THORLABS

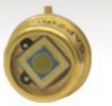
odiodes

- Si, InGaAs, Ge, and Dual Band (Si/InGaAs) Detectors Available
- Available in TO Can, FC Connector, and Flat Wafer Body Styles
- Available in Hermetically Sealed Packages


DSD2


FDS10X10

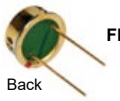

FGA21


FGA01FC


FGA01


Front

FDG03

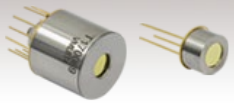

Back


FDG05

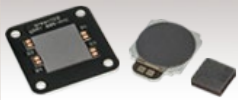
Related Items

Amplified Photodetectors

MIR Photodiodes



Thermopile Power Detectors



Transimpedance Amplifiers

Overview | Response Variation | Photodiode Tutorial | Lab Facts | Pulse Calculations | Feedback | Cross Reference

Features

- Si, InGaAs, Ge, and Dual Band (Si/InGaAs) Unmounted Photodiodes Available
- Wavelength Ranges from 200 to 2600 nm

Mounted and Unmounted Detectors
Unmounted Photodiodes (200 - 2600 nm)
Calibrated Photodiodes (350 - 1800 nm)
Mounted Photodiodes (150 - 1800 nm)
Thermopile Detectors (0.2 - 15 µm)
Photovoltaic Detectors (2.0 - 10.6 µm)
Pigtailed Photodiodes (320 - 1000 nm)

Thorlabs stocks a wide selection of photodiodes (PD) with various active area sizes and packages. Discrete PIN junction photodiodes include indium gallium arsenide (InGaAs) and silicon (Si) materials. Germanium (Ge) photodiodes, which are based on an N-on-P structure, are also available.

Our fastest photodiodes are the FDS015, FDS02, and FDS025 Si photodiodes. The FDS015 Si photodiode has a 35 ps rise time and a 0.65 pF junction capacitance, making it the highest speed, lowest capacitance photodiode offered below. Alternatively, the FD11A Si photodiode has a dark current of 2 pA, making it our photodiode with the lowest dark current. The FD10D and FD05D are InGaAs photodiodes with high responsivity from 900 to 2600 nm, allowing detection of wavelengths beyond the normal 1800 nm range of typical InGaAs photodiodes. The DSD2 is a dual-band photodiode, which incorporates two photodetectors sandwiched on top of each other (Si substrate on top of an InGaAs substrate), offering a combined wavelength range of 400 to 1700 nm.

To complement our photodiode product line, we offer mounted photodiodes and a range of compatible photodiode sockets. Please note that the PDs sold below are not calibrated, meaning responsivity will differ slightly from lot to lot; refer to the *Response Variation* tab for more information. We also offer calibrated photodiodes, which come with with NIST-traceable calibration, to correct for the differences in responsivity.

Click Image for Details								
Item #	FDS010	FD11A	FDS10X10	FDS100	FDS1010	FDS015	FDS02	FDS025
Key Feature	High Speed, UV Grade Fused Silica Window to Provide Sensitivity Down to 200 nm	Lowest Dark Current in TO-18 Can with a Window	Low Dark Current in 10 mm x 10 mm Ceramic Package	High Speed, Largest Sensor in a TO-5 Can	High Speed, Large Active Area and Mounted on an Insulating Ceramic Substrate	Highest Speed and Lowest Capacitance in a TO-46 Can with an AR-Coated Window	High Speed and Low Capacitance in a Direct Fiber-Coupled FC/PC Package	High Speed and Low Capacitance in a TO-46 Can with a Ball Lens
Info	i	i	i	i	i	i	i	i
Wavelength Range	200 - 1100 nm[a]	320 - 1100 nm	340 - 1100 nm	350 - 1100 nm	350 - 1100 nm	400 - 1100 nm	400 - 1100 nm	400 - 1100 nm
Active Area	0.8 mm^2 (Ø1.0 mm)	1.21 mm^2 (1.1 mm x 1.1 mm)	100 mm^2 (10 mm x 10 mm)	13 mm^2 (3.6 mm x 3.6 mm)	100 mm^2 (10 mm x 10 mm)	0.018 mm^2 (Ø150 µm)	0.049 mm^2 (Ø0.25 mm)	0.049 mm^2 (Ø0.25 mm)
Rise/Fall Time[b]	1 ns / 1 ns @ 830 nm, 10 V	400 ns[c,d] @ 650 nm, 0 V	150 ns / 150 ns[d] @ 5 V	10 ns / 10 ns[d] @ 632 nm, 20 V	65 ns / 65 ns[d] @ 632 nm, 5 V	35 ps / 200 ps @ 850 nm, 5 V	47 ps / 246 ps @ 850 nm, 5 V	47 ps / 246 ps @ 850 nm, 5 V
NEP ($W/Hz^{1/2}$)	5.0×10^{-14} @ 830 nm, 10 V	6.8×10^{-16} @ 960 nm, 0 V	1.50×10^{-14} @ 960 nm	1.2×10^{-14} @ 900 nm, 20 V	2.07×10^{-13} @ 970 nm, 5 V	8.60×10^{-15} @ 850 nm, 5 V	9.29×10^{-15} @ 850 nm, 5 V	9.29×10^{-15} @ 850 nm, 5 V
Dark Current	0.3 nA (Typ.) @ 10 V	2.0 pA (Max) @ 10 mV	200 pA @ 5 V	1.0 nA (Typ.) @ 20 V	600 nA (Max) @ 5 V	0.03 nA (Typ.) @ 5 V	35 pA (Typ.) @ 5 V	35 pA (Typ.) @ 5 V

Junction Capacitance	6 pF (Typ.) @ 10 V	140 pF (Typ.) @ 0 V	380 pF @ 5 V	24 pF (Typ.) @ 20 V	375 pF (Typ.) @ 5 V	0.65 pF (Typ.) @ 5 V	0.94 pF (Typ.) @ 5 V	0.94 pF (Typ.) @ 5 V
Package	TO-5	TO-18	Ceramic	TO-5	Ceramic	TO-46	TO-46, FC/PC Bulkhead	TO-46
Compatible Sockets	STO5S STO5P	STO46S STO46P	Not Available	STO5S STO5P	Not Available	STO46S STO46P	STO46S STO46P	STO46S STO46P

a. When long-term UV light is applied, the product specifications may degrade. For example, the product's UV response may decrease and the dark current may increase. The degree to which the specifications may degrade is based upon factors such as the irradiation level, intensity, and usage time.
b. Typical Values; R_L = 50 Ω Unless Otherwise Specified
c. Measured with a 1 kΩ Resistor
d. The photodiode will be slower at NIR wavelengths.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal		Price	Available
+1			**FDS010**	Si Photodiode, 1 ns Rise Time, 200 - 1100 nm, Ø1 mm Active Area	$48.15	Today
+1			**FD11A**	Si Photodiode, 400 ns Rise Time, 320 - 1100 nm, 1.1 mm x 1.1 mm Active Area	$14.58	Today
+1			**FDS10X10**	Si Photodiode, 150 ns Rise Time, 340 - 1100 nm, 10 mm x 10 mm Active Area	$114.70	Today
+1			**FDS100**	Si Photodiode, 10 ns Rise Time, 350 - 1100 nm, 3.6 mm x 3.6 mm Active Area	$14.94	Today
+1			**FDS1010**	Si Photodiode, 65 ns Rise Time, 350 - 1100 nm, 10 mm x 10 mm Active Area	$55.73	Today
+1			**FDS015**	Si Photodiode, 35 ps Rise Time, 400 - 1100 nm, Ø150 µm Active Area	$53.05	Today
+1			**FDS02**	Si Photodiode, 47 ps Rise Time, 400 - 1100 nm, Ø0.25 mm Active Area, FC/PC Bulkhead	$83.59	Today
+1			**FDS025**	Si Photodiode, 47 ps Rise Time, 400 - 1100 nm, Ø0.25 mm Active Area	$34.36	Today

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InGaAs Photodiodes - NIR Wavelengths

Click Image for Details								
Item #	FGA01	FGA01FC	FGA015	FDGA05	FGA21	FGA10	FD05D	FD10D
Key Feature	High Speed and Low Capacitance in a TO-46 Can with a Ball Lens	High Speed and Low Capacitance in a Direct Fiber-Coupled FC/PC Package	High Speed and Low Capacitance	High Speed, High Responsivity, and Low Capacitance	Large Active Area and High Speed	High Speed and Low Dark Current	Long Wavelength Range	Long Wavelength Range and Large Active Area
Info								
Wavelength Range	800 - 1700 nm	800 - 1700 nm	800 - 1700 nm	800 - 1700 nm	800 - 1700 nm	900 - 1700 nm	900 - 2600 nm	900 - 2600 nm
Active Area	0.01 mm^2 (Ø120 µm)	0.01 mm^2 (Ø120 µm)	0.018 mm^2 (Ø150 µm)	0.196 mm^2 (Ø0.5 mm)	3.1 mm^2 (Ø2 mm)	0.79 mm^2 (Ø1 mm)	0.20 mm^2 (Ø0.5 mm)	0.79 mm^2 (Ø1.0 mm)
Rise/Fall Time[a]	300 ps / 300 ps @ 5 V	300 ps / 300 ps @ 5 V	300 ps / 300 ps @ 1550 nm, 5 V	2.5 ns / 2.5 ns @ 5 V	25 ns / 25 ns @ 3 V	10 ns / 10 ns @ 5 V	17 ns / 17 ns @ 0 V	25 ns / 25 ns @ 0 V
NEP ($W/Hz^{1/2}$)	4.5×10^{-15} @ 1500 nm	4.5×10^{-15} @ 1500 nm	1.3×10^{-14} @ 1550 nm	2.0×10^{-14} @ 1550 nm	6.0×10^{-14} @ 1550 nm	2.5×10^{-14} @ 1550 nm, 5 V	5.0×10^{-13} @ 2300 nm	1.0×10^{-12} @ 2300 nm
Dark Current	0.05 nA (Typ.) @ 5 V	0.05 nA (Typ.) @ 5 V	0.5 nA (Typ.) @ 5 V	6 nA (Typ.) @ 5 V	50 nA (Typ.) @ 1 V	1.1 nA (Typ.) @ 5 V	1 µA (Typ.) @ 0.5 V	3 µA (Typ.) @ 0.5 V
Junction Capacitance	2.0 pF (Typ.) @ 5 V	2.0 pF (Typ.) @ 5 V	1.5 pF (Typ.) @ 5 V	10 pF (Typ.) @ 5 V	100 pF (Typ.) @ 3 V	80 pF (Typ.) @ 5 V	140 pF (Typ.) @ 0 V	500 pF (Typ.) @ 0 V
Package	TO-46	TO-46, FC/PC Bulkhead	TO-18	TO-46	TO-5	TO-5	TO-18	TO-18
Compatible Sockets	STO46S STO46P	STO46S STO46P	STO46S STO46P	STO46S STO46P	STO5S STO5P	STO5S STO5P	STO46S STO46P	STO46S STO46P

a. Typical Values; R_L = 50 Ω Unless Otherwise Specified

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal		Price	Available
+1			**FGA01**	InGaAs Photodiode, 300 ps Rise Time, 800-1700 nm, Ø0.12 mm Active Area	$62.76	Today
+1			**FGA01FC**	InGaAs Photodiode, 300 ps Rise Time, 800-1700 nm, Ø0.12 mm Active Area, FC/PC Bulkhead	$159.07	Today
+1			**FGA015**	InGaAs Photodiode, 300 ps Rise Time, 800-1700 nm, Ø150 µm Active Area	$58.35	Today
+1			**FDGA05**	InGaAs Photodiode, 2.5 ns Rise Time, 800-1700 nm, Ø0.5 mm Active Area	$148.25	Today
+1			**FGA21**	InGaAs Photodiode, 25 ns Rise Time, 800-1700 nm, Ø2 mm Active Area	$241.31	Today
+1			**FGA10**	InGaAs Photodiode, 10 ns Rise Time, 900-1700 nm, Ø1 mm Active Area	$180.71	Today
+1			**FD05D**	InGaAs Photodiode, 17 ns Rise Time, 900-2600 nm, Ø0.5 mm Active Area	$127.69	Today
+1			**FD10D**	InGaAs Photodiode, 25 ns Rise Time, 900-2600 nm, Ø1.0 mm Active Area	$226.17	Today

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Dual Band Si/InGaAs Photodiode

Zoom

- Dual Detector Chip Design - Si Over InGaAs - Provides Wide Detector Range
- 4-Pin TO-5 Package
- Large Active Area

Item #	Info	Wavelength Range	Active Area	Package	Rise/Fall Time[a]	NEP ($W/Hz^{1/2}$)	Dark Current	Junction Capacitance	Compatible Sockets
DSD2		400 - 1100 nm (Si) 1000 - 1800 nm (InGaAs)	5.07 mm^2 (Ø2.54 mm, Si) 1.77 mm^2 (Ø1.50 mm, InGaAs)	TO-5	4.0 µs (Both Layers) @ 0 V	1.9 x 10^{-14} (Si) 2.1 x 10^{-13} (InGaAs)	1 nA @ 1 V (Si) 0.5 nA @ 1 V (InGaAs)	450 pF @ 0 V (Si) 300 pF @ 0 V (InGaAs)	Not Available

a. Typical Values; R_L = 50 Ω Unless Otherwise Specified

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal		Price	Available
			DSD2	Dual Band Si/InGaAs Detector, 4 µs Rise Time, 400 - 1700 nm, Ø2.54/Ø1.5 mm	$604.91	Today

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Ge Photodiodes - NIR Wavelengths

Click Image for Details				
Item #	FDG03	FDG05[a]	FDG50	FDG10X10
Key Feature	Large Active Area in a TO-5 Can	High Speed on a Ceramic Substrate	Large Active Area in a TO-8 Can	Largest Active Area
Info				
Wavelength Range	800 - 1800 nm	800 - 1800 nm	800 - 1800 nm	800 - 1800 nm
Active Area	7.1 mm^2 (Ø3 mm)	19.6 mm^2 (Ø5 mm)	19.6 mm^2 (Ø5 mm)	100 mm^2 (10 mm x 10 mm)
Rise/Fall Time[b]	600 ns / 600 ns @ 3 V	220 ns / 220 ns @ 3 V	220 ns / 220 ns (Typ.) @ 10 V	10 µs (Typ.) @ 1 V
NEP	2.6 x 10^{-12} $W/Hz^{1/2}$ @ 1550 nm	4.0 x 10^{-12} $W/Hz^{1/2}$ @ 1550 nm	4.0 x 10^{-12} $W/Hz^{1/2}$ @ 1550 nm	4.0 x 10^{-12} $W/Hz^{1/2}$ @ 1550 nm[c]
Dark Current	4.0 µA (Max) @ 1 V	40 µA (Max) @ 3 V	60 µA (Max) @ 5 V	50 µA (Max) @ 0.3 V
Junction Capacitance	6 nF (Typ.) @ 1 V 4.5 nF (Typ.) @ 3 V	3000 pF (Typ.) @ 3 V	1800 pF (Max) @ 5 V 16000 pF (Max) @ 0 V	80 nF (Typ.) @ 1 V 135 nF (Typ.) @ 0 V
Shunt Resistance	25 kΩ (Min)	-	4 kΩ (Typ.)	2 kΩ (Min)
Package	TO-5	Ceramic	TO-8	Ceramic
Compatible Sockets	STO5S STO5P	Not Available	STO8S STO8P	Not Available

a. Please note that the wire leads on the FDG05 and FDG10X10 are attached to the sensor using a conductive epoxy, as soldering them on would damage the sensor. This results in a fragile bond. Care should be taken while handing this unit so that the wire leads are not broken.
b. Typical Values; R_L = 50 Ω Unless Otherwise Specified
c. NEP is Specified for the Photovoltaic Mode

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+1	Qty	Docs	Part Number - Universal		Price	Available
			FDG03	Ge Photodiode, 600 ns Rise Time, 800 - 1800 nm, Ø3 mm Active Area	$138.51	Today
			FDG05	Ge Photodiode, 220 ns Rise Time, 800 - 1800 nm, Ø5 mm Active Area	$264.04	Today
			FDG50	Ge Photodiode, 220 ns Rise Time, 800 - 1800 nm, Ø5 mm Active Area	$293.25	Today
			FDG10X10	Ge Photodiode, 10 µs Rise Time, 800 - 1800 nm, 10 mm x 10 mm Active Area	$498.62	Today

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Additional Photodiode Detectors

- Unmounted Photodiodes
- Calibrated Photodiodes
- Mounted Photodiodes
- Pigtailed Photodiodes
- MIR Photovoltaic Detectors
- High-Speed Amplified Detector, OEM Package
- High-Speed Biased Detectors, OEM Package
- Transimpedance & Voltage Amplifiers
- Response-Flattening Filters for Si Photodiodes