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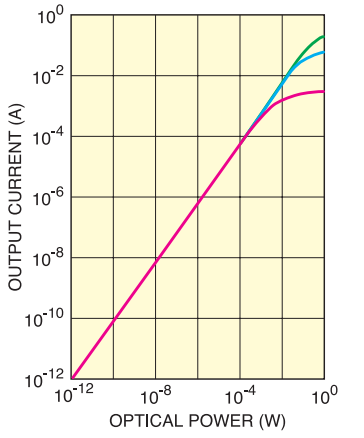
818 Series Calibrated Photodiode Sensors

818 Series advanced free space photodiode sensors are calibrated for use with Newport power meters. They feature a removable, threaded OD3 attenuator. The sensors are ISO 17025 accredited, ensuring compliance with the highest standards of calibration and measurement accuracy. Utilizing NIST-traceable standards and calibrated with high-precision equipment these optical power detectors offer the lowest calibration uncertainty in industry.

- NIST traceable calibration with lowest uncertainty available
- Removable OD3 attenuation filter
- Detachable DB15 calibration module
- Optional screw in fiber-optic adapters for fiber power measurement

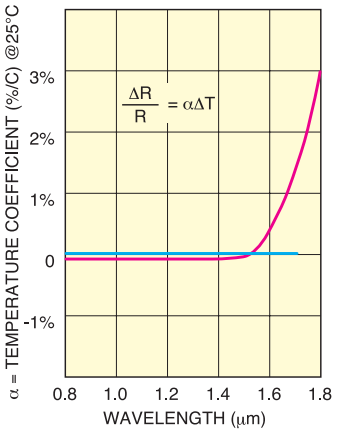


Product Features



Linearity of photodiode response

818-UV, 918D-UV
818-SL, 818-ST2, 918D-IS
818-IR, 818-IG, 918D-IR, 918D-IG



Temperature variation of response vs. wavelength

818-IG, 918D-IG
818-IR, 918D-IR

These photodiodes show excellent linearity over a large dynamic range. This is ideal for use in applications that require high accuracy measurements down to the pW level, especially when combined with a high sensitivity power meter that can accommodate the large dynamic range of the optical signal.

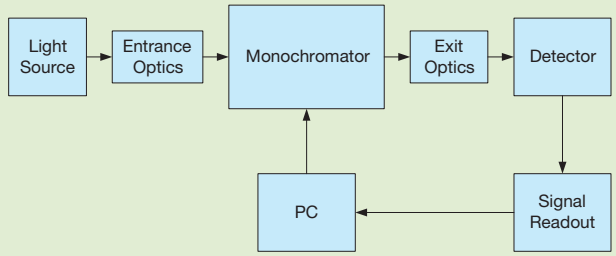
A natural characteristic of a photodiode is for its optical response to change as the temperature changes near the bandgap of semiconductor materials. Newport's 918D series sensors feature a thermocouple near the photodiode, which allows certain Newport meters to read the temperature and automatically adjust the responsivity, ensuring the most accurate measurements.

Factors that Affect Maximum Measurable Power

The maximum measurable power of photodiode sensors is dependent on several factors such as the wavelength of incoming light, photodiode current output saturation, temperature, use of an attenuator and a power meter's maximum current input value. Newport provides maximum power specifications based on the power meter models, with and without an attenuator, and wavelength-dependent maximum power level. With these factors affecting measurable power in mind, choosing the proper detector for your application is critical.

NIST-traceable Sensor Calibration

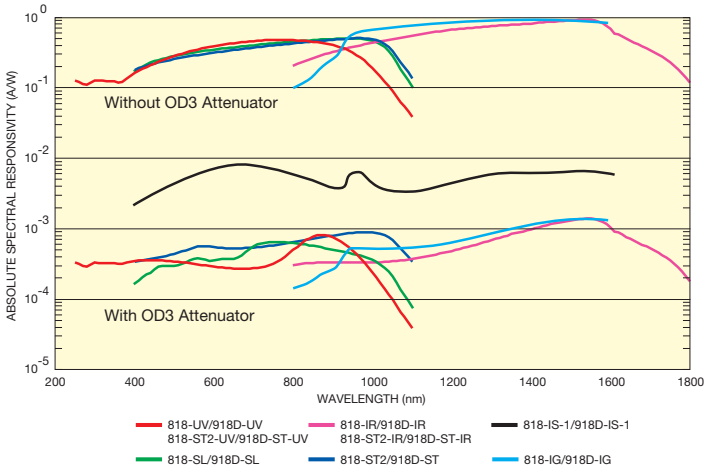
Our calibrated photodiode sensors include a full spectral response calibration utilizing NIST-traceable standards calibrated with high-precision equipment maintained in Newport's optical detector calibration facility. Tight calibration facility and process control allows the tightest calibration uncertainty in industry. Each detector is shipped with the calibration data, which is electronically stored inside the detector's EEPROM. A certificate of calibration as well as the actual calibration curves and data are shipped with each detector for attenuator and no attenuator models. To maintain accuracy and guarantee performance, Newport recommends annual photodiode detector calibration.



Detector calibration system block diagram

Wide Dynamic Range with OD3 Attenuator

The 884 Series OD3 attenuators extend the calibrated optical dynamic range of our detectors by three decades. Both the attenuator and detector have their serial number scribed on the part which, to maintain calibration, must match. Our attenuator design provides high damage threshold and spectral flatness. With the low noise equivalent power (NEP) associated with the photodiodes being used, a wider dynamic range is achieved. The clear aperture of the 884 Series attenuators is 10.3 mm.



Removable OD3 Attenuator

For less than 1 mW input power (or 0.1 mW for 818-UV/DB between 200-400 nm), removing the OD3 attenuator by unscrewing it from the detector head is recommended to maximize the signal-to-noise ratio.



Removable Calibration Module

The 818 series detectors include a BNC connector with a removable calibration module. The /DB suffix indicates a DB15-style calibration module that is directly compatible with Newport's current power meters. Please order the 818-SCAL when a new calibration module is needed for the 818 Series photodiode detectors, without the need to recalibrate the detector.



DB15 Cal Module



No Cal Module
(BNC)

Additional Functionality with BNC Connector

The BNC connector extends the functionality of the 818 Series photodiode sensors. It enables direct connection to an ammeter or lock-in amplifier. It also allows the detector output to be viewed on an oscilloscope after first connecting it to a current-to-voltage preamplifier, such as Newport's model 70710. Furthermore, the cable length can be extended by connecting another BNC cable.



Adapters for Fiber-Optic Applications

These photodiode sensors can be converted to measure optical power from connectorized or bare optical fibers. Newport offers a comprehensive set of screw-in fiber-optic adapters to match a variety of connector types. Our bare fiber holder and adapter mount are designed together to hold 250-µm bare fibers without damaging the fiber.





818 Series Specifications

Models	818-UV/DB	818-SL/DB	818-IR/DB	818-IG/DB
Sensor Size	Ø10 mm	Ø11.3 mm	Ø3 mm	Ø3 mm
Spectral Range	200 - 1100 nm	400 - 1100 nm	780 - 1800 nm	800 - 1650 nm
Max Measurable Power w/ Attenuator (W) [1]	40 mW	2W	3W	3W
Max Measurable Power w/o Attenuator (mW) [1]	0.1 mW	4 mW	10 mW	4 mW
Maximum Power Density	30 W/cm^2	30 W/cm^2	30 W/cm^2	30 W/cm^2
Maximum Power Density without Attenuator	0.2 W/cm^2	3 W/cm^2	3 W/cm^2	3 W/cm^2
Maximum Pulse Energy Without Attenuator	0.4 µJ	60 nJ	60 nJ	60 nJ
Calibration Uncertainty With Attenuator	3.4% @ 220-300nm, 1.65% @ 300-430nm, 1.1% @ 430-1000nm 4.3% @ 1035-1065nm	1.65% @ 400-430nm, 1.1% @ 430-1000nm, 4.3% @ 1035-1065nm	2.4% @ 780-1430nm, 2.6% @ 1430-1600nm	2.4% @ 900-1430nm, 2.6% @ 1430-1600nm
Calibration Uncertainty without Attenuator	3.4% @ 220-300nm, 1.65% @ 300-430nm, 1.1% @ 430-1000nm, 4.3% @ 1035-1065nm	1.65% @ 400-430nm 1.1% @ 430-1000nm, 4.3% @ 1035-1065nm	2.4% @ 780-1430nm, 2.6% @ 1430-1600nm	2.4% @ 900-1430nm, 2.6% @ 1430-1600nm
Attenuator	OD3, Threaded	OD3, Threaded	OD3, Threaded	OD3, Threaded
Linearity	±1 %	±1 %	±1 %	±1 %
Uniformity	±2 % over Ø2 mm with attenuator, ±2 % over Ø4 mm without attenuator	±2 %	±2 %	±2 % @ 1550 nm
Rise Time	3 µs	≤2 µs	≤2 µs	≤2 µs
Connector Type	DB15	DB15	DB15	DB15
Clear Aperture	10.3 mm	10.3 mm	10.3 mm	10.3 mm
Detector Material	UV Enhanced Silicon	Silicon	Germanium	Indium Gallium Arsenide
Detector Input	Free Space	Free Space	Free Space	Free Space
Calibration Module	DB15 removable	DB15 removable	DB15 removable	DB15 removable
Minimum Measurable Power	20 pW	20 pW	5 nW	20 pW
Cable Length	1.5 m	1.5 m	1.5 m	1.5 m
Maximum Pulse Energy	400 µJ	60 µJ	60 µJ	60 µJ
Detector Type	Post Mounted	Post Mounted	Post Mounted	Post Mounted
ISO 17025	Compliant			

1) Max power meter dependence table below.

818 Series Specifications (continuation #1)

Models	818-UV/DB	818-SL/DB	818-IR/DB	818-IG/DB
Max. Power (W) vs Wavelength (nm) – Responsivity (Ma/w) with Attenuator 1938/2938	200-400 40mW 401-1050 15mW 1051-1100 30mW	400-750 2W 751-1100 1.5W	780-1800 3W	800-1000 3W 1001-1650 1.5W
Max. Power (W) vs Wavelength (nm) – Responsivity (Ma/w) with Attenuator 1936/2936	200-400 30mW 401-1050 10mW 1051-1100 30mW	400-750 2W 751-1100 1.5W	780-1800 3W	800-1000 3W 1001-1650 1.5W
Max. Power (W) vs Wavelength (nm) – Responsivity (Ma/w) with Attenuator 1919-R/843-R/ 844-PE-USB	200-400 30mW 401-1050 10mW 1051-1100 30mW	400-750 1.5W 751-1100 1W	780-1000 1W 1001-1650 0.5W 1651-1800 1.5W	800-1000 1W 1001-1650 0.5W
Max. Power (W) vs Wavelength (nm) – Responsivity (Ma/w) with Attenuator 845-PE-RS	200-400 30mW 401-1050 10mW 1051-1100 30mW	400-750 2W 751-1100 1.5W	780-1000 2W 1001-1650 1W 1651-1800 2W	800-1000 2W 1001-1650 1W
Max. Power (W) vs Wavelength (nm) – Responsivity (Ma/w) without Attenuator 1938/2938	200-400 100µW 401-1050 30µW 1051-1100 40µW	400-750 4mW 751-1100 3mW	780-1000 10mW 1001-1650 6mW 1651-1800 15mW	800-1000 4mW 1001-1650 2mW
Max. Power (W) vs Wavelength (nm) – Responsivity (Ma/w) without Attenuator 1936/2936	200-400 100µW 401-1050 30µW 1051-1100 40µW	400-750 4mW 751-1100 3mW	780-1000 10mW 1001-1650 6mW 1651-1800 15mW	800-1000 4mW 1001-1650 2mW
Max. Power (W) vs Wavelength (nm) – Responsivity (Ma/w) without Attenuator 1919-R/843-R/ 844-PE-USB	200-400 100µW 401-1050 30µW 1051-1100 40µW	400-750 2.5mW 751-1100 2mW	780-1000 2mW 1001-1650 1mW 1651-1800 2mW	800-1000 1mW 1001-1650 0.7mW
Max. Power (W) vs Wavelength (nm) – Responsivity (Ma/w) without Attenuator 845-PE-RS	200-400 100µW 401-1050 30µW 1051-1100 40µW	400-750 4mW 751-1100 3mW	780-1000 3mW 1001-1650 1.5mW 1651-1800 4mW	800-1000 2.5mW 1001-1650 1.5mW

DS-051502 818 Series Photodiode Datasheet_07/25
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