1.1.1 Photodiode Power Sensors

1.1.1.1 Standard Photodiode Sensors

50pW to 3W

Features

- Very large dynamic range
- Swivel mount for hard to measure places
- Comes with filter in / filter out options
- Patented automatic background subtraction
- Fiber optic adapters available

PD300 with filter off

PD300 with filter installed

PD300-TP Mounted on stand

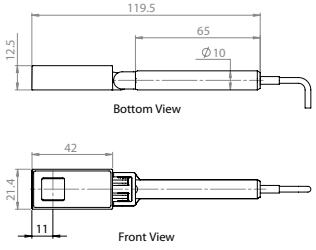
Model	PD300			PD300-1W			PD300-3W			PD300-TP		
Use	**General**			**Powers to 1W**			**Powers to 3W**			**Thin profile for tight fit**		
Detector Type	silicon			silicon			silicon			silicon		
Aperture	10x10mm			10x10mm			10x10mm			10x10mm		
Filter mode	Filter out		Filter in	Filter out		Filter in	Filter out		Filter in	Filter out		Filter in
Spectral Range nm	350-1100		430-1100	350-1100		430-1100	350-1100		430-1100	350-1100		400-1100
Power Range	30mW to 500pW		300mW to 200µW	30mW to 500pW		1W to 200 µW	100mW to 5nW		3W to 200µW	3mW to 50pW		1W to 20µW
Power Scales	30mW to 30nW and dBm		300mW to 30mW and dBm	30mW to 30nW and dBm		1W to 30mW and dBm	100mW to 300nW and dBm		3W to 30mW and dBm	3mW to 3nW and dBm		1W to 3mW and dBm
Resolution nW	0.01		NA	0.01		NA	0.1		NA	0.001		1
Maximum Power vs. Wavelength	nm	mW	mW	nm	mW	mW	nm	mW	mW	nm	mW	mW
	<488	30	300	<488	30	1000	<488	100	3000	350-400	3	NA
	633	20	300	633	20	1000	633	100	3000	400-500	3	1000
	670	13	200	670	13	1000	670	100	2000	600	2.5	1000
	790	10	100	790	10	600	790	100	1200	700	2	500
	904	10	100	904	10	700	904	100	1200	800-950	1.5	300
	1064	25	250	1064	25	1000	1064	100	2200	1064	3	500
Accuracy (including errors due to temp. variations)												
% error vs Wavelength nm	±10	360-400	NA	±10	360-400	NA	±10	360-400	NA	±7	350-400	NA
	±3	400-950	±5 430-950	±3	400-950	±5 430-950	±3	400-950	±5 430-950	±3	400-950	±5 400-950
	±5	950-1100	±7 950-1100	±5	950-1100	±7 950-1100	±5	950-1100	±7 950-1100	±5	950-1100	±7 950-1100
Damage Threshold W/cm²	10		50	10		10 [(a)]	10		100	10		50
Max Pulse Energy µJ	2		20	2		100	20		500	1		100
Noise Level for filter out pW	20			20			200			±2		
Response Time with Meter s	0.2			0.2			0.2			0.2		
Beam Position Dependence	±2%			±2%			±2%		±3%	±2%		
Background Subtraction	95-98% of background is cancelled automatically under normal room conditions, even when changing continuously						NA			NA		
Fiber Adapters Available (see page 43)	SMA, FC, ST, SC			SMA, FC, ST, SC			SMA, FC, ST, SC			NA		
Version							V1					
Part Number: Standard Sensor	**7Z02410**			**7Z02411A**			**7Z02426**			**7Z02424**		
StarLink Sensor: Direct USB link to PC (p. 42)	**787100**											

Note: (a) Maximum power density

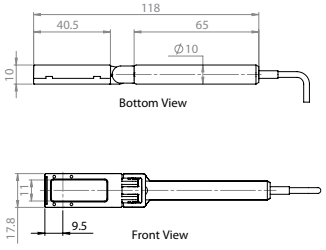
For graphs see page 24

For PD300-3W drawing see PD300-UV/PD300-IR drawing in page 23

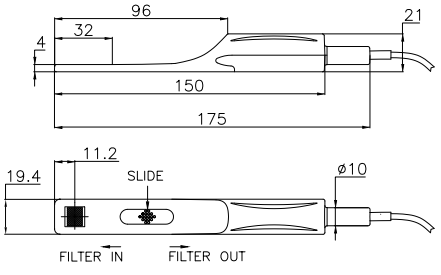
PD300/ PD300-1W filter installed



PD300/ PD300-1W filter off



PD300-TP



1.1.1.1 Standard Photodiode Sensors

10pW to 300mW

Features

- Spectral range including UV and IR
- Very large dynamic range
- Swivel mount for hard to measure places
- Comes with filter in / filter out options
- Fiber optic adapters available

PD300 with filter off

PD300 with filter installed

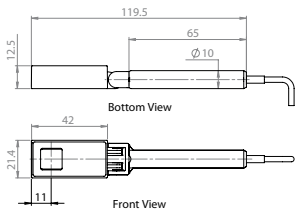
PD300-IRG with no fiber input

PD300-IRG with fiber input

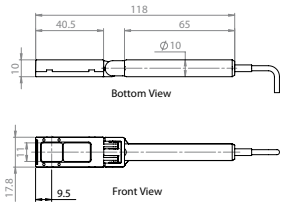
Model	**PD300-UV**				**PD300-IR**				**PD300-IRG**			
Use	**Lowest powers from 200-1100nm**				**Low powers from 700-1800nm**				**Telecom wavelength fiber and free space measurements**			
Detector Type	silicon				germanium				InGaAs			
Aperture	10x10mm				φ5mm				φ5mm for free space beams			
Filter mode	Filter out		Filter in		Filter out		Filter in		Filter out		Filter in	
Spectral Range nm	200 -1100		220 -1100		700-1800		700-1800		800 - 1700		950 - 1700	
Power Range	3mW to 20pW		300mW to 2µW		30mW to 5nW		300mW to 200µW		800µW to 10pW		150mW to 20µW	
Power Scales	3mW to 3nW and dBm		300mW to 300µW and dBm		30mW to 30nW and dBm		300mW to 30mW and dBm		800 µW to 800pW and dBm		300mW to 3mW and dBm	
Resolution nW	0.001		100		0.01		NA		0.0001		1	
Maximum Power vs. Wavelength	nm	mW	mW		nm	mW	mW		nm	mW	mW	
	250 - 350	3	300		800	12	120		<1000	0.8	100	
	400	3	300		1000-1300	30	300		1100	0.8	30	
	600	3	300		1400	30	250		1200	0.8	50	
	800 - 950	2.5	150		1500	25	80		>1300	0.8	150	
	1064	3	30		1600	30	100					
					1800	30	300					
Accuracy (including errors due to temp. variations)												
% error vs Wavelength nm	±6	200-270	±10	220-400	±5	700-900	±7	700-900	±3	1000-1650	±6	1000-1650
	±3	270-950	±5	400-950	±4	900-1700	±6	900-1700	±5	<1000 & >1650	±8	<1000 & >1650
	±5	950-1100	±7	950-1100	±7	1700-1800	±9	1700-1800				
Damage Threshold W/cm²	10		50		10		50		5		50	
Max Pulse Energy µJ	0.4		15		0.3		3		1		100	
Noise Level for filter out pW	±1				200				±300fW at 1550 nm and 1s average			
Response Time with Meter s	0.2				0.2				0.2			
Beam Position Dependence	±2%				±2%				±1% over 80% of aperture			
Fiber Adapters Available (see page 43&44)	SC, ST, FC, SMA				SC, ST, FC, SMA				FC, FC/APC, SMA			
Version									V1			
Part Number	**7Z02413**				**7Z02412**				**7Z02402**			

For graphs see page 24

PD300-UV/PD300-IR

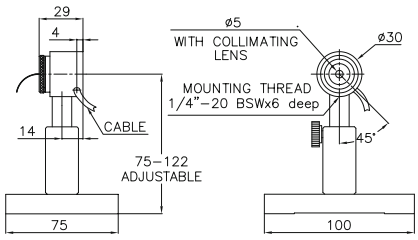


with filter installed

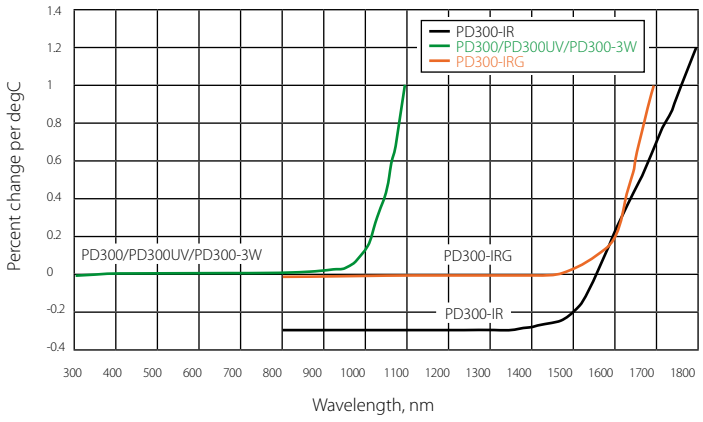


with filter off

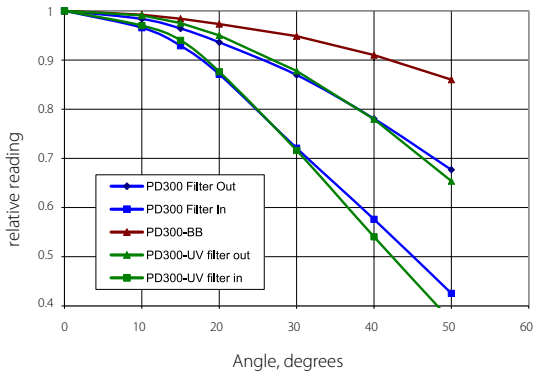
PD300-IRG



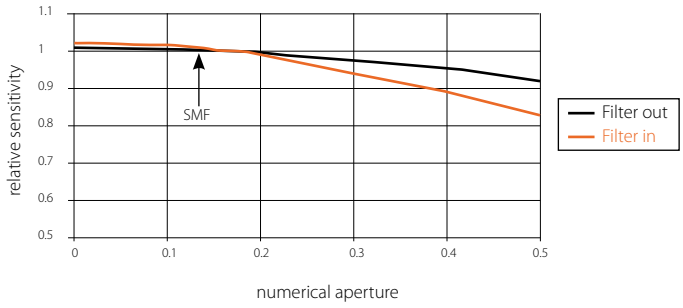
Temperature Coefficient of Sensitivity



PD300 Angle Dependence



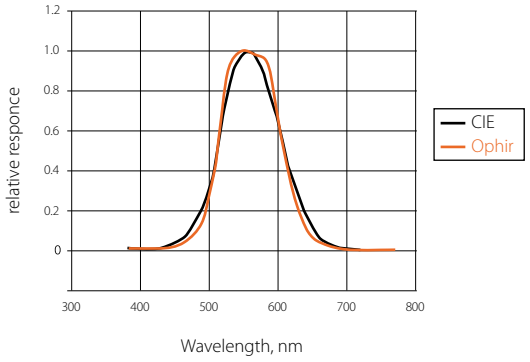
Dependence of Sensitivity on Numerical Aperture (PD300 - IRG)



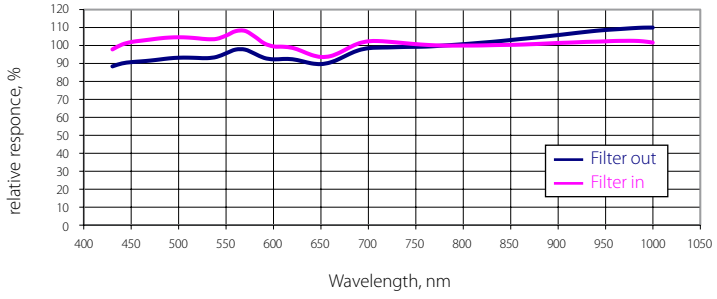
Note:

1. Graph assumes equal intensity into all angles up to maximum N.A.
2. Calibration is done with SMF, N.A. 0.13

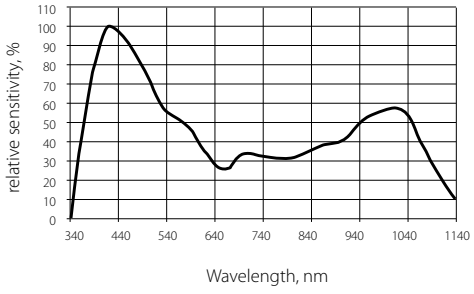
PD300-CIE spectral response vs. CIE curve



Typical Sensibility Curve of PD300-BB Sensors



Relative Spectral Response of BC20



Graph of the approximate relative spectral response of the BC20 for purpose of interpolation, if the instrument is to be used at a wavelength other than the ones that are factory calibrated

1.1.1.2 Round Photodiode Sensors

20pW to 3W

Features

- Round geometry for easy centering
- Threaded to fit standard SM1 bench equipment
- Same performance as standard PD300 sensors
- Comes with removable filter as standard
- Fiber optic adapters available

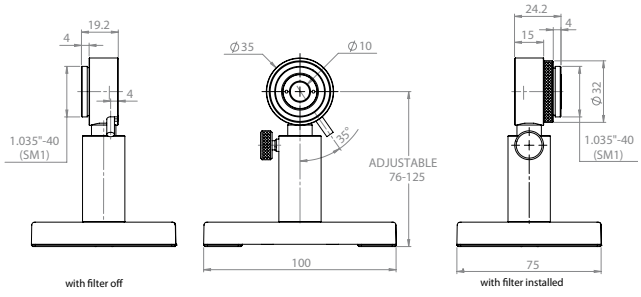
PD300R Filter Off

PD300R Filter installed

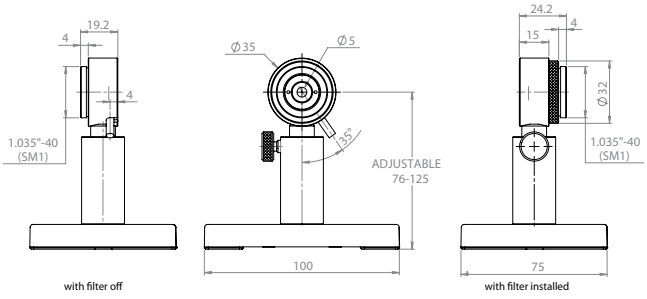
Model	PD300R			PD300R-3W			PD300R-UV			PD300R-IR		
Use	**General**			**Powers to 3W**			**Lowest powers from 200-1100nm**			**IR wavelengths 700-1800nm**		
Detector Type	silicon			silicon			silicon			germanium		
Aperture	φ10mm			φ10mm			φ10mm			φ5mm		
Filter mode	Filter out		Filter in	Filter out		Filter in	Filter out		Filter in	Filter out		Filter in
Spectral Range nm	350-1100		430-1100	350-1100		430-1100	200 -1100		220 -1100	700-1800		700-1800
Power Range	30mW to 500pW		300mW to 200µW	100mW to 5nW		3W to 200µW	3mW to 20pW		300mW to 2µW	30mW to 5nW		300mW to 200µW
Power Scales	30mW to 30nW and dBm		300mW to 30mW and dBm	100mW to 300nW and dBm		3W to 30mW and dBm	3mW to 3nW and dBm		300mW to 300µW and dBm	30mW to 30nW and dBm		300mW to 30mW and dBm
Resolution nW	0.01		NA	0.1		NA	0.001		100	0.01		NA
Maximum Power vs. Wavelength	nm	mW	mW	nm	mW	mW	nm	mW	mW	nm	mW	mW
	<488	30	300	<488	100	3000	250 - 350	3	300	800	12	120
	633	20	300	633	100	3000	400	3	300	1000-1300	30	300
	670	13	200	670	100	2000	600	3	300	1400	30	250
	790	10	100	790	100	1200	800 - 950	2.5	150	1500	25	80
	904	10	100	904	100	1200	1064	3	30	1600	30	100
	1064	25	250	1064	100	2200				1800	30	300
Accuracy (including errors due to temp. variations)												
% error vs Wavelength nm	±10	360-400	NA	±10	360-400	NA	±6	200-270	±10	220-400	±5	700-900	±7	700-900
	±3	400-950	±5 430-950	±3	400-950	±5 430-950	±3	270-950	±5	400-950	±4	900-1700	±6	900-1700
	±5	950-1100	±7 950-1100	±5	950-1100	±7 950-1100	±5	950-1100	±7	950-1100	±7	1700-1800	±9	1700-1800
Damage Threshold W/cm²	10		50	10		100	10		50	10		50
Max Pulse Energy µJ	2		20	20		500	0.4		15	0.3		3
Noise Level for filter out pW	20			200			±1			200		
Response Time with Meter s	0.2			0.2			0.2			0.2		
Beam Position Dependence	±2%			±2%		±3%	±2%			±2%		
Fiber Adapters Available (see page 44)	FC, ST, SC, SMA			FC, ST, SC, SMA			SC, ST, FC, SMA			SC, ST, FC, SMA		
Version												
Part Number	**7Z02436**			**7Z02437**			**7Z02438**			**7Z02439**		

For graphs see page 24

PD300R/ PD300R-3W/ PD300R-UV



PD300R-IR



1.1.1.3 Special photodiode sensors and integrating spheres

1.1.1.3.1 Special Photodiode Sensors

Features

- PD300-BB for broadband light sources - radiometry (PD300-BB-50mW option up to 50mW)
- PD300-CIE for eye adjusted Lux measurements
- BC20 for measuring scanned beams such as bar code light sources

BC20

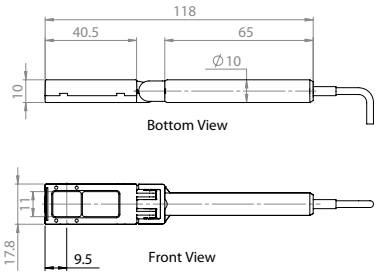
PD300-BB/ / PD300-BB-50mW

PD300-CIE

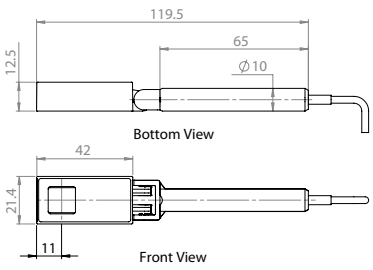
Model	PD300-BB	PD300-BB-50mW		PD300-CIE	BC20
Use	**Radiometry-broad spectrum**	**Same as PD300-BB with removable attenuator for use to 50mW**		**Eye adjusted measurement in Lux**	**Scanned beams e.g. bar code**
Detector Type	Silicon with special filter	Silicon with special filter		Silicon with special filter	Silicon with peak and hold circuit
Aperture	10x10mm	10x10mm		Active area 2.4 x 2.8mm	10x10mm
Spectral Range nm	430 - 1000 (see graph)	430 - 1000 (see graph)		400 - 700 (see graph)	633, 650, 675 (others available)
Filter Mode		Filter out	Filter in		
Power Range	4mW to 50pW	4mW to 50pW	50mW to 1nW	200kLux to 20 mLux	20mW to 100µW
Power Scales	4mW to 8nW and dBm	4mW to 8nW and dBm	50mW to 80nW and dBm	200kLux to 200 mLux	20mW to 2mW
Resolution nW	0.001	0.001	0.01	1 mLux	0.001
Accuracy	Maximum deviation from flat spectrum (see graph) ±10%	Maximum deviation from flat spectrum (see graph) ±10%	±12%	(see graph)	±3% for >10% of full scale. Deviation from calibration -3% at 30,000 inch/s scan rate on sensor.
Damage Threshold W/cm²	10	10	100	10	50
Max Pulse Energy µJ	1	1	10	1	NA
Noise Level pW	2	2	30	±1mLux	5µW
Response Time with Meter s	0.2	0.2	0.2	0.2	Two modes of operation: Hold: holds highest reading for 5s then updates. No Hold: updates reading 3 times per second.
Beam Position Dependence	±2% for broadband light sources	±2% for broadband light sources	±3% for broadband light sources	NA – source overfills detector	±2%
Background Subtraction	NA	NA	NA	NA	Background is automatically subtracted from both scanned and static beams.
Fiber Adapters Available (see page 43)	NA	SC, ST, FC, SMA		NA	NA
Version					
Part Number	**7Z02405**	**7Z02440**		**7Z02406**	**7Z02422A**[(a)]
Notes:					(a) Swivel stand for BC20 sensor P/N 1Z09004

For graphs see page 24

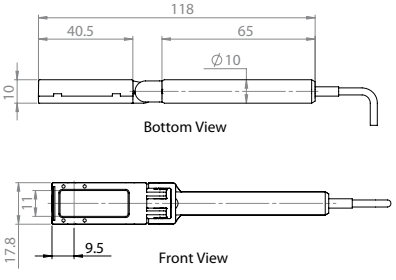
PD300-BB-CIE / PD300-BB / PD300-BB-50mW with filter off



PD300-BB-50mW with filter installed



BC20



1.1.1.3.2 Special Sensors - Integrating Spheres

1µW to 3W

Features

- Integrating sphere for divergent beams
- φ12mm aperture
- For fiber or free space input

3A-IS

3A-IS-IRG

Model	3A-IS	3A-IS-IRG
Use	**Divergent beams to 3W for visible NIR**	**Divergent beams to 3W for IR**
Absorber Type	Integrating sphere with Si detector	Integrating sphere with InGaAs detector
Spectral Range µm	0.42 - 1.1	0.8 - 1.7
Aperture mm	φ 12mm	φ 12mm
Maximum Beam Divergence	±40 degrees	±40 degrees
Sensitivity to beam size and angle	±2%	±2%
Power Mode		
Power Range	1µW - 3W	1µW - 3W
Power Scales	3W to 3µW and dBm	3W to 3µW and dBm
Power Noise Level	20nW	20nW
Maximum Average Power Density kW/cm²	0.2 on integrating sphere surface	
Response Time with Meter (0-95%) typ. s	0.2	0.2
Power Accuracy +/-%	5 at 420-1000nm, 10 at 1000-1100nm	5
Linearity with Power +/-%	1	1
Energy Mode		
Energy Range	NA	NA
Energy Scales	NA	NA
Minimum Energy mJ	NA	NA
Maximum Energy	5mJ	5mJ
Maximum Energy Density J/cm² (b)		
<100ns	0.5	0.5
0.5ms	6	6
2ms	12	12
10ms	25	25
Cooling	convection	convection
Fiber Adapters Available (see page 44)	SC, ST, FC, SMA (a)	SC, ST, FC, SMA (a)
Weight kg	0.6	0.6
Version	V1	
Part number	**7Z02404**	**7Z02403**
Notes:	(a) One fiber output port available with output = 2E-4 of input power/mm² of fiber area. (b) On integrating sphere surface.	

3A-IS/ 3A-IS-IRG