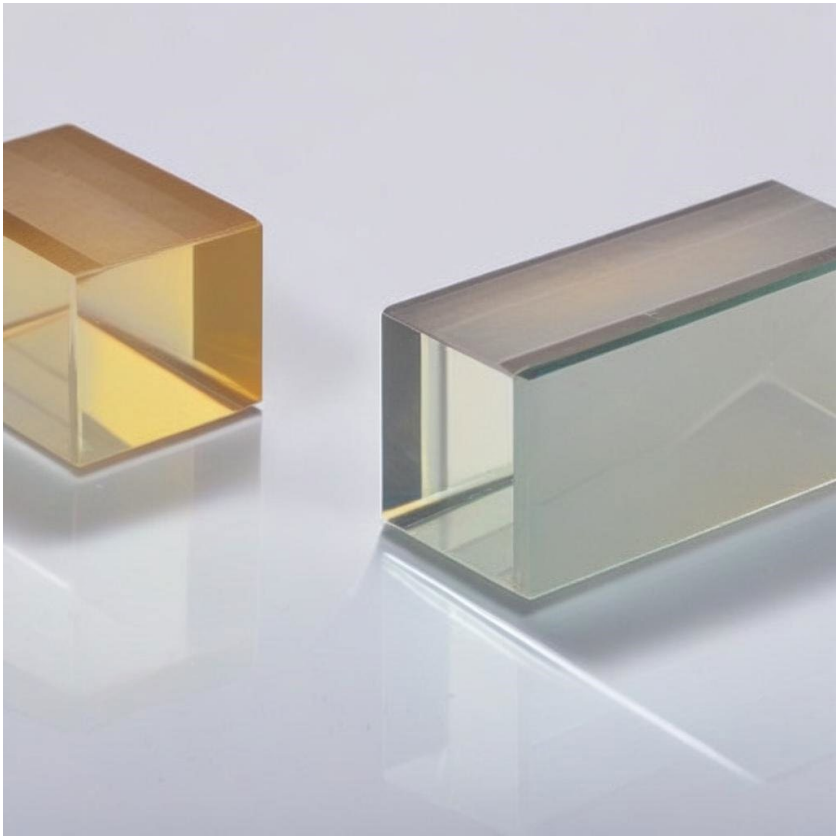
Photonics On Crystals

POC-OC-122490-DKDP Switch Crystal Datasheet

1 Main Features

- High optical transmission (>98%) across a wide wavelength range (200-2100 nm).
- Exceptional electro-optic properties suitable for Q-switching and laser modulation.
- High laser damage threshold (>750 MW/cm² at 1064 nm).
- Low optical loss and excellent optical homogeneity.
- Versatile applications in laser systems, including medical and industrial fields.



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2. Material General Description

DKDP (Potassium Dideuterium Phosphate) Switch Crystals, with the chemical formula KD_2PO_4, are widely recognized for their low optical losses, high extinction ratio, and superior electro-optic efficiency. These crystals are primarily used in electro-optic modulators, Q-switches, and frequency conversion systems. DKDP crystals feature excellent laser damage thresholds (>750 MW/cm²) and high transmission (>98%), making them ideal for low-repetition and high-energy laser applications. With a wide transparency range (200-2100 nm) and low absorption coefficient (0.006 cm^{-1}), DKDP crystals are a reliable choice for advanced laser technologies in industrial, medical, and research applications.

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3. General Applications

DKDP Switch Crystals are primarily used in:

- **Electro-Optic Q-Switches**: High-energy lasers for material processing and micromachining.
- **Frequency Conversion Systems**: Second harmonic generation (SHG) and optical parametric oscillators (OPOs) for precision laser frequency doubling.
- **Laser Modulation**: Pulse shaping and beam intensity modulation in research and medical laser systems.
- **Medical Lasers**: Low-repetition lasers for non-invasive surgical and therapeutic applications.
- **Industrial Laser Systems**: Cutting-edge laser technologies requiring precise beam control and frequency modulation.

For instance, in the field of laser eye surgery, DKDP Q-switch crystals are integral to high-precision laser scalpel systems. In industrial applications, they enhance productivity in micromachining by enabling efficient pulse shaping and beam energy modulation.

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4. Chemical, Physical, or Structural Properties

The key chemical and physical properties of DKDP Switch Crystals are summarized in the table below:

Property	**Value**
Chemical Formula	KD_2PO_4
Transparency Range	200-2100 nm
Nonlinear Coefficient	d_{36} = 0.4 pm/V
Electro-Optic Coefficient	γ_{41} = 8.8 pm/V, γ_{63} = 25 pm/V
Half-Wave Voltage	V = 2.98 kV @ 546 nm, 6.4 kV @ 1064 nm
Absorption Coefficient	0.006 cm^{-1}
Damage Threshold	>750 MW/cm^2, 10 Hz, 10 ns @ 1064 nm

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5. Optical, Laser, or Nonlinear Optical Properties

The optical properties of DKDP crystals are tailored for their applications in high-power and high-precision laser systems. These properties include:

Optical Property	**Value**
Refractive Index (at 1064 nm)	1.490
Electro-Optic Ratio	High extinction (>1000:1)
Laser Damage Threshold	>750 MW/cm^2

Optical Homogeneity	High uniformity
Transparency Range	200-2100 nm

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6. Spectrum Transmission Curves

Note: Spectrum transmission data can be provided upon request. Please contact Photonics On Crystals (POC) for additional details or consult the comprehensive product catalog for more information.

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7. Coating Specifications

POC offers high-quality anti-reflection coatings to enhance the performance of DKDP crystals:

- AR Coating Range: 200-2100 nm
- Typical Reflectance: <0.2%
- Laser Damage Threshold: >750 MW/cm²

Customized coatings for specific wavelength ranges are available upon request.

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8. Standard Fabrication Specifications

Below are the standard fabrication specifications for DKDP Switch Crystals:

Parameter	**Specification**
Optical Aperture	3-15 mm (effective diameter 85%)
Wavefront Distortion	<λ/8 @ 632.8 nm
Surface Quality	10-5 Scratch-Dig
Parallelism	<1 arc minute
Flatness	<λ/10 @ 632.8 nm
Damage Threshold	>750 MW/cm² @ 1064 nm

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9. POC Strength and Capabilities

Photonics On Crystals (POC) specializes in the processing and customization of DKDP Switch Crystals for a wide range of applications:

- Expertise in advanced fabrication techniques ensures superior crystal quality and optical performance.
- Precision coatings tailored for high-power laser applications.
- Customization services for non-standard dimensions and specific wavelength requirements.

- Extensive quality control measures, including rigorous optical and physical property testing.

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10. Standard Products

POC offers a range of standard DKDP Switch Crystal products. Customization options are also available upon request.

Product Code	Dimensions (mm)	Coating Option	Price (USD)
DKDP-001	10x10x5	AR @ 1064 nm	$1500
DKDP-002	15x15x10	AR @ 532 nm	$1800
DKDP-Custom	Customized Size	Custom Coating	Contact Us

Note: Prices are approximate and subject to change based on customization and volume orders.