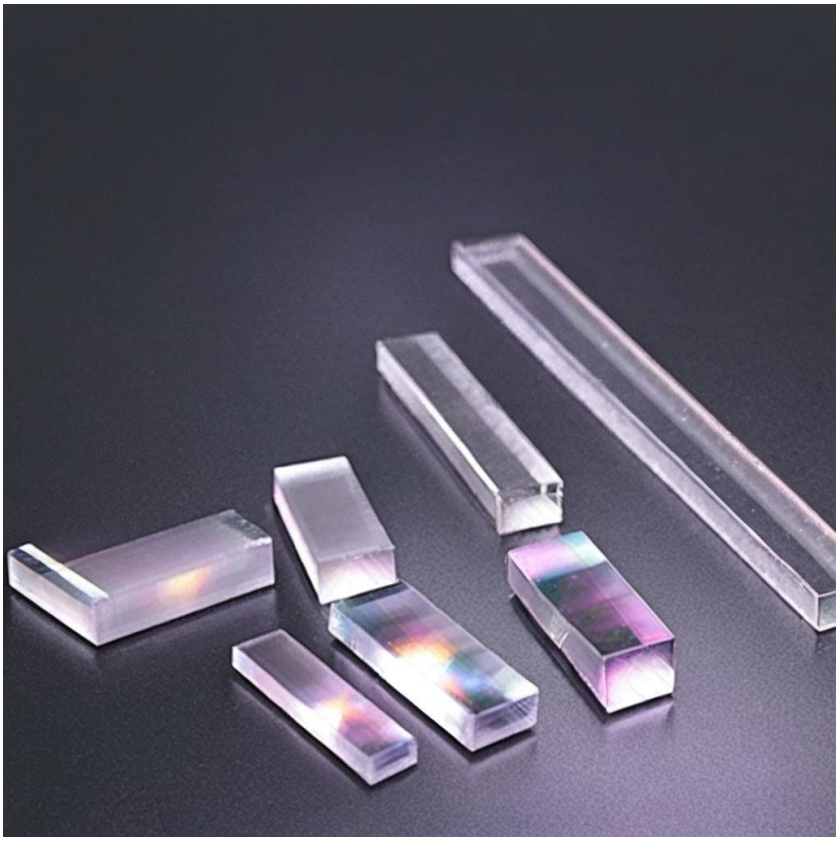
Photonics On Crystals

POC-OC-122514-BSO Crytals Datasheet

1 Main Features

- High electro-optic coefficient (r41 = 5 pm/V) for exceptional modulation capabilities.
- Superior phase-conjugation efficiency, ideal for advanced optical applications.
- Available in large-size elements or wafers up to 3 inches in diameter.
- Customization options, including coatings and dimensions, available on request.
- Highly efficient photoconductors with low dark conductivity for better space-charge handling.



2. Material General Description

Bismuth Silicon Oxide (Bi12SiO20 or BSO) is a highly efficient photoconductive material known for its low dark conductivity and excellent electro-optic properties. These characteristics allow for the accumulation of significant photo-induced space charges, making BSO crystals highly suitable for applications requiring high sensitivity and precise control. Grown through the Czochralski method, BSO crystals are available in dimensions up to 3 inches and are used in a wide range of photonic applications, including optical switches and waveguides. The unique optical and photoconductive properties make BSO a cost-effective and versatile solution in modern photonic systems.

3. General Applications and Examples

- **Spatial Light Modulators**: Used in advanced imaging and optical communication systems.

- **Optical Switches**: Ideal for high-speed, high-precision optical data routing.
- **Pockels Readout Optical Memory (PROM)**: Employed in data storage and retrieval systems leveraging electro-optic effects.
- **Optical Waveguides**: Facilitating efficient light transmission in integrated photonic circuits.
- **Photorefractive Devices**: Applicable in holography and adaptive optics for dynamic imaging systems.

4. Chemical, Physical, and Structural Properties

Property	Value
Chemical Formula	Bi12SiO20
Crystal Structure	Cubic, Point Group 23
Lattice Parameter	10.10 Å
Density	9.2 g/cm³
Mohs Hardness	5
Transmission Range	0.45–6 µm
Refractive Index	2.54 @ 0.63 µm
Electro-optic Coefficient	r41 = 5 pm/V
Dielectric Constant (Low Freq)	56
Dark Resistance	10^14 Ω·cm

5. Optical, Laser, and Nonlinear Optical Properties

Property	Value
Optical Activity	42°/mm @ 500 nm
Wavefront Distortion	<λ/4 @ 632.8 nm
Clear Aperture	85%
Surface Quality	40-20 S-D over clear aperture

6. Spectrum Transmission Curves

No specific spectrum transmission curves are available. The transmission range (0.45–6 µm) provides broad usability across visible and mid-infrared applications.

7. Coating Specification

- Standard: Uncoated (ITO coatings available upon request).
- Custom coatings can be provided based on application needs.

8. Standard Fabrication Specifications

Specification	Value
Clear Aperture	85%
Face Dimension Tolerance	±0.1–0.25 mm
Thickness Tolerance	±0.2 mm
Surface Flatness	<λ/4 @ 632.8 nm
Parallelism Error	<30 arcsec
Protective Chamfers	<0.3 mm at 45°

9. POC Strength and Capabilities

Photonics On Crystals (POC) is a leader in photonic material solutions, offering high-quality BSO crystals with precision fabrication and advanced customization options. POC's manufacturing expertise ensures low defect rates and high optical performance, catering to the needs of cutting-edge optical and photonic technologies.

10. Standard Products

Face Dimensions (mm)	Length (mm)	Orientation	Price (USD)
5 x 5	5	[100]	Request
10 x 10	5	[100]	Request
20 x 20	1.1	[110]	$490
25 x 25	1.1	[110]	$570
30 x 30	1.4	[110]	$690

Customization available upon request.

This datasheet provides a detailed overview of the BSO crystal's capabilities, ideal for photonic, optical, and electronic applications.