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Ultrafast Photodetectors: UPD Series



42 UNIQUE PHOTODIODE MODELS AVAILABLE NOW! ALPHALAS GmbH has released new models of ultrafast photodiodes that expand the product range towards faster rise time and wider wavelength ranges from ultraviolet to infrared.

New: Greatly improved HF performance of ultrafast photodetectors in the wavelength range 800 to 2600 nm (Press Release, PDF)

[Ultrafast Photodetectors: UPD Series \[Detailed Datasheet, PDF\]](#)

Features of the Photodiodes

- Ultra High-Speed Operation
- Rise Times: **starting from 15 ps**
- Bandwidths: **up to 25 GHz**
- Spectral Ranges: **170 - 2600 nm (UV to IR)**
- Compact Design
- Battery or External Power Supply
- Models for Free-Space Beam, or with FC/PC Receptacle or Pigtailed with SM Fiber

Applications of the Photodiodes

- Pulse Form Measurements
- Pulse Duration Measurements
- Precise Synchronization
- Mode Beating Monitoring
- Heterodyne Measurements

From Stock: Most models of our bestselling ultrafast photodiodes are available from stock!

Competitive prices & additional **discounts** for universities, academic & research institutions! Contact us now!

[ALPHALAS Ultrafast Photodetectors - Product Citations \[PDF\]](#)

[ALPHALAS UPD Photodiode BNC - 2D Drawing \[PDF\]](#)
 [ALPHALAS UPD Photodiode BNC - 3D Model \[PDF\]](#)
 [ALPHALAS UPD Photodiode SMA - 2D Drawing \[PDF\]](#)
 [ALPHALAS UPD Photodiode SMA - 3D Model \[PDF\]](#)

Introducing the UPD Series of Ultrafast Photodiodes

The UPD series of ultrafast photodetectors are best suited for measurement of optical waveforms from DC to 25 GHz. Various models feature rise times **as short as 15 ps** and cover the spectral range from **170 to 2600 nm**.

All photodiodes are enclosed in compact and solid aluminum housings and can be biased with a battery or an external power supply.

The UV-extended versions of the silicon type photodetectors are the only commercial products that cover the spectral range from 170 to 1100 nm.

Another type of unique UV-sensitive InGaAs photodetectors can be used for detecting laser pulses in the range from 350 to 1700 nm, thus having the widest spectral range and the highest speed commercially available.

Perfect impedance matching and state-of-the-art microwave technology assure pulse form measurements without any ringing or artefacts. The customer is free to use a 50 Ω terminating resistor for highest speed operation, or a high impedance for maximum flexibility for

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Ok,
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diverse applications.

In combination with our [BBA series of wideband high-gain amplifiers](#), the high-speed photodetectors are an advantageous alternative to the expensive and cumbersome avalanche photodiodes.

The UPD series high-speed photodetectors are indispensable tools for laser and photonics research.

New Photodetector Models Available: Faster Rise Times & Wider Wavelength Ranges

- **UPD-15-IR2-FC:** Ultrafast InGaAs PIN photodetector, rise time < 15 ps, bandwidth > 25 GHz, spectral range 800 - 1700 nm, fiber-coupled input with FC/APC connector
- **UPD-35-IR2-P, UPD-35-IR2-D:** Ultrafast InGaAs PIN photodetectors, rise time < 35 ps, bandwidth > 10 GHz, spectral range 800 - 1700 nm, with polished or diffuse window
- **UPD-35-UVIR-P, UPD-35-UVIR-D:** Ultrafast InGaAs PIN photodetectors, rise time < 35 ps, bandwidth > 10 GHz, spectral range 350 - 1700 nm, with polished or diffuse window
- **UPD-50-SP, UPD-50-SD, UPD-50-UD, UPD-50-UP:** Ultrafast Si PIN photodetector, rise time 50 ps, fall time 50 ps, bandwidth > 7 GHz, spectral range 170 - 1100 nm or 320 - 1100 nm, with polished or diffuse window
- **UPD-100-IR1-P:** Ultrafast Ge photodetector, rise time < 100 ps, pulswidth (FWHM) 300 ps, spectral range 400 - 2000 nm
- **UPD-3N-IR2-P:** Fast InGaAs photodetector, extended infrared range up to 2.1 μm, rise time 150 ps
- **UPD-5N-IR2-P:** Fast InGaAs photodetector, extended infrared range up to 2.6 μm, rise time 200 ps

Ultrafast Photodiodes (UPD Series) - Available Models

Photodetector Model	Rise Time (ps)	Bandwidth (GHz)	Spectral Range (nm)	Quantum Efficiency @ Peak	Sensitive Area (Dia. μm/mm²)	Noise Equiv. Power (W/√Hz)	Dark Current (nA)	Material	Optical Input / Window Type 1)	RF Output Connector
UPD-15-IR2-FC	< 15	> 25	800 - 1700	75%	Fiber, 9 μm	1.0 × 10 ⁻¹⁵	0.1	InGaAs	Fiber w. FC/APC 5)	SMA
UPD-30-VSG-P	< 30	> 10	320 - 900	40%	200x200/0.04	3.0 × 10 ⁻¹⁵	0.1	GaAs	Polished, glass	SMA
UPD-35-IR2-P	< 35	> 10	800 - 1700	80%	55/0.0024	1.0 × 10 ⁻¹⁵	0.3	InGaAs	Polished, glass	SMA
UPD-35-IR2-D	< 35	> 10	800 - 1700	80%	55/0.0024	1.0 × 10 ⁻¹⁵	0.3	InGaAs	Diffuse, quartz	SMA
UPD-35-IR2-FR	< 35	> 10	800 - 1700	80%	55/0.0024	1.0 × 10 ⁻¹⁵	0.3	InGaAs	FC/PC receptacle 5)	SMA
UPD-35-IR2-FC	< 35	> 10	800 - 1700	80%	Fiber, 9 μm	1.0 × 10 ⁻¹⁵	0.3	InGaAs	Fiber w. FC/APC 5)	SMA
UPD-35-UVIR-P	< 35	> 10	350 - 1700	80%	55/0.0024	1.0 × 10 ⁻¹⁵	0.3	InGaAs 4)	Polished, MgF ₂	SMA
UPD-35-UVIR-D	< 35	> 10	350 - 1700	80%	55/0.0024	1.0 × 10 ⁻¹⁵	0.3	InGaAs 4)	Diffuse, quartz	SMA
UPD-40-VSI-P	< 40	> 8.5	500 - 1690	40%	200x200/0.04	3.0 × 10 ⁻¹⁰	5000	InGaAs	Polished, glass	SMA
UPD-40-IR2-P	< 40	> 8.5	800 - 1700	80%	60/0.0028	1.1 × 10 ⁻¹⁵	0.5	InGaAs	Polished, glass	SMA
UPD-40-IR2-D	< 40	> 8.5	800 - 1700	80%	60/0.0028	1.1 × 10 ⁻¹⁵	0.5	InGaAs	Diffuse, quartz	SMA
UPD-40-IR2-FR	< 40	> 8.5	800 - 1700	80%	60/0.0028	1.1 × 10 ⁻¹⁵	0.5	InGaAs	FC/PC receptacle 5)	SMA
UPD-40-IR2-FC	< 40	> 8.5	800 - 1700	80%	Fiber, 9 μm	1.1 × 10 ⁻¹⁵	0.5	InGaAs	Fiber w. FC/APC 5)	SMA
UPD-40-UVIR-P	< 40	> 8.5	350 - 1700	80%	60/0.0028	1.1 × 10 ⁻¹⁵	0.5	InGaAs 4)	Polished, MgF ₂	SMA
UPD-40-UVIR-D	< 40	> 8.5	350 - 1700	80%	60/0.0028	1.1 × 10 ⁻¹⁵	0.5	InGaAs 4)	Diffuse, quartz	SMA
UPD-50-SP	< 50	> 7.0	320 - 1100	45%	100/0.0079	1.2 × 10 ⁻¹⁵	0.001	Si	Polished, glass	SMA
UPD-50-SD	< 50	> 7.0	320 - 1100	45%	100/0.0079	1.2 × 10 ⁻¹⁵	0.001	Si	Diffuse, quartz	SMA
UPD-50-UP	< 50	> 7.0	170 - 1100	45%	100/0.0079	1.2 × 10 ⁻¹⁵	0.001	Si 4)	Polished, MgF ₂	SMA
UPD-50-UD	< 50	> 7.0	170 - 1100	45%	100/0.0079	1.2 × 10 ⁻¹⁵	0.001	Si 4)	Diffuse, MgF ₂	SMA

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Photodetector Model	Rise Time (ps)	Bandwidth (GHz)	Spectral Range (nm)	Quantum Efficiency @ Peak	Sensitive Area (Dia. $\mu\text{m}/\text{mm}^2$)	Noise Equiv. Power (W/ $\sqrt{\text{Hz}}$)	Dark Current (nA)	Material	Optical Input / Window Type 1)	RF Output Connector
UPD-70-IR2-P	< 70	> 5.0	800 - 1700	80%	80/0.005	2.0×10^{-15}	0.8	InGaAs	Polished, glass	SMA
UPD-70-IR2-D	< 70	> 5.0	800 - 1700	80%	80/0.005	2.0×10^{-15}	0.8	InGaAs	Diffuse, quartz	SMA
UPD-70-IR2-FR	< 70	> 5.0	800 - 1700	80%	80/0.005	2.0×10^{-15}	0.8	InGaAs	FC/PC receptacle 5)	SMA
UPD-70-IR2-FC	< 70	> 5.0	800 - 1700	80%	Fiber, 9 μm	2.0×10^{-15}	0.8	InGaAs	Fiber w. FC/APC 5)	SMA
UPD-70-UVIR-P	< 70	> 5.0	350 - 1700	80%	80/0.005	2.0×10^{-15}	0.8	InGaAs 4)	Polished, MgF ₂	SMA
UPD-70-UVIR-D	< 70	> 5.0	350 - 1700	80%	80/0.005	2.0×10^{-15}	0.8	InGaAs 4)	Diffuse, quartz	SMA
UPD-100-IR1-P	< 100	> 3.0	400 - 2000	80%	80/0.005	3.0×10^{-13}	700	Ge	Polished, glass	SMA
UPD-200-SP	< 175	> 2.0	320 - 1100	85%	400/0.126	1.5×10^{-15}	0.001	Si	Polished, glass	BNC
UPD-200-SD	< 175	> 2.0	320 - 1100	85%	400/0.126	1.5×10^{-15}	0.001	Si	Diffuse, quartz	BNC
UPD-200-UP	< 175	> 2.0	170 - 1100	85%	400/0.126	1.5×10^{-15}	0.001	Si 4)	Polished, MgF ₂	BNC
UPD-200-UD	< 175	> 2.0	170 - 1100	85%	400/0.126	1.5×10^{-15}	0.001	Si 4)	Diffuse, quartz	BNC
UPD-300-SP	< 300	> 1.0	320 - 1100	90%	600/0.283	3.0×10^{-15}	0.01	Si	Polished, glass	BNC
UPD-300-SD	< 300	> 1.0	320 - 1100	90%	600/0.283	3.0×10^{-15}	0.01	Si	Diffuse, quartz	BNC
UPD-300-UP	< 300	> 1.0	170 - 1100	90%	600/0.283	3.0×10^{-15}	0.01	Si 4)	Polished, MgF ₂	BNC
UPD-300-UD	< 300	> 1.0	170 - 1100	90%	600/0.283	3.0×10^{-15}	0.01	Si 4)	Diffuse, quartz	BNC
UPD-500-SP	< 500	> 0.6	320 - 1100	90%	800/0.5	3.5×10^{-15}	0.01	Si	Polished, glass	BNC
UPD-500-SD	< 500	> 0.6	320 - 1100	90%	800/0.5	3.5×10^{-15}	0.01	Si	Diffuse, quartz	BNC
UPD-500-UP	< 500	> 0.6	170 - 1100	90%	800/0.5	3.5×10^{-15}	0.01	Si 4)	Polished, MgF ₂	BNC
UPD-500-UD	< 500	> 0.6	170 - 1100	90%	800/0.5	3.5×10^{-15}	0.01	Si 4)	Diffuse, quartz	BNC
UPD-3N-IR2-P 6)	< 150	> 0.4	800 - 2100	75%	300/0.07	1.5×10^{-13}	90	InGaAs	Polished, glass	BNC
UPD-5N-IR2-P 6)	< 200	> 0.3	800 - 2600	70%	300/0.07	7.0×10^{-13}	2000	InGaAs	Polished, glass	BNC
UPD-2M-IR2-P 75000	< 75000	> 0.004	900 - 1700	80%	2000/3.14	4.0×10^{-14}	5	InGaAs	Polished, glass	BNC
UPD-2M-IR2-P-1TEC 3)	< 75000	> 0.004	900 - 1700	75%	2000/3.14	1.0×10^{-14}	0.3	InGaAs	Polished, glass	BNC

- Notes:**
- 1) The diffuse window reduces the positioning accuracy requirements and increases the damage threshold at the cost of a reduced sensitivity by a factor of approx. three to five. **Recommended for high peak power lasers only.**
- 2) This model has negative output. All other models have positive output by default but may be ordered with negative output if required.
- 3) With TEC cooling module, non-standard housing.
- 4) Modified material with increased blue / UV sensitivity.
- 5) Not compatible with the optional filter holder.
- 6) Greatly improved performance.

Power Sources for UPD Series Photodetectors Related Products

• Low-Noise Power Supply, Input: 230 V AC • Broadband Amplifiers BBA Series

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- Low-Noise Power Supply, Input: 100 - 240 V AC (for **worldwide** usage)
PS-UPD-6-WW: Output: 6 V DC
PS-UPD-9-WW: Output: 9 V DC
PS-UPD-12-WW: Output: 12 V DC
- **BAT-UPD-6V**: Bias Battery, 6 V
- BNC 50 Ω Terminating Load
- SMA (male) to BNC (female) Adapter
- SMA to SMA Adapter
- Attenuator Filter Adapter

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