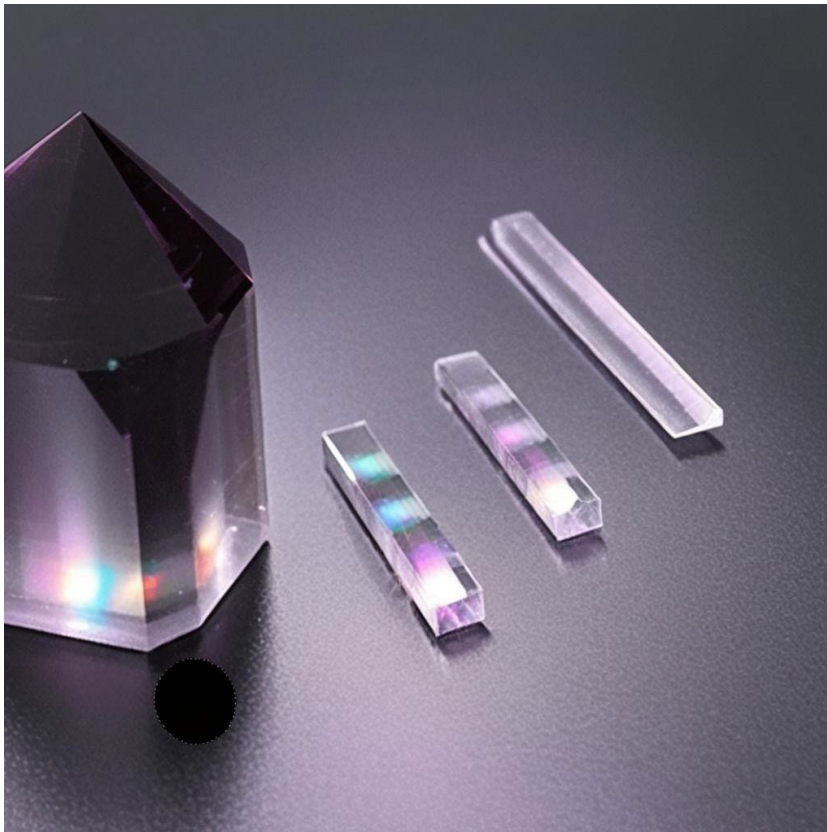


## POC-OC-122494-V:YAG Crystal Datasheet

### 1 Main Features

- High ground-state absorption and low excited-state absorption.
- Excellent optical, mechanical, and thermal properties.
- High Q-switch contrast for superior laser performance.
- UV-resistant and capable of withstanding high laser damage thresholds.
- Custom crystals available upon request.



---

### 2. Material General Description

V:YAG (Vanadium-doped Yttrium Aluminum Garnet) is a saturable absorber crystal specifically designed for passive Q-switching in lasers emitting between 1064 nm and 1440 nm. This advanced crystal exhibits superior ground-state absorption and negligible excited-state absorption, ensuring high efficiency in laser systems. V:YAG is grown using the Czochralski method, resulting in exceptional optical, mechanical, and thermal properties, making it highly versatile and reliable for demanding applications. The material's robustness also provides UV resistance and exceptional laser damage thresholds, allowing for long-term use in various environments.

---

### 3. General Application and Examples

<https://www.poc.com.sg> Photonics on Crystals, A brand of *Shapeoptics Holdings*

Add: Prestige Centre, #09-10, 71 BUKIT BATOK CRESCENT, Singapore 658071 Tel: +65-90799669

V:YAG Crystals are primarily used in passive Q-switching for lasers and provide significant advantages in laser systems such as:

- **Laser Rangefinders:** Enables precise distance measurements in military, industrial, and surveying applications.
- **LIDAR Systems:** Suitable for environmental monitoring and autonomous vehicle navigation.
- **LIBS Systems:** Widely used for laser-induced breakdown spectroscopy in material analysis.
- **Medical Lasers:** Ensures precise operation in dermatology, ophthalmology, and surgical applications.
- **Industrial Applications:** Ideal for precision laser machining, engraving, and welding.

V:YAG crystals are also commonly paired with active laser media like Nd:YAG, Nd:YVO4, and Er:Glass for enhanced Q-switching performance. The exceptional recovery time and emission cross-section values ensure high-efficiency pulse generation without the need for external modulators, simplifying laser design.

#### 4. Chemical, Physical, or Structural Properties

Property	Value
Crystal Structure	Cubic
Density	4.56 g/cm <sup>3</sup>
Thermal Expansion Coefficient	6.14 × 10 <sup>-6</sup> K <sup>-1</sup>
Thermal Conductivity	11.2 W/m·K
Mohs Hardness	8.2
Refractive Index	1.82 @ 1064 nm

#### 5. Optical, Laser, or Nonlinear Optical Properties

Property	Value
Laser Wavelength Range	1064 nm - 1440 nm
Absorption Cross-Section	72 × 10 <sup>-20</sup> cm <sup>2</sup> @ 1340 nm
Excited-State Absorption Cross-Section	7.4 × 10 <sup>-20</sup> cm <sup>2</sup>
Recovery Time (T3)	5 - 37 ns
Emission Cross-Section	Varies with laser media

#### 6. Spectrum Transmission Curves

The absorption coefficient graph provided indicates V:YAG’s superior ground-state absorption in the spectral range from 1064 nm to 1440 nm, ensuring high performance in Q-switched laser systems.

## 7. Coating Specification

- **Anti-Reflective Coatings:** AR coatings are optimized for 1310-1360 nm on both crystal faces, ensuring low reflection losses and improved efficiency in laser systems.

## 8. Standard Fabrication Specifications

Parameter	Value
Initial Transmission (T0)	30-98% @ 1340 nm
Face Dimensions Tolerance	+0.0/-0.1 mm
Parallelism Error	<20 arcsec
Protective Chamfers	<0.1 mm at 45°
Surface Flatness	< $\lambda/8$ @ 632.8 nm
Laser Damage Threshold	>10 J/cm <sup>2</sup> @ 1340 nm

## 9. POC Strength and Capabilities

Photonics On Crystals (POC) excels in the precise customization, polishing, and coating of V:YAG Crystals to meet specific client requirements. Our advanced manufacturing facilities ensure consistent quality and reliability for applications in industrial, medical, and scientific laser systems. With a dedicated team of experts, we guarantee superior customer service and fast delivery timelines, reinforcing our position as a trusted partner in photonics.

## 10. Standard Products

Face Dimensions (mm)	Initial Transmission	Coatings	Price (USD)
6 × 6	30% @ 1340 nm	AR @ 1310-1360 nm	540
6 × 6	40% @ 1340 nm	AR @ 1310-1360 nm	540
3 × 3	70% @ 1340 nm	AR @ 1310-1360 nm	540
3 × 3	95% @ 1340 nm	AR @ 1310-1360 nm	540
<b>Customization Available</b>	<b>Upon Request</b>	<b>Optimized Coatings</b>	<b>Contact Us</b>