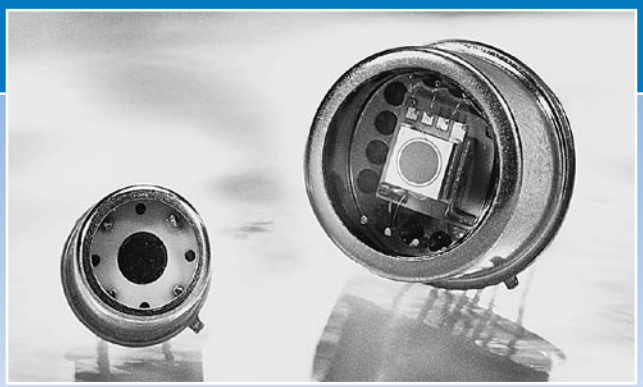
Dual Sandwich Detector Series

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.

APPLICATIONS

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

FEATURES

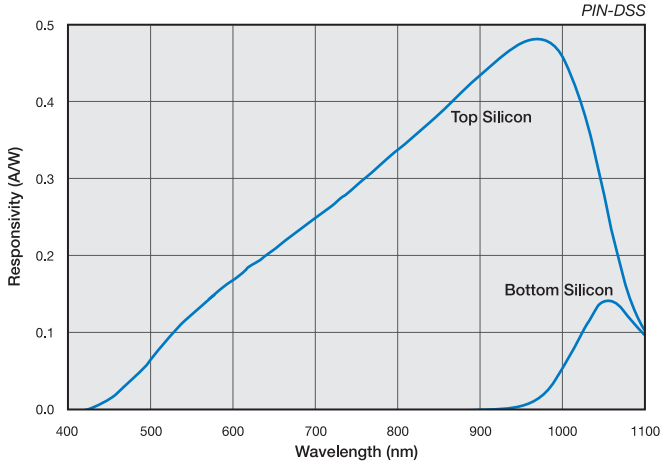
- Compact
- Hermetically Sealed
- Low Noise
- Wide Wavelength Range
- Remote Measurements
- w/ TEC

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 µm, 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.

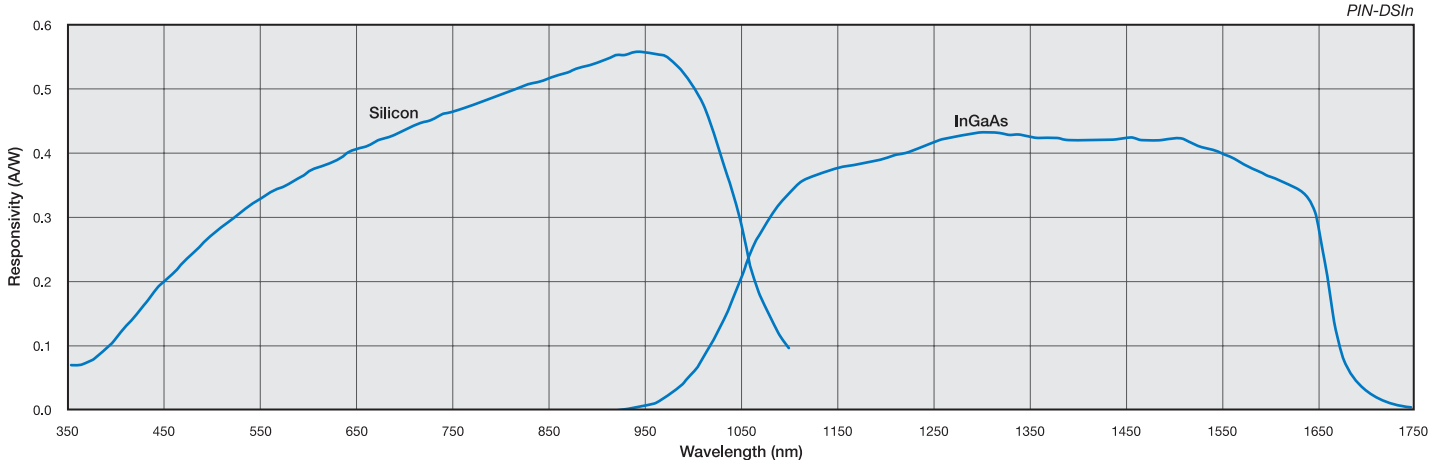
Typical Spectral Response

PIN-DSS



Typical Spectral Response

PIN-DSIn



Dual Sandwich Detector Series

Typical Electro-Optical Specifications at T_A=23°C

Model Number	Detector Element	Active Area	Spectral Range (nm)	Peak Wavelength	Responsivity	Capacitance	Shunt Resistance		NEP	D* @ peak	Reverse Voltage	Rise Time (µs)	Temp* Range (°C)		PackageStyle ¶
		Dimension (mm)		nm	λ_P	0 V	-10 mV		0V, λ_P	0V, λ_P	V	0 V 50 Ω λ_P	Operating	Storage	
					A/W	pF	MΩ		(W/√Hz)	(cm√Hz/W)					
				typ.	typ.	typ.	min.	typ.	typ.	typ.	max.	typ.			
Non-Cooled															
PIN-DSS	Si (top)	2.54 ϕ	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 ϕ	400-1100	950	0.55 §	450	150		1.9 e -14 §	1.2 e +13 §	5	4			
	InGaAs	1.50 ϕ	1000-1800	1300	0.60	300	1.0		2.1 e -13	8.4 e +11	2	4			
Two Stage Thermoelectrically Cooled ‡															
PIN-DSIn-TEC	Si (top)	2.54 ϕ	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 ϕ	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 °C to +100 °C
Nominal Resistance	---	1.25 KW @ 25 °C
Accuracy	-100 °C to -25 °C	± 6.5 °C
	-25 °C to +50 °C	± 3.5 °C
	@ 25 °C	± 1.5 °C
	+50 °C to +100 °C	± 6.7 °C

Two Stage Thermo-electric Cooler Specifications

PARAMETER	SYMBOL	CONDITION		SPECIFICATION
Maximum Achievable Temperature Difference	ΔT_{MAX} (°C)	$I = I_{MAX}$, QC = 0	Vacuum	91
			Dry N2	83
Maximum Amount Of Heat Absorbed At The Cold Face	Q_{MAX} (W)	$I = I_{MAX}$, $\Delta T = 0$		0.92
Input Current Resulting In Greatest ΔT_{MAX}	I_{MAX} (A)	---		1.4
Voltage At ΔT_{MAX}	V_{MAX} (V)	---		2.0

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"

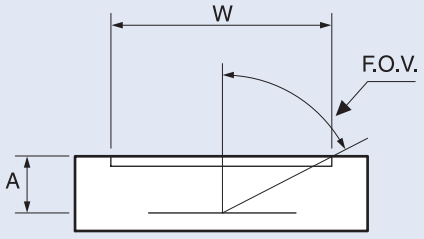
5. Windows

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.



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

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

310-978-0516

- Or -
On the Internet at

www.osioptoelectronics.com

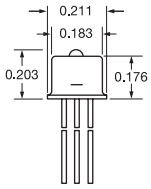
Mechanical Specifications

All units in inches. Pinouts are bottom view.

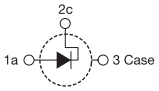
16 TO-18 Lensed Cap

Products:

PIN-HR005L
PIN-HR008L
PIN-HR020L
PIN-HR026L
PIN-HR040L



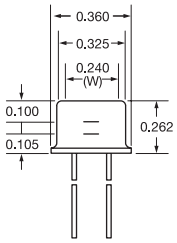
Pin Circle Dia.=0.100



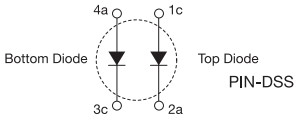
17 TO-5

Products:

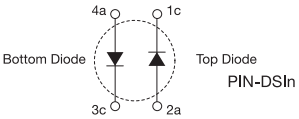
PIN-DSS
PIN-DSIn



Pin Circle Dia.=0.220



PIN-DSS

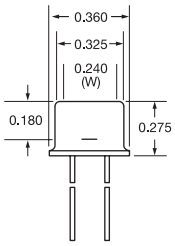


PIN-DSIn

18 TO-5

Products:

PIN-005D-245F

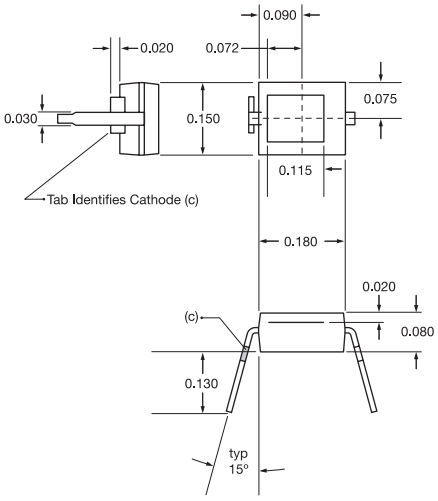


Pin Circle Dia.=0.215

19 Plastic Mold

Products:

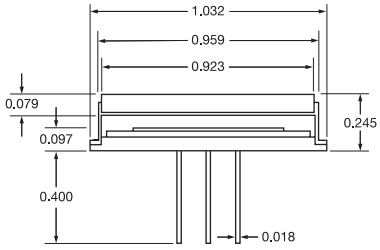
BPW34
BPW34B

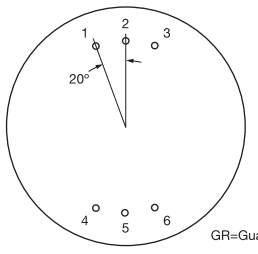


20 Special Metal

Products:

SPOT-15-YAG
SPOT-9-YAG
PIN-100-YAG





Pin Circle Dia.=0.750

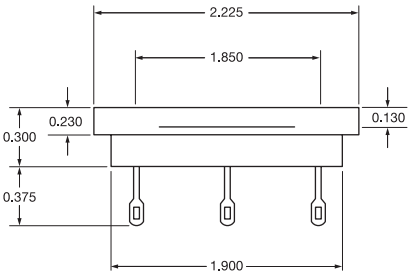
Pinouts

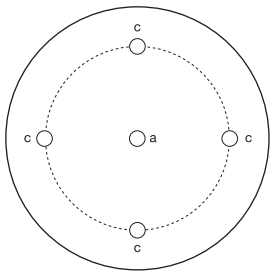
P/N	1	2	3	4	5	6
SPOT-15-YAG	C1	GR	C4	C2	A	C3
SPOT-9-YAG	C1	GR	C4	C2	A	C3
PIN-100-YAG	--	C	--	--	A	--

21 Special Metal

Products:

SC-50D





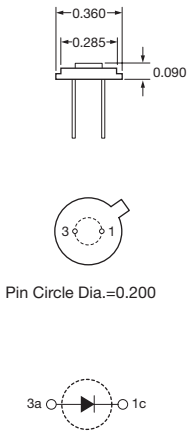
Pin Circle Dia.=1.110

All units in inches. Pinouts are bottom view.

22 TO-5

Products:

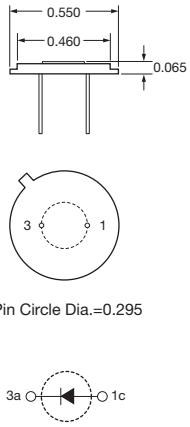
XUV-005



23 TO-8

Products:

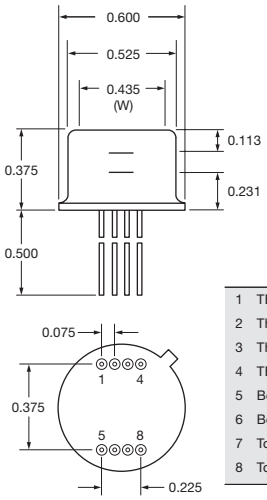
XUV-020
XUV-035



24 TO-8

Products:

PIN-DSIn-TEC



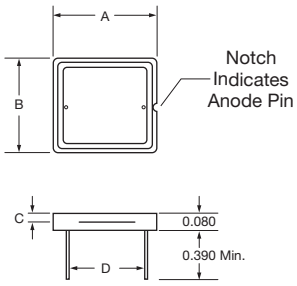
Pinout

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



Dimensions

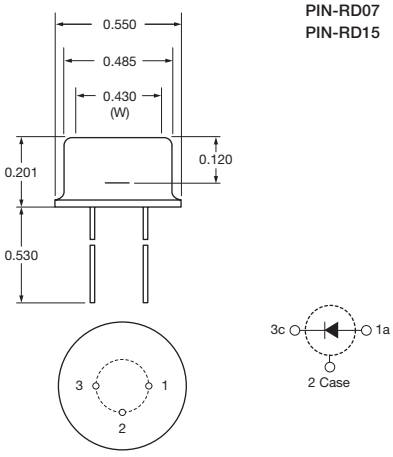
P/N	A	B	C	D
UV-005EC	0.400	0.350	0.030	0.280
UV-035EC	0.400	0.350	0.030	0.290
UV-100EC	0.650	0.590	0.048	0.500
UV-005DC	0.400	0.350	0.030	0.280
UV-035DC	0.400	0.350	0.030	0.290
UV-100DC	0.650	0.590	0.053	0.500
XUV-50C	0.650	0.590	0.027	0.490
XUV-100C	0.650	0.590	0.027	0.490
RD-100	0.650	0.590	0.027	0.490
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:

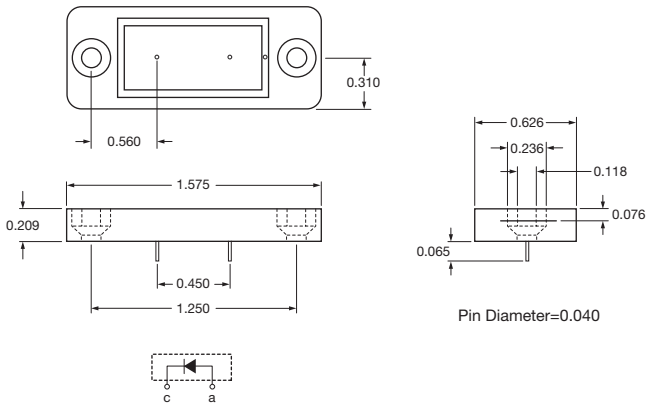
PIN-RD07
PIN-RD15



27 Special Plastic

Products:

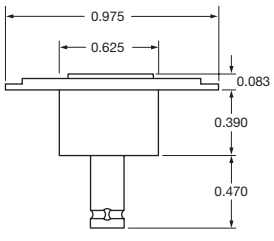
PIN-220D
PIN-220DP
PIN-220DP/SB



28 BNC

Products:

XUV-100



BNC Connector
Outer Contact = Cathode