

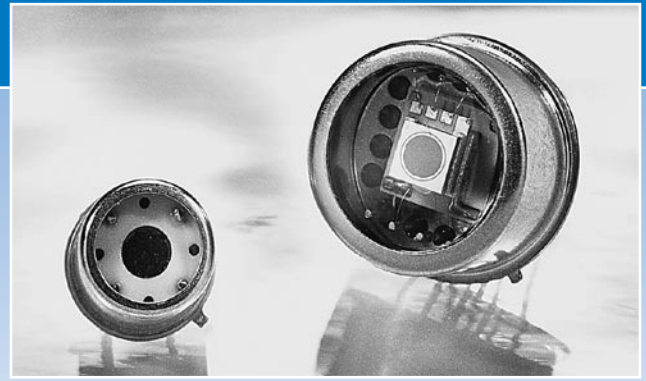
## ■ Dual Sandwich Detector Series

### Two Color Photodiodes

Dual Sandwich Detectors or Two Color Detectors are mostly employed for remote temperature measurements. The temperature is measured by taking the ratio of radiation intensities of two adjacent wavelengths and comparing them with the standard black body radiation curves. The advantages of optical remote measurement have definitely made these devices the perfect match for this type of measurements. They are independent of emissivity and unaffected by contaminants in the field of view or moving targets. In addition, measurements of targets out of the direct line of sight and the ability to function from outside RF/EMI interference or vacuum areas are possible. They also have the advantages of overcoming obstructed target views, blockages from sight tubes, channels or screens, atmospheric smoke, steam, or dust, dirty windows as well as targets smaller than field of view and/or moving within the field of view. These detectors can also be used in applications where wide wavelength range of detection is needed.

OSI Optoelectronics offers three types of dual sandwich detectors. The Silicon-Silicon sandwich, in which one silicon photodiode is placed on top of the other, with the photons of shorter wavelengths absorbed in the top silicon and the photons of longer wavelengths penetrating deeper, absorbed by the bottom photodiode. For applications requiring a wider range of wavelength beyond 1.1  $\mu\text{m}$ , an InGaAs photodiode replaces the bottom photodiode. The Silicon-InGaAs version is also available with a two stage thermo-electric cooler for more accurate measurements by stabilizing the temperature of the InGaAs detector.

All devices are designed for photovoltaic operation (no bias), however, they may be biased if needed, to the maximum reverse voltage specified. They are ideal for coupling to an operational amplifier in the current mode. For further details refer to the "Photodiode Characteristics" section of this catalog.



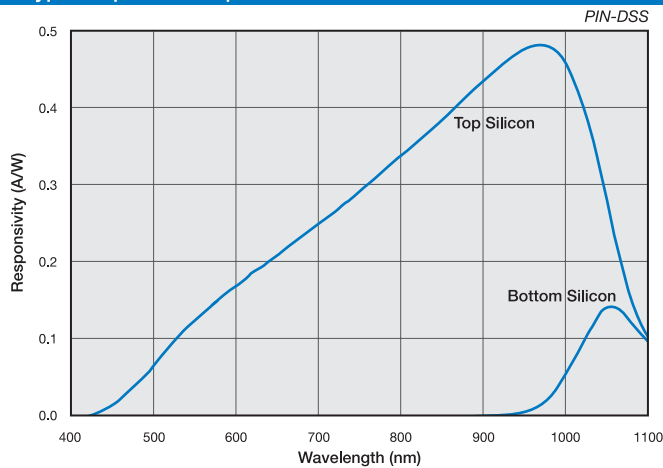
### ■ APPLICATIONS

- Flame Temperature sensing
- Spectrophotometer
- Dual-wavelength detection
- IR Thermometers for Heat Treating, induction heating, and other metal parts processing

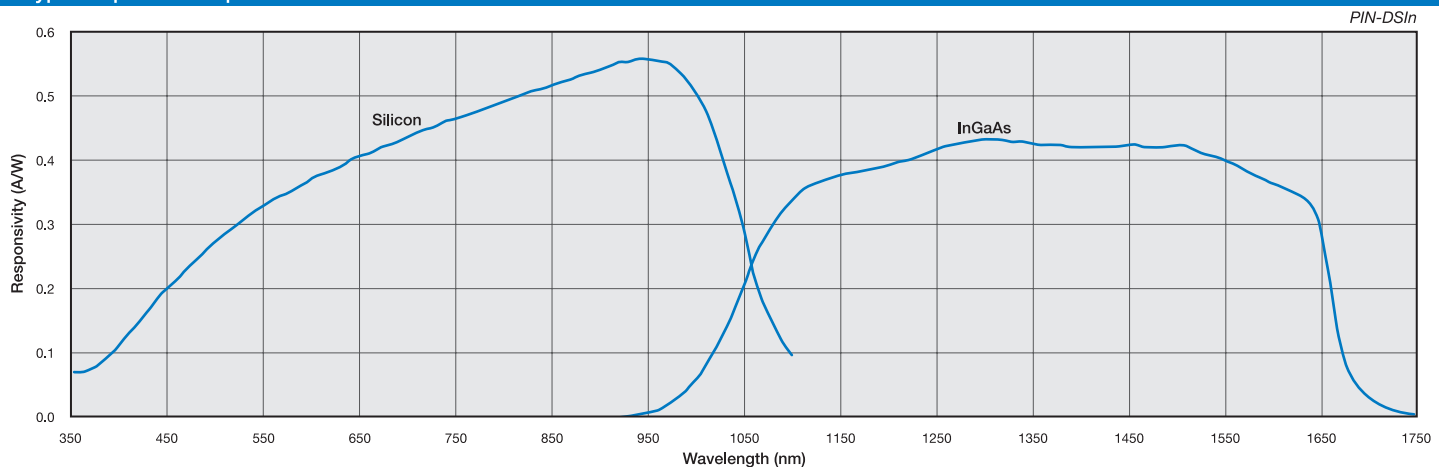
### ■ FEATURES

- Compact
- Hermetically Sealed
- Low Noise
- Wide Wavelength Range
- Remote Measurements
- w/ TEC

### ■ Typical Spectral Response



### ■ Typical Spectral Response



# Dual Sandwich Detector Series

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

Model Number	Detector Element	Active Area	Spectral Range (nm)	Peak Wavelength	Responsivity	Capacitance	Shunt Resistance		NEP	D* @ peak	Reverse Voltage	Rise Time ( $\mu\text{s}$ )	Temp* Range ( $^\circ\text{C}$ )		Package Style ¶
		Dimension (mm)		nm	$\lambda_p$	0 V	-10 mV	0V, $\lambda_p$	0V, $\lambda_p$	V	0 V 50 $\Omega$ $\lambda_p$	Operating	Storage		
					A/W	pF	M $\Omega$	(W/ $\sqrt{\text{Hz}}$ )	( $\text{cm}\sqrt{\text{Hz/W}}$ )						
				typ.	typ.	typ.	min.	typ.	typ.	typ.	max.	typ.			
<b>Non-Cooled</b>															
PIN-DSS	Si (top)	2.54 $\phi$	400-1100	950	0.45	70	50	500	1.3 e -14	1.7 e +13	5	10	-40 ~ +100	-55 ~ +125	17 / TO-5
	Si		950-1100	1060	0.12				4.8 e -14	4.7 e +12		150			
PIN-DSIn	Si (top)	2.54 $\phi$	400-1100	950	0.55 §	450	150	1.9 e -14 §	1.2 e +13 §	5	4				
	InGaAs	1.50 $\phi$	1000-1800	1300	0.60	300	1.0	2.1 e -13	8.4 e +11	2	4				
<b>Two Stage Thermoelectrically Cooled †</b>															
PIN-DSIn-TEC	Si (top)	2.54 $\phi$	400-1100	950	0.55 §	450	150	1.9 e -14 §	1.2 e +13 §	5	4	-40 ~ +100	-55 ~ +125	24 / TO-8	
	InGaAs	1.5 $\phi$	1000-1800	1300	0.60	300	1.0	2.1 e -13	8.4 e +11	2	4				

§ @ 870 nm

† Thermo-Electric Cooler and Thermistor Specifications are specified in the tables below.

¶ For mechanical drawings please refer to pages 58 thru 69.

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

## Thermistor Specifications

PARAMETER	CONDITION	SPECIFICATION
Temperature Range	---	-100 $^\circ\text{C}$ to +100 $^\circ\text{C}$
Nominal Resistance	---	1.25 KW @ 25 $^\circ\text{C}$
Accuracy	-100 $^\circ\text{C}$ to -25 $^\circ\text{C}$	$\pm 6.5$ $^\circ\text{C}$
	-25 $^\circ\text{C}$ to +50 $^\circ\text{C}$	$\pm 3.5$ $^\circ\text{C}$
	@ 25 $^\circ\text{C}$	$\pm 1.5$ $^\circ\text{C}$
	+50 $^\circ\text{C}$ to +100 $^\circ\text{C}$	$\pm 6.7$ $^\circ\text{C}$

## Two Stage Thermo-electric Cooler Specifications

PARAMETER	SYMBOL	CONDITION	SPECIFICATION
Maximum Achievable Temperature Difference	$\Delta T_{\text{MAX}}$ ( $^\circ\text{C}$ )	I = $I_{\text{MAX}}$ QC = 0	Vacuum
		Dry N2	83
Maximum Amount Of Heat Absorbed At The Cold Face	$Q_{\text{MAX}}$ (W)	I = $I_{\text{MAX}}$ , $\Delta T = 0$	0.92
Input Current Resulting In Greatest $\Delta T_{\text{MAX}}$	$I_{\text{MAX}}$ (A)	---	1.4
Voltage At $\Delta T_{\text{MAX}}$	$V_{\text{MAX}}$ (V)	---	2.0

## 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"

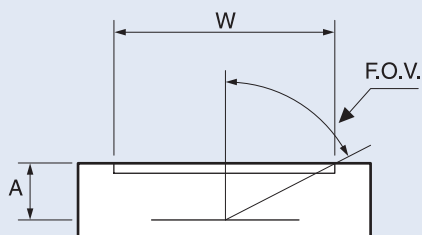
## 5. Windows

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**

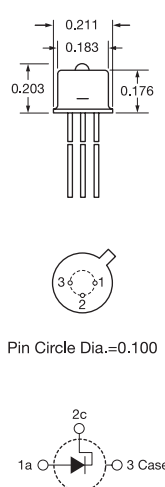

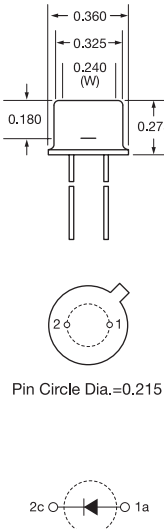
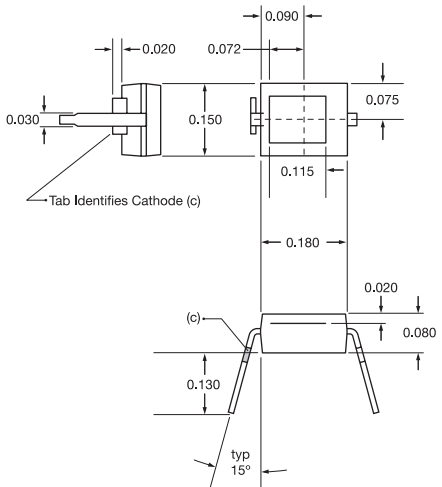
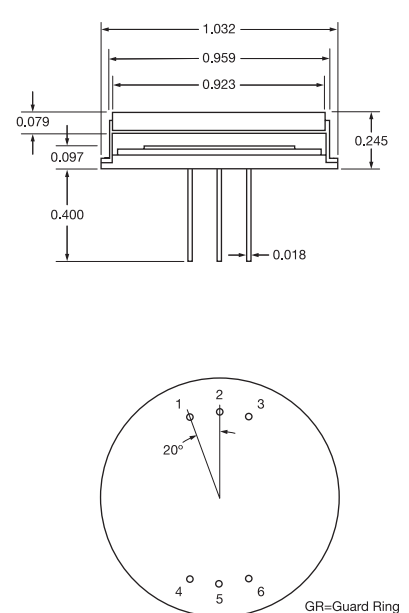
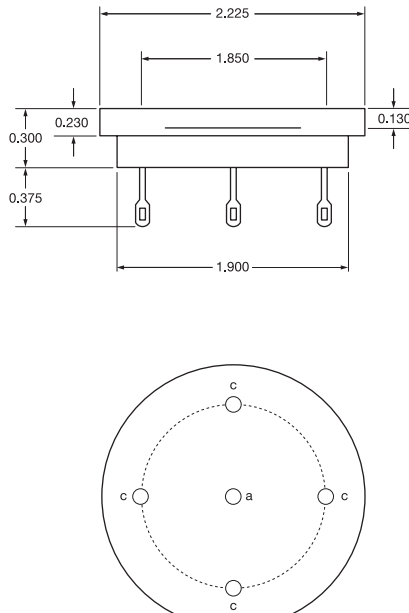


- Or -  
On the Internet at

[www.osioptoelectronics.com](http://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><b>Products:</b></p> <p>PIN-HR005L PIN-HR008L PIN-HR020L PIN-HR026L PIN-HR040L</p>  <p>Pin Circle Dia.=0.100</p>	<p><b>Products:</b></p> <p>PIN-DSS PIN-DSIn</p>  <p>Pin Circle Dia.=0.220</p> <p>Bottom Diode Top Diode PIN-DSS</p> <p>Bottom Diode Top Diode PIN-DSIn</p>	<p><b>Products:</b></p> <p>PIN-005D-245F</p>  <p>Pin Circle Dia.=0.215</p>																												
19 Plastic Mold	20 Special Metal	21 Special Metal																												
<p><b>Products:</b></p> <p>BPW34 BPW34B</p>  <p>Tab Identifies Cathode (c)</p>	<p><b>Products:</b></p> <p>SPOT-15-YAG SPOT-9-YAG PIN-100-YAG</p>  <p>Pin Circle Dia.=0.750</p> <p>GR=Guard Ring</p> <p><b>Pinouts</b></p> <table border="1" data-bbox="584 1869 1023 1963"> <thead> <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>	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><b>Products:</b></p> <p>SC-50D</p>  <p>Pin Circle Dia.=1.110</p>
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	--																								

All units in inches. Pinouts are bottom view.

**22 TO-5**

Products:  
XUV-005

Pin Circle Dia.=0.200

**23 TO-8**

Products:  
XUV-020  
XUV-035

Pin Circle Dia.=0.295

**24 TO-8**

Products:  
PIN-DSIn-TEC

Pinout

1	TEC (-)
2	Thermistor
3	Thermistor
4	TEC (+)
5	Bottom InGaAs, Cathode
6	Bottom InGaAs, Anode
7	Top Silicon, Anode
8	Top Silicon, Cathode

**25 Special Ceramic / Plastic**

Products:  
RD-100  
RD-100A  
UV-35P  
UV-005EC  
UV-035EC  
UV-100EC  
UV-005DC  
UV-035DC  
UV-100DC  
XUV-50C  
XUV-100C  
OSD35-7CO  
OSD35-LR-A  
OSD35-LR-D

Notch Indicates Anode Pin

Dimensions				
P/N	A	B	C	D
UV-005EC	0.400	0.350	0.030	0.280
UV-035EC	0.400	0.350	0.030	0.290
UV-100EC	0.650	0.590	0.048	0.500
UV-005DC	0.400	0.350	0.030	0.280
UV-035DC	0.400	0.350	0.030	0.290
UV-100DC	0.650	0.590	0.053	0.500
XUV-50C	0.650	0.590	0.027	0.490
XUV-100C	0.650	0.590	0.027	0.490
RD-100	0.650	0.590	0.027	0.490
RD-100A	0.650	0.590	0.027	0.490
UV-35P	0.390	0.345	0.050	0.275
OSD35-7CO	0.390	0.350	---	0.290
OSD35-LR-A	0.390	0.350	---	0.290
OSD35-LR-D	0.390	0.350	---	0.290

Note: OSD35-prefix packages come with 0.31" (min.) leads

**26 TO-8**

Products:  
PIN-RD07  
PIN-RD15

Pin Circle Dia.=0.295

**27 Special Plastic**

Products:  
PIN-220D  
PIN-220DP  
PIN-220DP/SB

Pin Diameter=0.040

**28 BNC**

Products:  
XUV-100

BNC Connector  
Outer Contact = Cathode