

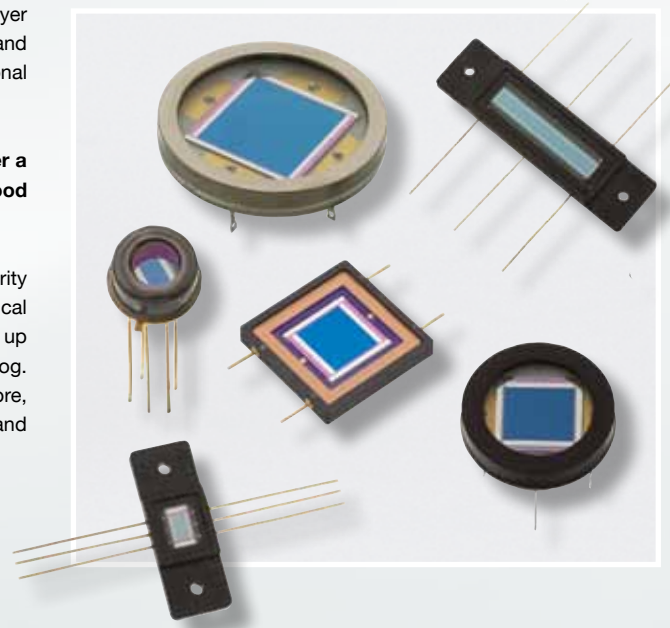
Tetra-Lateral PSD's

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 mW / cm². Furthermore, typical uniformity of response for a 1 mm ϕ spot size is $\pm 5\%$ for SC-25D and SC-50D and $\pm 2\%$ for all other tetra-lateral devices.

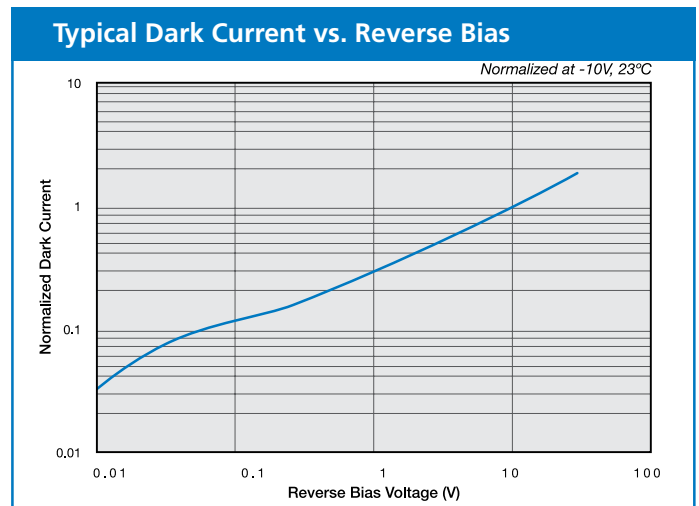
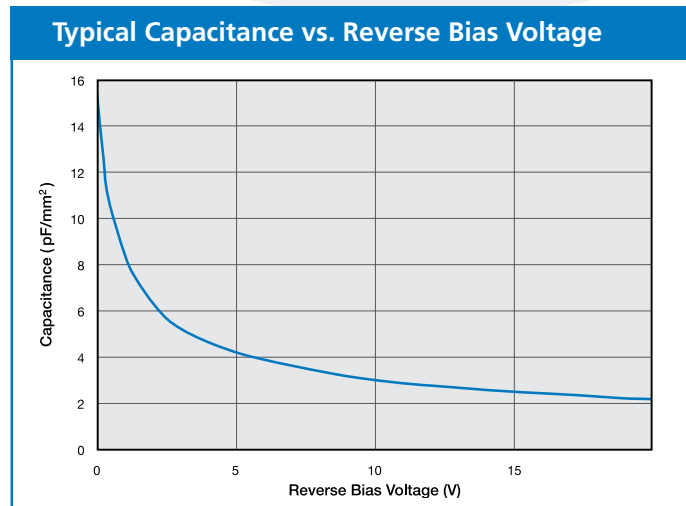
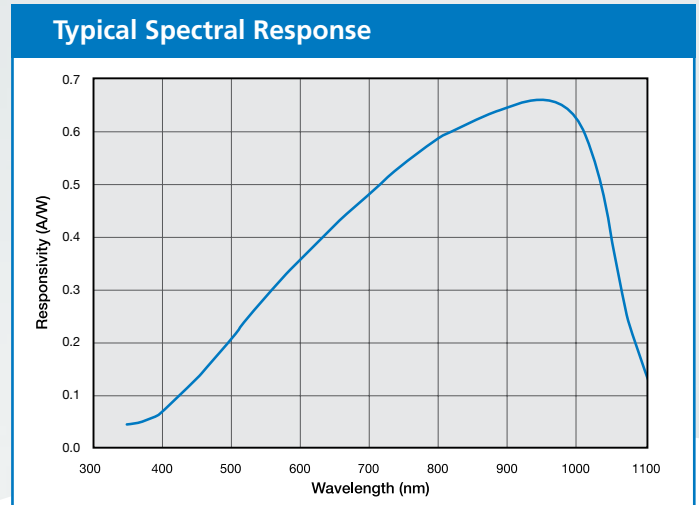
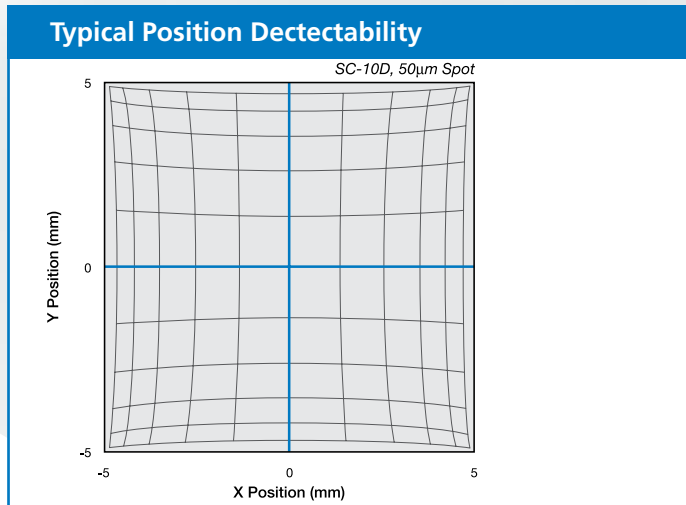


APPLICATIONS

- 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



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) | Dimensions (mm) | 670 nm | | Over 80% of Length 64% of Area | -15 V | | -15 V | -15 V 670 nm 50 Ω | Inter-electrode Resistance ($\text{k}\Omega$) | | Operating | Storage | |
| | | | min. | typ. | typ. | typ. | max. | typ. | min. | max. | | | | |

One-Dimensional Series, Plastic Package

| Model | Area (mm^2) | Dimensions (mm) | Responsivity (min) | Responsivity (typ) | Absolute Error (typ) | Dark Current (typ) | Dark Current (max) | Capacitance (typ) | Rise Time (typ) | Inter-electrode Resistance (min) | Inter-electrode Resistance (max) | Operating Temp Range | Storage Temp Range | Package Style |
|---------------------|------------------------|-----------------|--------------------|--------------------|----------------------|--------------------|--------------------|-------------------|-----------------|----------------------------------|----------------------------------|----------------------|--------------------|---------------|
| LSC-5D \llcorner | 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 \llcorner | 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) | Dimensions (mm) | Responsivity (min) | Responsivity (typ) | Absolute Error (typ) | Dark Current (typ) | Dark Current (max) | Capacitance (typ) | Rise Time (typ) | Inter-electrode Resistance (min) | Inter-electrode Resistance (max) | 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 2q | | | 5.0 | 0.25 | 2.5 | 3900 | 5.00 | | | | | 21 / Special |

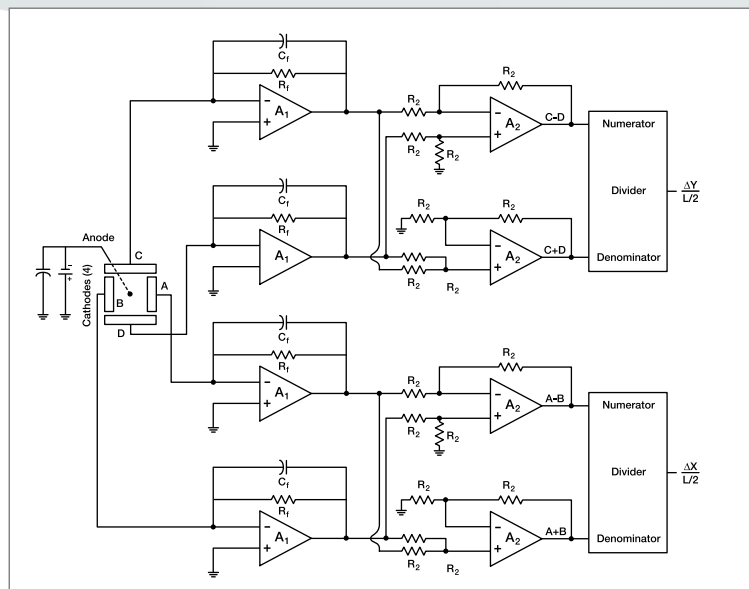
\dagger Rise time specifications are with a 1 mm ϕ spot size at the center of the device.

\ddagger For mechanical drawings please refer to pages 61 thru 73.

* Non-Condensing temperature and Storage Range, Non-Condensing Environment.

Chip centering within $\pm 0.010^\circ$.

\llcorner Minimum order quantities apply



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

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: 260±5°C. Immersion Time: within 5 Sec. Soldering Time: 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

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: $0.XX \pm 0.01$ "

$0.XXX \pm 0.005$ "

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

OSI Optoelectronics
An OSI Systems Company

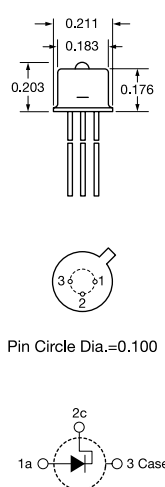

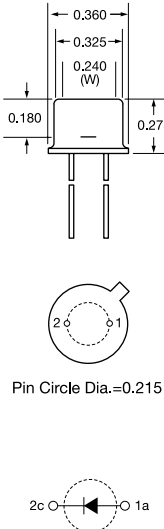
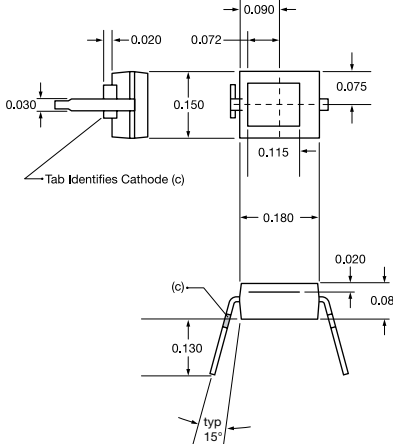
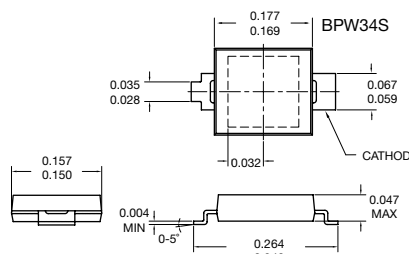
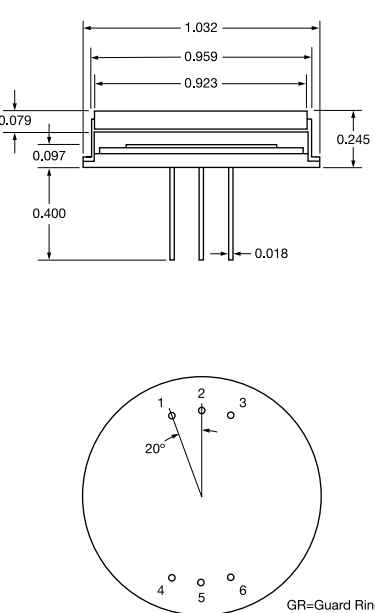
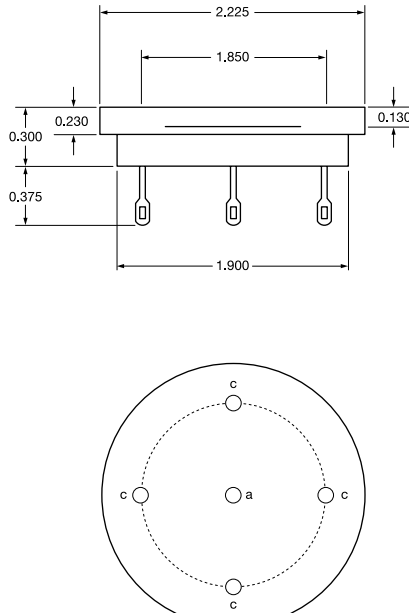
- Or -

visit our website at

www.osioptoelectronics.com

Mechanical Specifications

All units in inches. Pinouts are bottom view.

| 16 TO-18 Lensed Cap | 17 TO-5 | 18 TO-5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|----|----|---|----|--|--|-----|---|---|---|---|---|---|-------------|----|----|----|----|---|----|------------|----|----|----|----|---|----|-------------|----|---|----|----|---|----|---|
| <p>Products: PIN-HR005L PIN-HR008L PIN-HR020L PIN-HR026L PIN-HR040L</p>  <p>Pin Circle Dia.=0.100</p> | <p>Products: PIN-DSS PIN-DSIn</p>  <p>Pin Circle Dia.=0.220</p> | <p>Products: PIN-005D-245F</p>  <p>Pin Circle Dia.=0.215</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 Plastic Mold | 20 Special Metal | 21 Special Metal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Products: BPW34 BPW34B BPW34S</p>  <p>Tab Identifies Cathode (c)</p>  <p>BPW34S</p> <p>CATHODE</p> | <p>Products: SPOT-15-YAG SPOT-9-YAG PIN-100-YAG</p>  <p>GR=Guard Ring</p> <p>Pin Circle Dia.=0.750</p> <table border="1" data-bbox="584 1848 1023 1953"> <thead> <tr> <th colspan="7">Pinouts</th> </tr> <tr> <th>P/N</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>SPOT-15-YAG</td> <td>C1</td> <td>GR</td> <td>C4</td> <td>C2</td> <td>A</td> <td>C3</td> </tr> <tr> <td>SPOT-9-YAG</td> <td>C1</td> <td>GR</td> <td>C4</td> <td>C2</td> <td>A</td> <td>C3</td> </tr> <tr> <td>PIN-100-YAG</td> <td>--</td> <td>C</td> <td>--</td> <td>--</td> <td>A</td> <td>--</td> </tr> </tbody> </table> | Pinouts | | | | | | | P/N | 1 | 2 | 3 | 4 | 5 | 6 | SPOT-15-YAG | C1 | GR | C4 | C2 | A | C3 | SPOT-9-YAG | C1 | GR | C4 | C2 | A | C3 | PIN-100-YAG | -- | C | -- | -- | A | -- | <p>Products: SC-50D</p>  <p>Pin Circle Dia.=1.110</p> |
| Pinouts | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P/N | 1 | 2 | 3 | 4 | 5 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPOT-15-YAG | C1 | GR | C4 | C2 | A | C3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SPOT-9-YAG | C1 | GR | C4 | C2 | A | C3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PIN-100-YAG | -- | C | -- | -- | A | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Mechanical Specifications

All units in inches. Pinouts are bottom view.

40 TO-18 41 TO-5 42 TO-8

Products:
SPOT-2DMI

Pin Circle Dia.=0.100

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 |

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