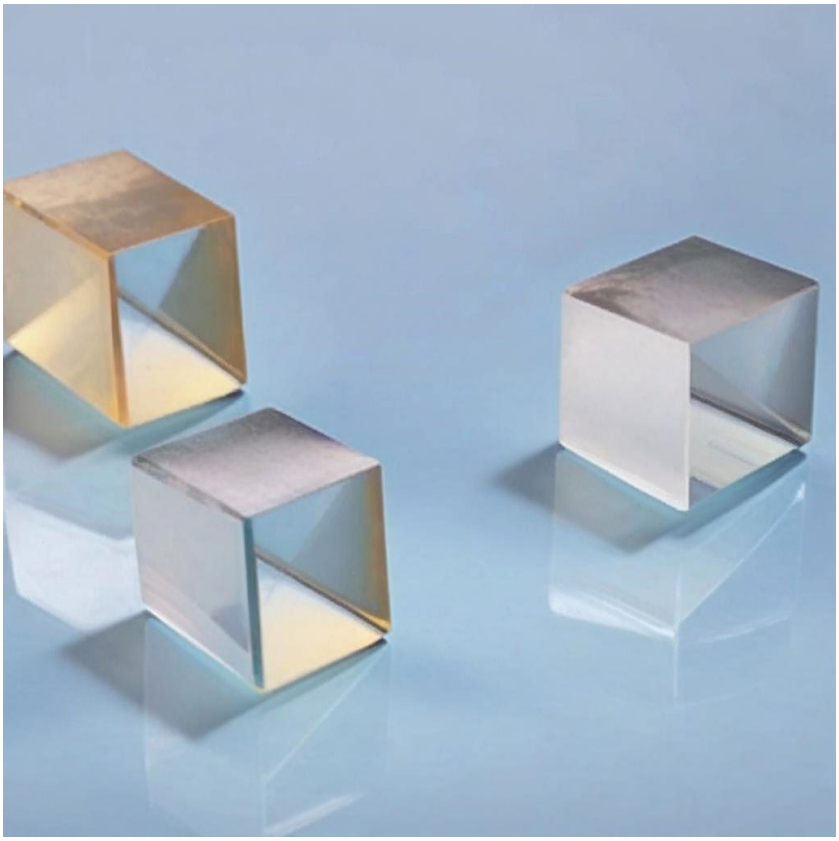
Photonics On Crystals

POC-OC-122420-BaGa4S7 Crystal Datasheet

1 Main Features

- Wide transparency range: 0.35–13.7 µm.
- High nonlinear optical coefficient: d33 = 12.7 pm/V.
- Excellent chemical stability and low optical absorption.
- High damage threshold for intense laser applications.
- Ideal for frequency conversion processes like OPA, DFG, and SFG.



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2. Material General Description

BaGa4S7 Crystal, also known as BGS Crystal, is a transparent pale-yellow crystal with exceptional nonlinear optical (NLO) properties. This crystal is distinguished by its broad transparency range from 0.35 µm to 13.7 µm, a wide bandgap of 3.54 eV, and a high damage threshold. BaGa4S7 is chemically stable and exhibits a high nonlinear optical coefficient of d33 = 12.7 pm/V.

Uniquely, BaGa4S7 has minimal two-photon absorption at 1 µm, making it highly efficient for 1064 nm Nd:YAG laser pumping. This crystal is widely used in nonlinear frequency conversion processes,

including optical parametric oscillation (OPO) and second-harmonic generation (SHG). Additionally, it is compatible with widely available 1030 fs lasers for advanced photonics applications.

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3. General Applications and Examples

BaGa4S7 Crystals are highly versatile and find applications in a wide range of industries. Some key examples include:

1. **Laser Frequency Conversion**: BaGa4S7 is highly suitable for generating mid-IR wavelengths through frequency conversion processes such as OPA, DFG, and SFG, providing efficient laser wavelength tuning.
2. **Nd:YAG Laser Pumping**: The crystal is an excellent medium for 1064 nm Nd:YAG laser pumping, enabling efficient parametric oscillation and higher-order harmonic generation.
3. **Biomedical Applications**: With its high optical clarity and low absorption losses, BaGa4S7 supports biomedical imaging and diagnostics in the mid-IR region.
4. **Spectroscopy**: BaGa4S7 Crystals are used for advanced spectroscopic studies, especially in atmospheric sensing and material characterization.
5. **Defense and Lidar**: The crystal's broad transparency range and high damage threshold make it ideal for lidar technologies and defense applications in high-power laser systems.

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4. Chemical and Structural Properties

Property	Value
Transparency Range	0.35–13.7 µm
Nonlinear Coefficient	d33 = 12.7 pm/V
Density	3.95 g/cm³
Surface Quality (Scratch/Dig)	40-20
Bandgap Energy	3.54 eV
Melting Point	1000°C

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5. Optical and Nonlinear Optical Properties

Property	Value
Transparency Range	0.35–13.7 µm
Nonlinear Coefficient	d33 = 12.7 pm/V
Laser Damage Threshold	High
Surface Quality	40-20

6. Spectrum Transmission Curves

(Spectrum transmission curves can be provided upon request, showcasing superior transparency in the range of 0.35–13.7 µm.)

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7. Coating Specification

- **AR Coatings**: Anti-reflective coatings optimized for the 0.8–1.2 µm and 3–5 µm ranges.
- **Dual-Band Coatings**: Customized for specific mid-IR laser wavelengths.
- **Customization**: Available for high-power applications upon request.

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8. Standard Fabrication Specifications

Specification	Value
Dimension Tolerance	±0.1 mm
Surface Quality (Scratch/Dig)	40-20
Flatness	λ/8 @ 632.8 nm
Parallelism	<30 arc sec
Perpendicularity	<10 arc min
Edge Bevel	<0.2 mm × 45°

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9. POC Strength and Capabilities

Photonics On Crystals (POC) is committed to delivering advanced BaGa4S7 Crystals tailored for high-performance photonics applications. POC ensures:

- High-precision cutting and polishing tailored to customer needs.
- Stringent quality control for optical and surface properties.
- Comprehensive customization for scientific and industrial applications.

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10. Standard Products

Face Dimensions (mm)	Length (mm)	Orientation (Theta/Phi)	Coating	Application	Price (USD)
5 × 5	10	0°/0°	AR @ 3–5 µm	Mid-IR spectroscopy	Request

10 × 10	15	0°/0°	AR @ 8–12 µm	Frequency conversion	Request
Custom	Custom	Custom	Custom	Custom	Request