

Tetra-Lateral PSD's

Position Sensing Detectors (PSD)

Tetra-lateral position sensing detectors are manufactured with one single resistive layer for both one and two dimensional measurements. They feature a common anode and two cathodes for one dimensional position sensing or four cathodes for two dimensional position sensing.

These detectors are best when used in applications that require measurement over a wide spacial range. They offer high response uniformity, low dark current, and good position linearity over 64% of the sensing area.

A reverse bias should be applied to these detectors to achieve optimum current linearity when large light signals are present. The circuit on the opposite page represents a typical circuit set up for two dimensional tetra-lateral PSDs.

For further details as well as the set up for one dimensional PSDs refer to the "Photodiode Characteristics" section of the catalog. Note that the maximum recommended incident power density is $10 \text{ mW} / \text{cm}^2$. Furthermore, typical uniformity of response for a $1 \text{ mm } \phi$ spot size is $\pm 5\%$ for SC-25D and SC-50D and $\pm 2\%$ for all other tetra-lateral devices.



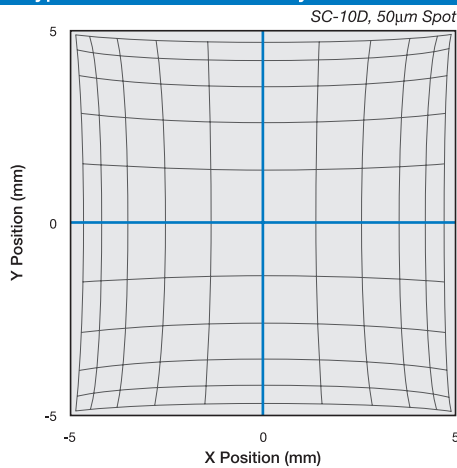
APPLICATIONS

- Tool Alignment and Control
- Leveling Measurements
- Angular Measurements
- 3 Dimensional Vision
- Position Measuring

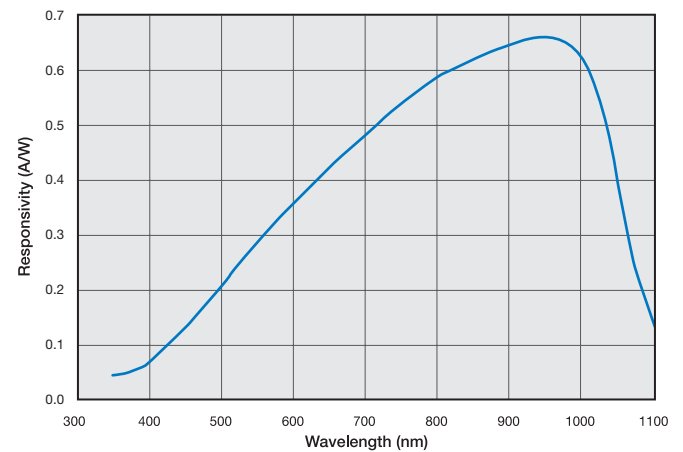
FEATURES

- Single Resistivity Layer
- High Speed Response
- High Dynamic Range
- Very High Resolution
- Spot Size & Shape Independence

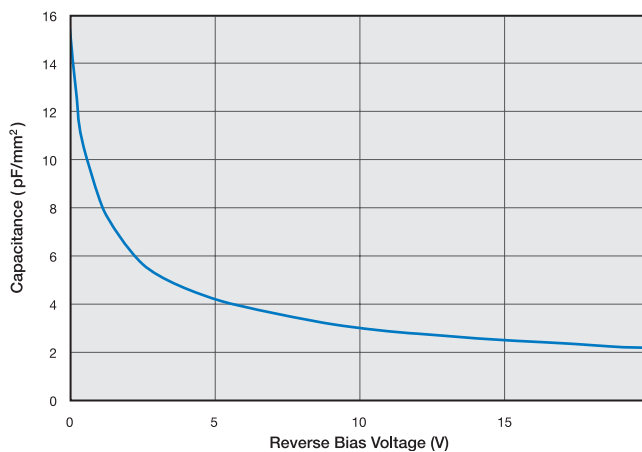
Typical Position Detectability



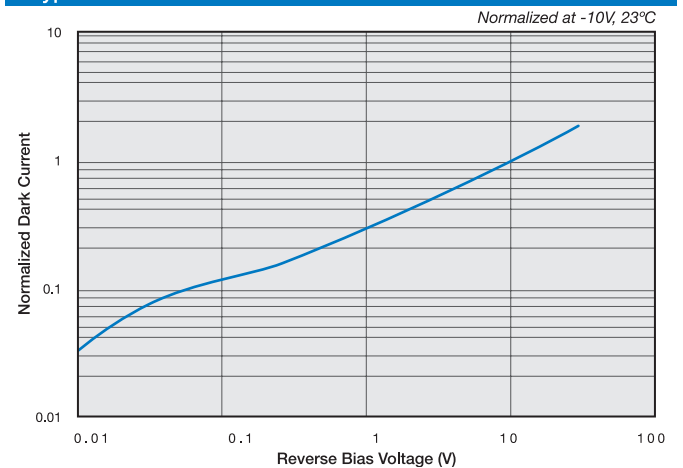
Typical Spectral Response



Typical Capacitance vs. Reverse Bias Voltage



Typical Dark Current vs. Reverse Bias



Tetra-Lateral Position Sensors

Typical Electro-Optical Specifications at $T_A=23^\circ\text{C}$

Model Number	Position Sensing Area		Responsivity (A/W)		Absolute Position Detection Error (mm)	Dark Current (μA)		Capacitance (pF)	Rise Time \dagger (μs)	Inter-electrode Resistance ($\text{k}\Omega$)		Temp.* Range ($^\circ\text{C}$)		Package Style \ddagger
	Area (mm^2)	Dimension (mm)	670 nm		Over 80% of Length 64% of Area	-15 V		-15 V	-15 V 670 nm 50 Ω	min.	max.	Operating	Storage	
			min.	typ.		typ.	typ.							

One-Dimensional Series, Plastic Package

Model	Area (mm^2)	Dimension (mm)	min. Responsivity	typ. Responsivity	typ. Error	typ. Dark Current	max. Dark Current	typ. Capacitance	typ. Rise Time	min. Int. Res.	max. Int. Res.	Operating Temp. Range	Storage Temp. Range	Package Style
LSC-5D	11.5	5.3 x 2.2	0.35	0.42	0.040	0.01	0.10	50	0.25	2	50	$-10 \sim +60$	$-20 \sim +70$	47 / Plastic
LSC-30D	122	30 x 4.1			0.240	0.025	0.250	300	3.00	4	100			46 / Plastic

Two-Dimensional Series, Metal Package

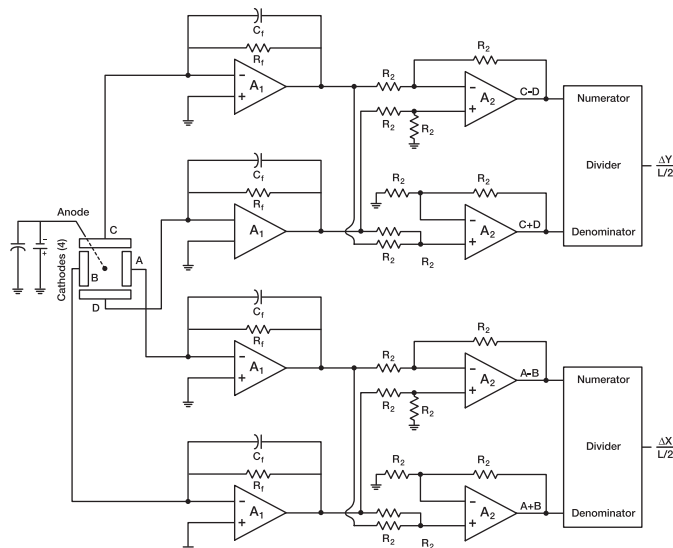
Model	Area (mm^2)	Dimension (mm)	min. Responsivity	typ. Responsivity	typ. Error	typ. Dark Current	max. Dark Current	typ. Capacitance	typ. Rise Time	min. Int. Res.	max. Int. Res.	Operating Temp. Range	Storage Temp. Range	Package Style
SC-4D	6.45	2.54 sq	0.35	0.42	0.080	0.005	0.050	20	0.66	3	30	$0 \sim +70$	$-20 \sim +80$	41 / TO-5
SC-10D	103	10.16 sq			1.30	0.025	0.250	300	1.00					44 / Special
SC-25D	350	18.80 sq			2.5	0.10	1.0	1625	5.00					45 / Special
SC-50D	957	30.94 sq			5.0	0.25	2.5	3900	13.00					21 / Special

Two Dimensional Series, Plastic Package \S

Model	Area (mm^2)	Dimension (mm)	min. Responsivity	typ. Responsivity	typ. Error	typ. Dark Current	max. Dark Current	typ. Capacitance	typ. Rise Time	min. Int. Res.	max. Int. Res.	Operating Temp. Range	Storage Temp. Range	Package Style
FIL-C4DG	6.45	2.54 sq	0.35	0.42	0.080	0.005	0.050	20	0.66	3	30	$-10 \sim +60$	$-20 \sim +70$	14 / Plastic
FIL-C10DG	103	10.16 sq			1.30	0.025	0.250	300	1.00					15 / Plastic

\dagger Rise time specifications are with a 1 mm spot size at the center of the device.
 \S The photodiode chips in "FIL" series are isolated in a low profile plastic package. They have a large field of view as well as "in line" pins.
 \ddagger For mechanical drawings please refer to pages 58 thru 69.
 * Non-Condensing temperature and Storage Range, Non-Condensing Environment.

Chip centering within $\pm 0.010"$.



For further details, refer to the "Photodiode Characteristics" section of the catalog.

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. = Field 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"

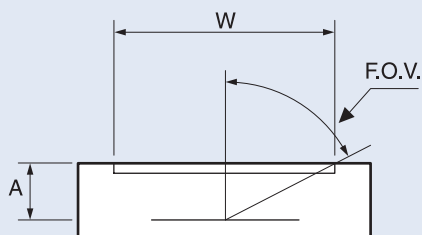
5. Windows

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.



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



For Further Assistance
Please Call One of Our Experienced
Sales and Applications Engineers

310-978-0516



- Or -
On the Internet at

www.osioptoelectronics.com

All units in inches. Pinouts are bottom view.

Low Profile

Products:
 PIN-10DI
 PIN-10DPI
 PIN-10DPI/SB
 UV-50L
 UV-100L

Pin Circle Dia.=0.73

BNC

Products:
 PIN-10D
 PIN-10DP
 PIN-10DP/SB
 UV-50
 UV-100

Outer Contact — Anode	PIN-10D, PIN-10DP, PIN-10DP/SB
Outer Contact — Cathode	UV-50, UV-100

BNC

Products:
 PIN-25D
 PIN-25DP

Outer Contact — Anode

Special BNC

Products:
 PIN-10AP
 PIN-10DF

P/N	A	B	C
PIN-10DF	0.217	0.330	1.020
PIN-10AP	0.386	0.550	1.415

Special Plastic

Products:
 FIL-5C
 FIL-20C
 FIL-UV20
 FIL-C4DG

P/N	A	B
FIL-5C FIL-20C	0.060	0.130
FIL-UV005 FIL-UV20 FIL-C4DG	0.087	0.152

P/N	1	2	3	4	5	6
FIL-5C FIL-20C FIL-UV005	a	-	c	a	-	c
FIL-UV20	c	-	a	c	-	a
FIL-C4DG	c	a	c	c	a	c

Special Plastic

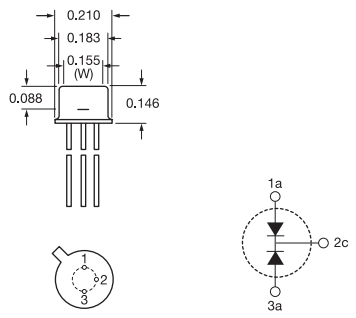
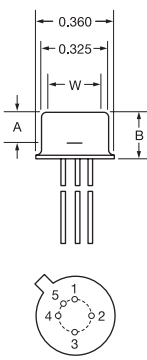
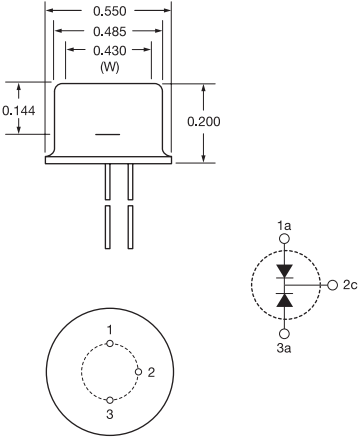
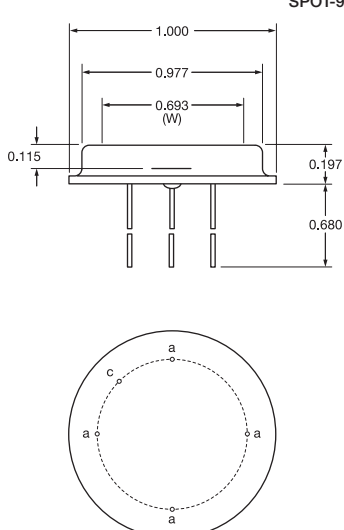
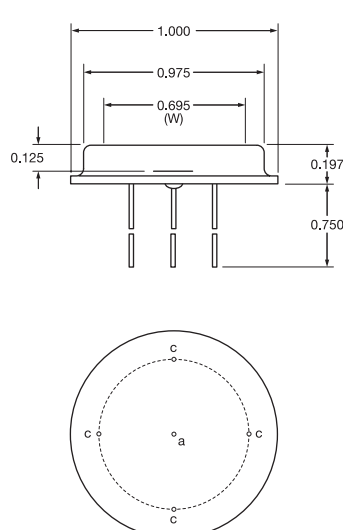
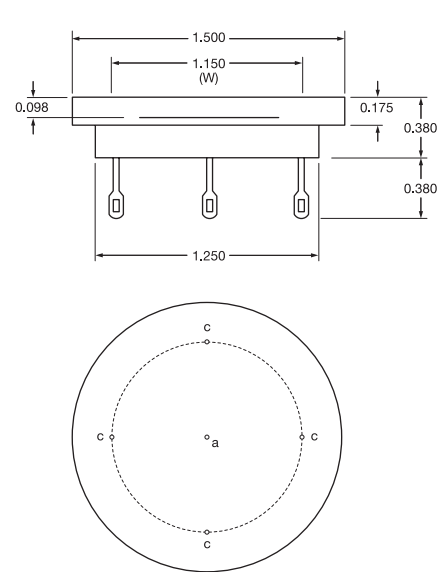
Products:
 FIL-44C
 FIL-100C
 FIL-UV50
 FIL-UV100
 FIL-C10DG

P/N	A	B
FIL-44C FIL-100C	0.052	0.130
FIL-UV50 FIL-UV100 FIL-C10DG	0.090	0.155

P/N	1	2	3	4	5	6	7	8
FIL-44C FIL-100C	a	-	-	c	a	-	-	c
FIL-UV50 FIL-UV100	c	-	-	a	c	-	-	a
FIL-C10DG	c	a	a	c	c	a	a	c

Mechanical Specifications

All units in inches. Pinouts are bottom view.

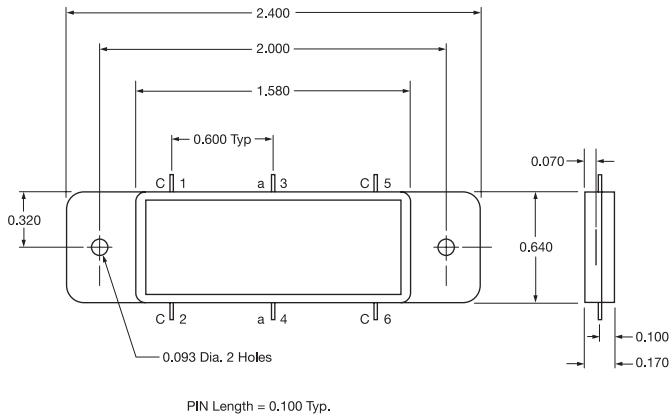
40 TO-18	41 TO-5	42 TO-8																																																																																										
Products:	Products:	Products:																																																																																										
<p data-bbox="430 247 519 268">SPOT-2DMI</p>  <p data-bbox="194 651 349 672">Pin Circle Dia.=0.100</p>	<p data-bbox="909 247 998 420">SC-4D SL3-1 SPOT-2D SPOT-3D SPOT-4D SPOT-4DMI SPOT-4DUV QD7-0</p>  <p data-bbox="649 630 803 651">Pin Circle Dia.=0.200</p> <table border="1" data-bbox="592 682 1031 913"> <caption>Dimensions</caption> <thead> <tr> <th>P/N</th> <th>A</th> <th>B</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>SC-4D</td> <td>0.071</td> <td>0.142</td> <td>0.240</td> </tr> <tr> <td>SL3-1</td> <td>0.106</td> <td>0.195</td> <td>0.217</td> </tr> <tr> <td>SPOT-2D</td> <td>0.063</td> <td>0.114</td> <td>0.240</td> </tr> <tr> <td>SPOT-3D</td> <td>0.104</td> <td>0.138</td> <td>0.240</td> </tr> <tr> <td>SPOT-4D</td> <td>0.063</td> <td>0.142</td> <td>0.240</td> </tr> <tr> <td>SPOT-4DMI</td> <td>0.063</td> <td>0.142</td> <td>0.240</td> </tr> <tr> <td>SPOT-4DUV</td> <td>0.063</td> <td>0.142</td> <td>0.240</td> </tr> <tr> <td>QD7-0</td> <td>0.050</td> <td>0.130</td> <td>0.230</td> </tr> </tbody> </table> <table border="1" data-bbox="592 934 1031 1176"> <caption>Pinouts</caption> <thead> <tr> <th>P/N</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>SC-4D</td> <td>c</td> <td>c</td> <td>c</td> <td>c</td> <td>a</td> </tr> <tr> <td>SL3-1</td> <td>a</td> <td>c</td> <td>a</td> <td>--</td> <td>--</td> </tr> <tr> <td>SPOT-2D</td> <td>a</td> <td>c</td> <td>a</td> <td>--</td> <td>--</td> </tr> <tr> <td>SPOT-3D</td> <td>a</td> <td>c</td> <td>a</td> <td>--</td> <td>--</td> </tr> <tr> <td>SPOT-4D</td> <td>a</td> <td>a</td> <td>a</td> <td>a</td> <td>c</td> </tr> <tr> <td>SPOT-4DMI</td> <td>a</td> <td>a</td> <td>a</td> <td>a</td> <td>c</td> </tr> <tr> <td>SPOT-4DUV</td> <td>a</td> <td>a</td> <td>a</td> <td>a</td> <td>c</td> </tr> <tr> <td>QD7-0</td> <td>a</td> <td>a</td> <td>a</td> <td>a</td> <td>c</td> </tr> </tbody> </table>	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	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	<p data-bbox="1388 247 1453 268">SL5-1</p>  <p data-bbox="1161 735 1315 756">Pin Circle Dia.=0.300</p>
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QD7-0	a	a	a	a	c																																																																																							
<p data-bbox="105 1207 267 1228">43 Low Profile</p> <p data-bbox="430 1239 519 1312">SPOT-9D SPOT-9DMI</p>  <p data-bbox="235 1858 389 1879">Pin Circle Dia.=0.730</p>	<p data-bbox="584 1207 706 1228">44 Special</p> <p data-bbox="909 1270 982 1291">SC-10D</p>  <p data-bbox="722 1858 876 1879">Pin Circle Dia.=0.730</p>	<p data-bbox="1063 1207 1185 1228">45 Special</p> <p data-bbox="1388 1270 1461 1291">SC-25D</p>  <p data-bbox="1193 1890 1347 1911">Pin Circle Dia.=0.950</p>																																																																																										

All units in inches.

46 Plastic

Products:

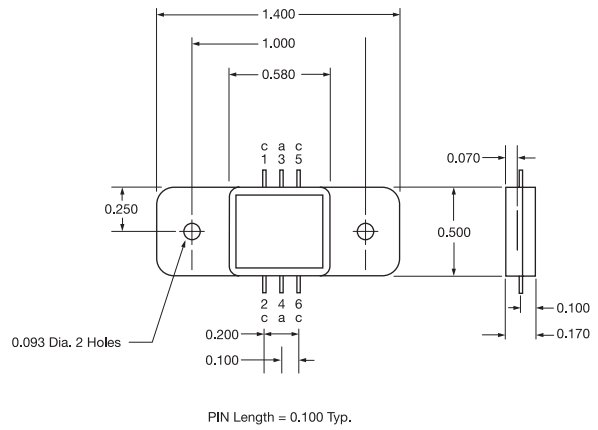
LSC-30D



47 Plastic

Products:

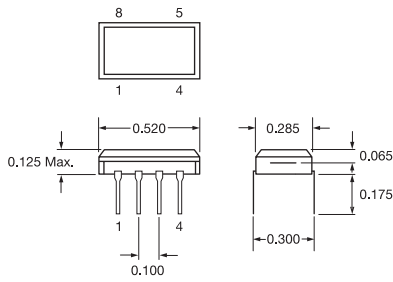
LSC-5D



48 8-PIN DIP

Products:

SL3-2
SL5-2



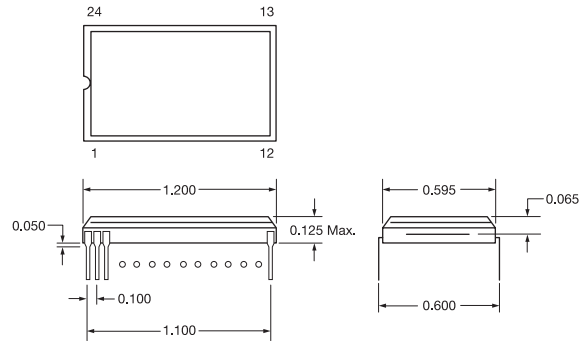
Pinouts

2, 7	Anode 1
1, 4, 5, 8	Common Cathode
3, 6	Anode 2

49 24-PIN DIP

Products:

SL-15



Pinouts

11	Anode 1
12, 24	Common Cathode
23	Anode 2
All Other Pins NOT CONNECTED	

PIN Length = 0.225 Typ.
PIN Thickness = 0.010 Typ.

50 Special

Products:

SL76-1

