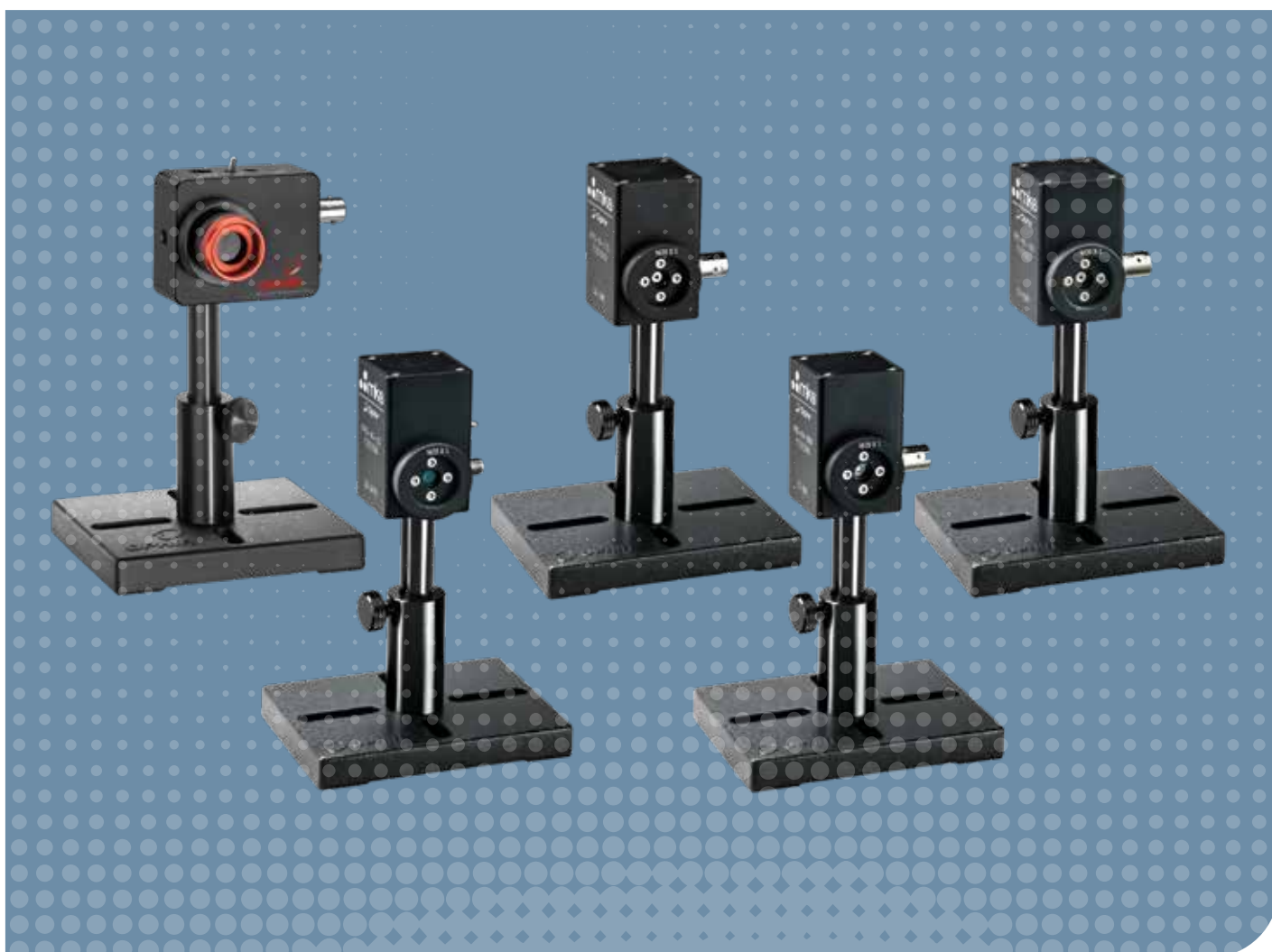
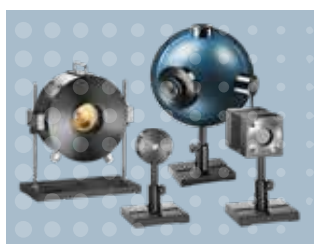


2026

PULSE CHARACTERIZATION  
SENSORS 1.3

SENSORS



## 1.3 Pulse Characterization Sensors

### Introduction

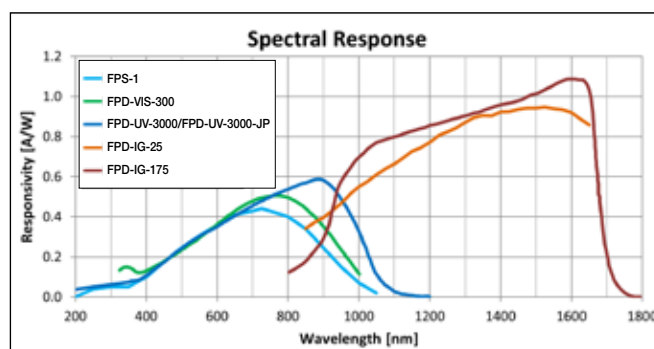
Ophir's high speed, biased PIN **Fast Photodiode Detectors (FPD series)** convert fast optical pulses into electrical signals. When terminated into  $50\Omega$  into an oscilloscope or spectrum analyzer, the temporal characteristics of lasers pulses can be viewed and measured. A selection of models covers the spectrum from 190nm to 1700nm and a range of rise times and sensitivities. The photodiode bias voltage is supplied by internal batteries and/or external power supply depending on the model. Ophir's Pulse Characterization Sensors do not require calibration.

In order to achieve minimal response times, the photodiodes used in these detectors are relatively small. This reduces their capacitance and increases their electrical bandwidth. This makes them ideal for sampling a portion of the laser beam by placing them directly in the beam path or by picking up reflections bouncing off a nearby target.

When it is important to capture the entire beam, the temporal sensor can be attached to an integrating sphere. The laser beam enters the integrating sphere, and the temporal

detector attached at the side will sample a small portion of the laser beam's energy which is scattered inside the sphere. When additional amplification of the detected signal is needed, for example, in order to feed the detected signal into a digital acquisition system, a trans-impedance amplifier should be used. For best performance a trans-impedance amplifier with  $50\Omega$  input resistance and bandwidth equal to or larger than that of the sensor should be used.

Accessories available include attenuators, fiber optic adapters and adapters for attaching to integrating spheres.



### Related Product

For an FPD detector built into an integrating sphere sensor, see our **IS1.5-VIS-FPD-800, 1.5" High Speed Response, Multi-functional Integrating Sphere** on page 38.

IS1.5-VIS-FPD-800 (see p. 38)



## 1.3.1 Fast Photodiode Detectors (FPD)

### Features

- Fast response time down to 25 psec
- Measure temporal pulse shape
- Spectral coverage from 193 to 1700 nm
- Optional attenuators, fiber optic adapters and integrating sphere adapters available



### Description

Ophir's high speed, biased PIN photodiode detectors convert fast optical pulses into electrical signals. When terminated into 50Ω into an oscilloscope or spectrum analyzer, the temporal characteristics of lasers can be viewed and measured. A selection of models covers the spectrum from 190nm to 1700nm and a range of rise times and sensitivities. The photodiode bias voltage is supplied by internal batteries and/or external power supply depending

on the model. Ophir's Pulse Characterization Sensors do not require calibration.

Accessories available include attenuators, fiber optic adapters and adapters for attaching to integrating spheres.

For an FPD detector built into an integrating sphere sensor, see our IS1.5-VIS-FPD-800, 1.5" High Speed Response, Multi-functional Integrating Sphere on page 38.

| Model <sup>(a)</sup>                                                | FPS-1                | FPD-UV-3000 /<br>FPD-UV-3000-JP <sup>(d)</sup> | FPD-VIS-300           | FPD-IG-175             | FPD-IG-25               |
|---------------------------------------------------------------------|----------------------|------------------------------------------------|-----------------------|------------------------|-------------------------|
| Detector Type                                                       | UV-Si                | UV-Si                                          | Si                    | InGaAs                 | InGaAs                  |
| Rise Time/Fall Time nsec                                            | 1.5                  | 3                                              | <0.3                  | <0.175                 | <0.025                  |
| Spectral Range nm (see graph on next page)                          | 193-1100             | 193-1100                                       | 320-1100              | 900-1700               | 900-1700                |
| Active Area Diameter mm                                             | 1.02                 | 2.55                                           | 0.4                   | 0.1                    | 0.032                   |
| Detector Area mm <sup>2</sup>                                       | 0.8                  | 5.11                                           | 0.13                  | 0.0079                 | 0.00080                 |
| Wavelength of Peak Sensitivity nm                                   | 720                  | 890                                            | 770                   | 1600                   | 1500                    |
| Responsivity at Peak Wavelength A/W                                 | 0.45                 | 0.58                                           | 0.5                   | 1.1                    | 0.95                    |
| Responsivity (Irradiance) at Peak Wavelength V/(W/cm <sup>2</sup> ) | 0.18                 | 1.5                                            | 31 x 10 <sup>-3</sup> | 4.3 x 10 <sup>-3</sup> | 0.19 x 10 <sup>-3</sup> |
| Bias Voltage VDC                                                    | 12                   | 24                                             | 9                     | 6                      | 6                       |
| Bias Voltage Source                                                 | External or Battery  | External                                       | Batteries             | Batteries              | Batteries               |
| Bandwidth                                                           | 233 MHz              | >118 MHz                                       | >1.2 GHz              | >2 GHz                 | >15 GHz                 |
| Dark Current nA                                                     | 0.3 typ, 1.0 max     | <10                                            | <0.1                  | <2                     | <3                      |
| Noise Equivalent Power <sup>(b)</sup> pW/√Hz                        | 0.05                 | <0.10                                          | <0.01                 | <0.03                  | 20                      |
| Maximum Average Power Input <sup>(b), (c)</sup> mW                  | 3                    | 15                                             | 25                    | 10                     | 10                      |
| Mounting (Tapped Holes)                                             | 1/4-20               | 8-32 & M4                                      | 8-32 & M4             | 8-32 & M4              | 8-32 & M4               |
| Output Connector                                                    | BNC                  | BNC                                            | BNC                   | BNC                    | SMA                     |
| Accessory Threads                                                   | SM-1                 | M20x1                                          | M20x1                 | M20x1                  | M20x1                   |
| Version                                                             |                      |                                                |                       |                        |                         |
| Compliance                                                          | CE, UKCA, China RoHS | CE, UKCA, China RoHS                           | CE, UKCA, China RoHS  | CE, UKCA, China RoHS   | CE, UKCA, China RoHS    |
| Part Number                                                         | 7Z02505              | 7Z02506 / 7Z07153                              | 7Z02507               | 7Z02509                | 7Z02508                 |

Note: (a) All specs are with 50 ohm load

Note: (b) At wavelength of peak sensitivity

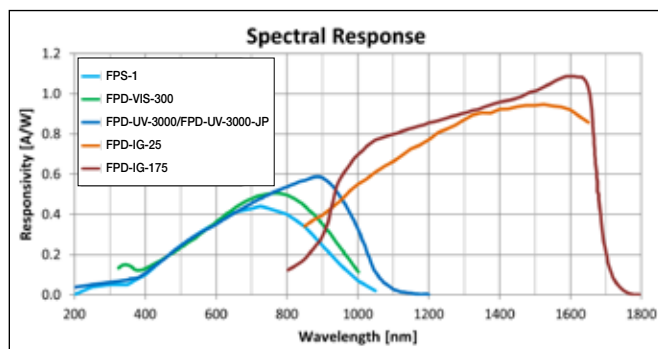
Note: (c) Maximum peak power is twice the average power for 10 nsec pulses

Note: (d) The FPD-UV-3000-JP is sold exclusively in Japan

\* For drawings please see page 152

| Fiber Adapters <sup>(d)</sup> - see page 35 |         |         |          | ND Attenuators <sup>(d)</sup> |                         | IS6 Integrating Sphere Adapters - see page 42 |           |
|---------------------------------------------|---------|---------|----------|-------------------------------|-------------------------|-----------------------------------------------|-----------|
| SC type                                     | ST type | FC type | SMA type | ND1 nom. X10 attenuator       | ND2 nom. X50 attenuator | For FPD                                       | For FPS-1 |
| 7Z08227                                     | 7Z08226 | 7Z08229 | 1G01236A | 7Z08200                       | 7Z08201                 | 7Z08350                                       | 7Z08289   |

Note: (d) FPS-1 sensor requires also a SM1 to M20 mounting bracket adapter P/N 1G02259



FPD detector mounted on IS6



ND Attenuators

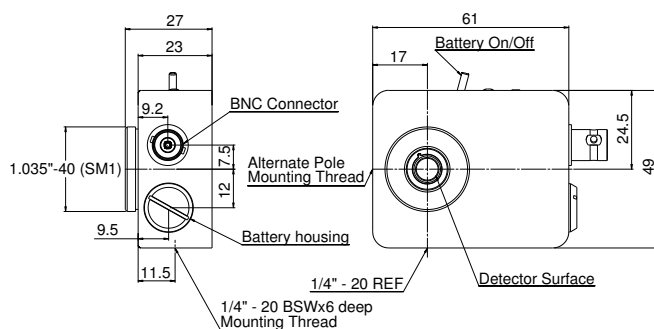


Related Product

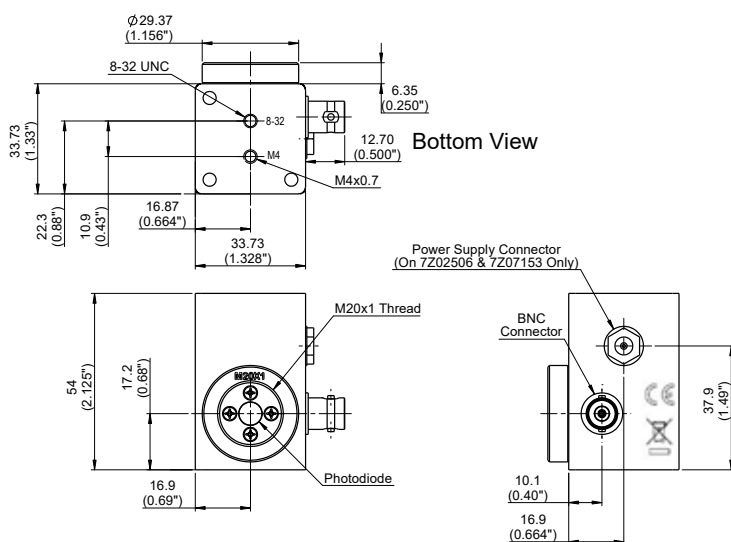
IS1.5-VIS-FPD-800  
Integrating Sphere with built in FPD Detector (see p. 38)



FPS-1



FPD-UV-3000 / FPD-UV-3000-JP / FPD-VIS-300 / FPD-IG-175



FPD-IG-25

