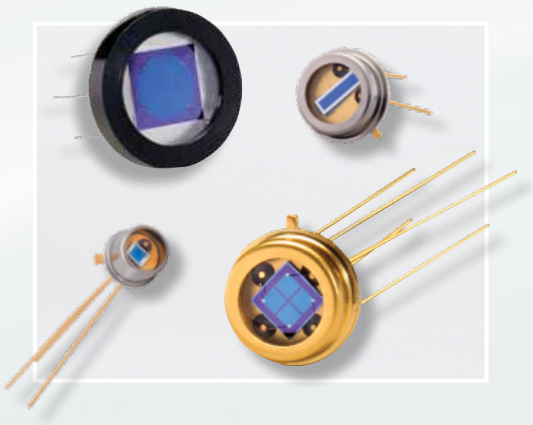
Segmented Photodiodes (SPOT Series)

Position Sensing Detector (PSD)

The **SPOT** Series are common substrate photodetectors segmented into either two (2) or four (4) separate active areas. They are available with either a 0.005" or 0.0004" well defined gap between the adjacent elements resulting in high response uniformity between the elements. The SPOT series are ideal for very accurate nulling or centering applications. Position information can be obtained when the light spot diameter is larger than the spacing between the cells.

Spectral response range is from 350-1100nm. Notch or bandpass filters can be added to achieve specific spectral responses.

These detectors exhibit excellent stability over time and temperature, fast response times necessary for high speed or pulse operation, and position resolutions of better than 0.1 µm. Maximum recommended power density is 10 mW / cm² and typical uniformity of response for a 1 mm diameter spot is ±2%.



APPLICATIONS

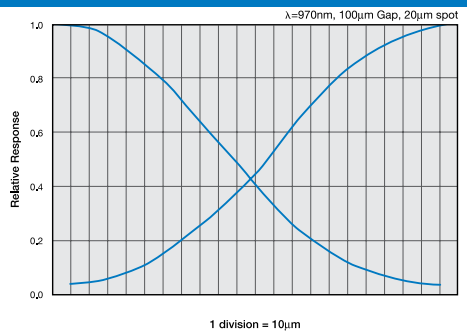
- Machine Tool Alignment
- Position Measuring
- Beam Centering
- Surface Profiling
- Targeting
- Guidance Systems

FEATURES

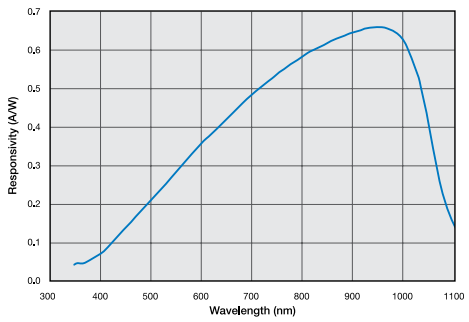
- High Accuracy
- Excellent Resolution
- High-Speed Response
- Ultra Low Dark Current
- Excellent Response Match
- High Stability over Time and Temperature

The circuit on the opposite page represents a typical biasing and detection circuit set up for both bi-cells and quad-cells. For position calculations and further details, refer to "Photodiode Characteristics" section of the catalog.

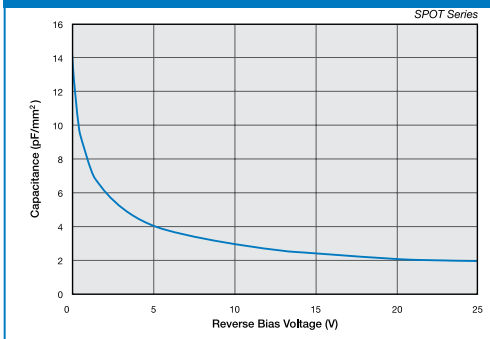
Typical Cross-Over Characteristics



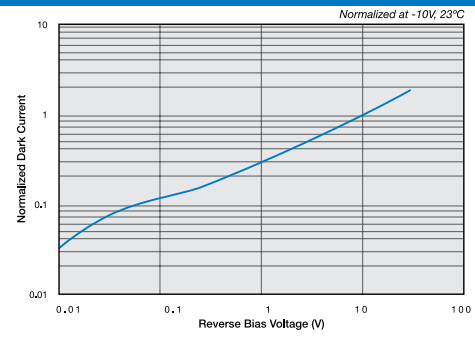
Typical Spectral Response



Typical Capacitance vs. Reverse Bias Voltage



Typical Dark Current vs. Reverse Bias



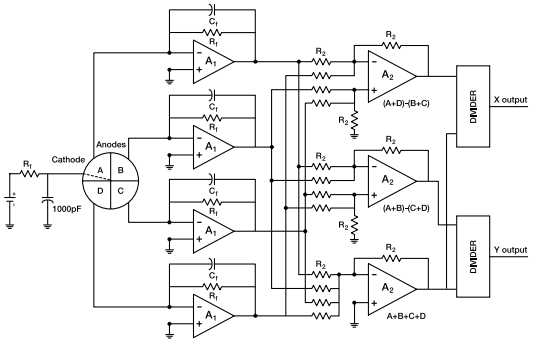
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/ France LASER COMPONENTS S.A.S. Tel +33 1 39 59 52 25 info@lasercomponents.fr www.lasercomponents.fr
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Segmented Photodiodes (SPOT Series)

Typical Electro-Optical Specifications at T_A=23°C

Model Number	Active Area Per Element		Element Gap (mm)	Responsivity (A/W)		Capacitance (pF)	Dark Current (nA)		NEP (W/√Hz)	Reverse Voltage (V)	Rise Time (ns)	Temp Range (°C)		Package Style ¶
	Area (mm²)	Dimensions (mm)		970 nm		-10 V	-10 V		-10 V 970 nm		-10 V 780 nm 50 Ω	Operating	Storage	
				min.	typ.	typ.	typ.	max.	typ.	max.	typ.			
Two-Element Series, Metal Package														
CD-25T	2.3	4.6 x 0.5	0.020	0.60	0.65	50@ -15V	20@ -15V		1.1 e-14	30	18	-40 ~ +100	-55 ~ +125	2 / TO-5
SPOT-2D	3.3	1.3 x 2.5	0.127			11	0.15	2.0			22			41 / TO-5
SPOT-2DMI	0.7	0.6 x 1.2	0.013			3	0.05	1.0	6.2 e-15		11			40 / TO-18
SPOT-3D	2.8	0.6 x 4.6	0.025			7	0.13	2.0	9.9 e-15		25			41 / TO-5
Four Element Series, Metal Package														
SPOT-4D	1.61	1.3 sq	0.127	0.60	0.65	5	0.10	1.0	8.7 e-15	30	22	-40 ~ +100	-55 ~ +125	41 / TO-5
SPOT-4DMI	0.25	0.5 sq	0.013			1	0.01	0.5	2.8 e-15		9			
SPOT-9D	19.6	10 ϕ ‡	0.102			60	0.50	10.0	1.9 e-14		33			43 / LoProf
SPOT-9DMI	19.6		0.010								28			

‡ Overall Diameter (All four Quads)
¶ For mechanical drawings please refer to pages 61 thru 73.
Chip centering within ±0.010".



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11/26 / V1 / CJ-IF / apx/si-pd/quad/spot-series-segmented-photodiode

Photodiode Care and Handling Instructions

AVOID DIRECT LIGHT

Since the spectral response of silicon photodiode includes the visible light region, care must be taken to avoid photodiode exposure to high ambient light levels, particularly from tungsten sources or sunlight. During shipment from OSI Optoelectronics, your photodiodes are packaged in opaque, padded containers to avoid ambient light exposure and damage due to shock from dropping or jarring.

AVOID SHARP PHYSICAL SHOCK

Photodiodes can be rendered inoperable if dropped or sharply jarred. The wire bonds are delicate and can become separated from the photodiode's bonding pads when the detector is dropped or otherwise receives a sharp physical blow.

CLEAN WINDOWS WITH OPTICAL GRADE CLOTH / TISSUE

Most windows on OSI Optoelectronics photodiodes are either silicon or quartz. They should be cleaned with isopropyl alcohol and a soft (optical grade) pad.

OBSERVE STORAGE TEMPERATURES AND HUMIDITY LEVELS

Photodiode exposure to extreme high or low storage temperatures can affect the subsequent performance of a silicon photodiode. Storage temperature guidelines are presented in the photodiode performance specifications of this catalog. Please maintain a non-condensing environment for optimum performance and lifetime.

OBSERVE ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

OSI Optoelectronics photodiodes, especially with IC devices (e.g. Photops) are considered ESD sensitive. The photodiodes are shipped in ESD protective packaging. When unpacking and using these products, anti-ESD precautions should be observed.

DO NOT EXPOSE PHOTODIODES TO HARSH CHEMICALS

Photodiode packages and/or operation may be impaired if exposed to CHLOROTHENE, THINNER, ACETONE, or TRICHLOROETHYLENE.

INSTALL WITH CARE

Most photodiodes in this catalog are provided with wire or pin leads for installation in circuit boards or sockets. Observe the soldering temperatures and conditions specified below:

Soldering Iron:	Soldering 30 W or less Temperature at tip of iron 300°C or lower.	
Dip Soldering:	Bath Temperature: Immersion Time: Soldering Time:	260±5°C. within 5 Sec. within 3 Sec.
Vapor Phase Soldering:	DO NOT USE	
Reflow Soldering:	DO NOT USE	

Photodiodes in plastic packages should be given special care. Clear plastic packages are more sensitive to environmental stress than those of black plastic. Storing devices in high humidity can present problems when soldering. Since the rapid heating during soldering stresses the wire bonds and can cause wire to bonding pad separation, it is recommended that devices in plastic packages to be baked for 24 hours at 85°C.

The leads on the photodiode **SHOULD NOT BE FORMED**. If your application requires lead spacing modification, please contact OSI Optoelectronics Applications group at (310)978-0516 before forming a product's leads. Product warranties could be voided.

***Most of our standard catalog products are RoHS Compliant. Please contact us for details**

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Mechanical Drawings

Mechanical Specifications and Die Topography

1. Parameter Definitions:

A = Distance from top of chip to top of glass.
a = Photodiode Anode.
B = Distance from top of glass to bottom of case.
c = Photodiode Cathode
(Note: cathode is common to case in metal package products unless otherwise noted).
W = Window Diameter.
F.O.V. = Filed of View (see definition below).

2. Dimensions are in inches (1 inch = 25.4 mm).

3. Pin diameters are 0.018 ± 0.002" unless otherwise specified.

4. Tolerances (unless otherwise noted)

General: 0.XX ±0.01"
0.XXX ±0.005"
Chip Centering: ±0.010"
Dimension 'A': ±0.015"

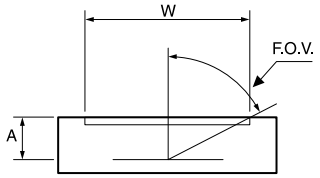
5. Windows

All **'UV'** Enhanced products are provided with QUARTZ glass windows, 0.027 ± 0.002" thick.

All **'XUV'** products are provided with removable windows.

All **'DLS'** PSD products are provided with A/R coated glass windows.

All **'FIL'** photoconductive and photovoltaic products are epoxy filled instead of glass windows.



$$F.O.V. = \tan^{-1}\left(\frac{W}{2A}\right)$$

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beyond borders

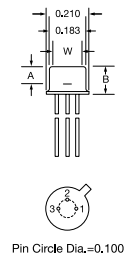
Mechanical Specifications

All units in inches. Pinouts are bottom view.

1 TO-18

Products:

PIN-020A
PIN-040A
PIN-040-DP/SB

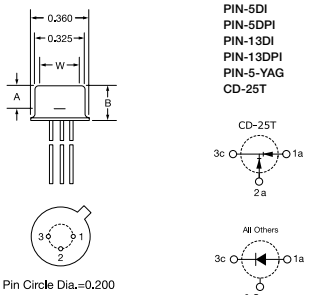


P/N	A	B	W
PIN-020A	0.075	0.200	0.155
PIN-040A	0.075	0.200	0.155

2 TO-5

Products:

PIN-5DI
PIN-5DPI
PIN-13DI
PIN-13DPI
PIN-5-YAG
CD-25T

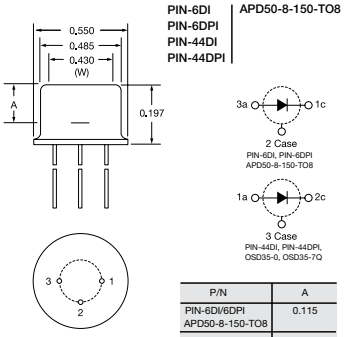


P/N	A	B	W
All Others	0.094	0.180	0.240
CD-25T	0.050	0.130	0.23

3 TO-8

Products:

PIN-6DI
PIN-6DPI
PIN-44DI
PIN-44DPI
APD50-8-150-TO8

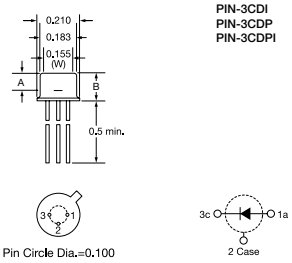


P/N	A
PIN-6DI/6DPI APD50-8-150-TO8	0.115
PIN-44DI/44DPI	0.125
OSD35-0	0.130

4 TO-18

Products:

PIN-2DI
PIN-2DPI
PIN-3CDI
PIN-3CDP
PIN-3CDPI



A	B
0.070	0.200
0.090	0.150

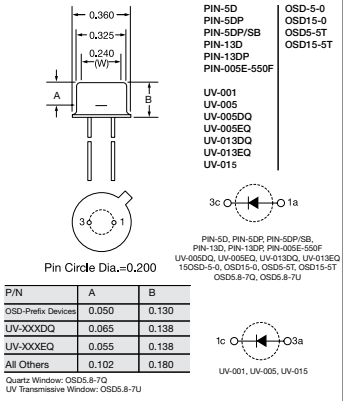
5 TO-5

Products:

PIN-5D
PIN-5DP
PIN-5DP/SB
PIN-13D
PIN-13DP
PIN-005E-550F

UV-001
UV-005
UV-005DQ
UV-005EQ
UV-013DQ
UV-013EQ
UV-015

OSD-5-0
OSD15-0
OSD5-5T
OSD15-5T



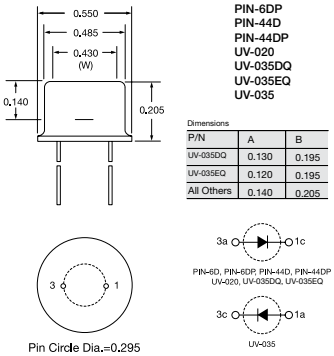
P/N	A	B
OSD-Prefix Devices	0.050	0.130
UV-XXXDQ	0.065	0.138
UV-XXXEQ	0.055	0.138
All Others	0.102	0.180

Quartz Window: OSD5.8-7Q
UV Transmissive Window: OSD5.8-7U

6 TO-8

Products:

PIN-6D
PIN-6DP
PIN-44D
PIN-44DP
UV-020
UV-035DQ
UV-035EQ
UV-035



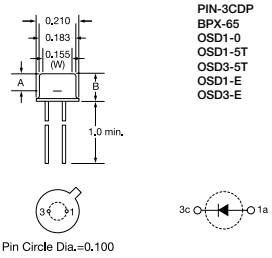
Dimensions

P/N	A	B
UV-035DQ	0.130	0.195
UV-035EQ	0.120	0.195
All Others	0.140	0.205

7 TO-18

Products:

PIN-3CD
PIN-3CDP
BPX-65
OSD1-0
OSD1-5T
OSD3-5T
OSD1-E
OSD3-E



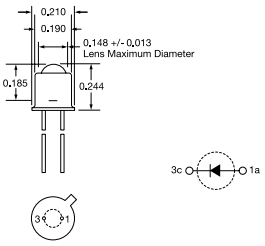
P/N	A	B
PIN-3CD / 3CDP	0.087	0.146
BPX-65	0.075	0.200
OSD-Prefix Devices	0.080	0.200

Quartz Window: OSD1.2-7Q
UV Transmissive Window: OSD1.2-7U

8 TO-18

Products:

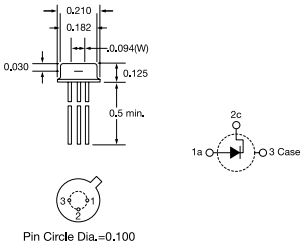
PIN-125DPL



9 TO-18

Products:

PIN-HR005
PIN-HR008
PIN-HR020
PIN-HR026
PIN-HR040

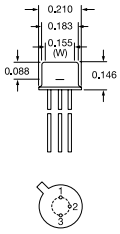


Mechanical Specifications

All units in inches. Pinouts are bottom view.

40 TO-18

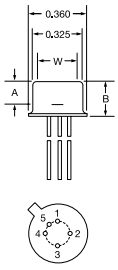
Products:
SPOT-2DMI



Pin Circle Dia.=0.100

41 TO-5

Products:
SC-4D
SL3-1
SPOT-2D
SPOT-3D
SPOT-4D
SPOT-4DMI
QD7-0



Pin Circle Dia.=0.200

Dimensions

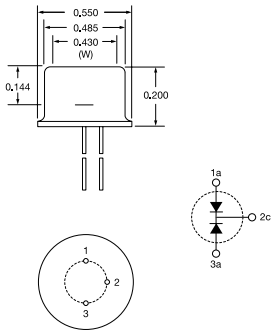
P/N	A	B	W
SC-4D	0.071	0.142	0.240
SL3-1	0.106	0.195	0.217
SPOT-2D	0.063	0.114	0.240
SPOT-3D	0.104	0.138	0.240
SPOT-4D	0.063	0.142	0.240
SPOT-4DMI	0.063	0.142	0.240
SPOT-4DUV	0.063	0.142	0.240
QD7-0	0.050	0.130	0.230

Pinouts

P/N	1	2	3	4	5
SC-4D	c	c	c	c	a
SL3-1	a	c	a	--	--
SPOT-2D	a	c	a	--	--
SPOT-3D	a	c	a	--	--
SPOT-4D	a	a	a	a	c
SPOT-4DMI	a	a	a	a	c
SPOT-4DUV	a	a	a	a	c
QD7-0	a	a	a	a	c

42 TO-8

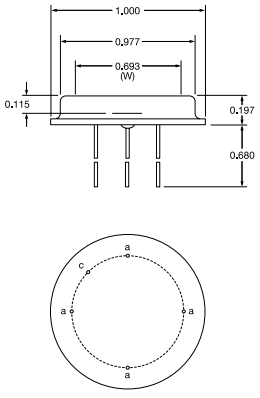
Products:
SL5-1



Pin Circle Dia.=0.300

43 Low Profile

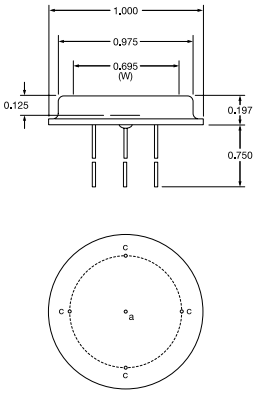
Products:
SPOT-9D
SPOT-9DMI



Pin Circle Dia.=0.730

44 Special

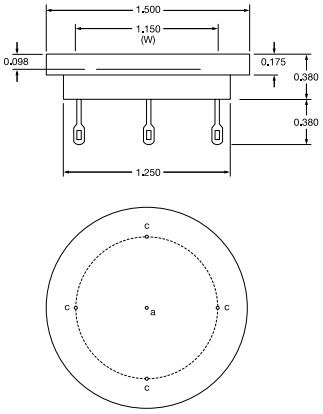
Products:
SC-10D



Pin Circle Dia.=0.730

45 Special

Products:
SC-25D



Pin Circle Dia.=0.950