

# Detector-Filter Combination Series

Planar Diffused Silicon Photodiodes

The Detector-Filter combination series incorporates a filter with a photodiode to achieve a tailored spectral response. OSI Optoelectronics offers a multitude of standard and custom combinations. Upon request, all detector-filter combinations can be provided with a NIST traceable calibration data specified in terms of Amps/Watt, Amps/lumen, Amps/lux or Amps/footcandle.

Among many possible custom combinations, following are a few detector-filter combinations available as standard parts.

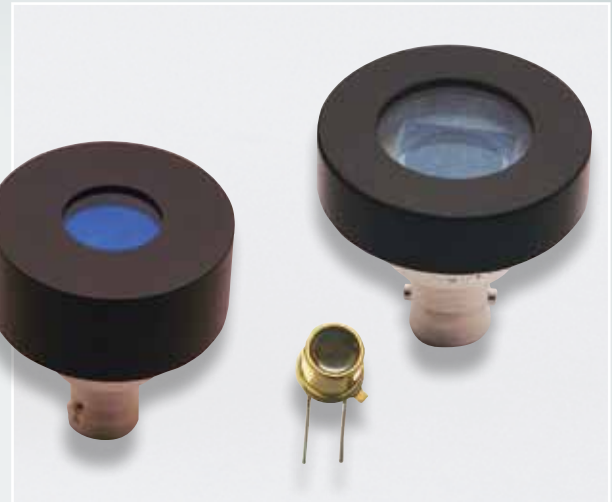
**PIN-10DF** - is a 1 cm<sup>2</sup> active area, BNC package detector-filter combination, optimized to achieve a flat responsivity, from 450 to 950 nm. This is the spectral response required for radiometric measurements. This type of detector has several advantages over thermopile, such as sensitivity, which is about a thousand times higher, as well as 10 times more stability.

**PIN-10AP** - is a 1 cm<sup>2</sup> active area, BNC package detector- filter combination which duplicates the response of the most commonly available optical aid; the human eye. The eye senses both brightness and color, with response varying as a function of the wavelength. This response curve is commonly known as the CIE curve. The AP filters accurately match the CIE curve to within 4% of area.

**PIN-555AP** - has the same optical characteristics as the PIN 10-AP, with an additional operational amplifier in the same package. The package and the opamp combination is identical to UDT-555D detector-amplifier combination (Photops™).

**PIN-005E-550F** - uses a low cost broad bandpass filter with peak transmission at 550nm to mimic the CIE curve for photometric applications. The pass band is similar to the CIE curve, but the actual slope of the spectral response curve is quite different. This device can also be used to block the near IR portion of the spectral range, 700 nm and above.

**PIN-005D-254F** - is a 6 mm<sup>2</sup> active area, UV enhanced photodiode-filter combination which utilizes a narrow bandpass filter peaking at 254 nm.



## APPLICATIONS

- Analytical Chemistry
- Spectrophotometry
- Densitometers
- Photometry/Radiometry
- Spectroradiometry
- Medical Instrumentation
- Liquid Chromatography

## FEATURES

- CIE Match (AP series)
- Flat Band Response (DF)
- 254 Narrow Bandpass
- w/ Amplifier Hybrid
- BNC Packages

## CUSTOMIZED CAPABILITIES

Current existing standard photodiodes can be modified by adding various optical filter(s), to match your specific spectral requirements. The filters can either replace the standard glass windows or be used in conjunction with the glass window, depending on the specific requirement and / or nature of the filter. Customer furnished optical filters can also be incorporated in the package. The following are among a few of the optical filter types available. These colored glass filters are grouped into four major categories: Shortpass Filters, Longpass Filters, Bandpass Filters, and Neutral Density Filters. Windows are also available with Custom Thin Film, Anti-reflective, Cut-on and Cut-off Filter Coatings.

ALL PHOTODIODES WITH OR WITHOUT FILTERS CAN BE CALIBRATED IN HOUSE FOR RESPONSIVITY FROM 200 NM TO 1100 NM IN 10 NM STEPS AS WELL AS SINGLE POINT CALIBRATION. ALL OPTICAL CALIBRATIONS ARE NIST TRACEABLE.

# Detector-Filter Combination Series

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

Model Number	Active Area		Spectral Match	Responsivity at 550nm		Capacitance (pF)	Shunt Resistance (MΩ)	NEP (W/√Hz)	Rise Time (μs)	Temp. Range (°C)		Package Style ¶
	Area (mm²)	Dimensions (mm)	λp (nm)	(A/W)	mA/Lum	0 V	-10 mV	-10mV 550 nm	0 V 550 nm 50 Ω	Operating	Storage	
			typ.	typ.		typ.	typ.	typ.	typ.			
Detector Filter Combination Series												
PIN-10DF	100	11.28 ϕ	± 7% ±	0.15	---	1500	20	1.9 e-13	1.0	0 ~ +70	-25 ~ +85	13 / BNC
PIN-10AP-1			4%***	0.27	0.4			1.1 e-13	0.15			33 / Special
PIN-555AP-1§									0.1*			5 / TO-5
PIN-005E-550F	5.7	2.4 sq.	---	0.23	---	200	500	2.5 e-14	0.1*			18 / TO-5
PIN-005D-254F				0.025*	---	100	300	3.0 e-13*				

‡ Point by point from 450nm to 950nm.

§ PIN-555AP is a Detector / Operational Amplifier hybrid. For Op-Amp specifications, please see p.29.

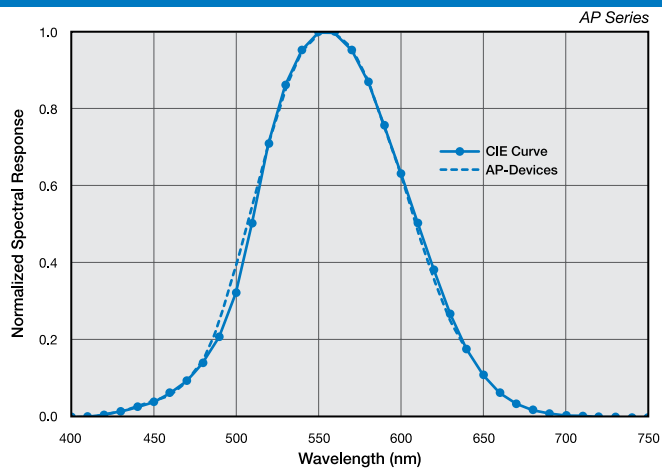
¶ For mechanical drawings please refer to pages 61 thru 73.

\*  $\lambda=254\text{nm}$

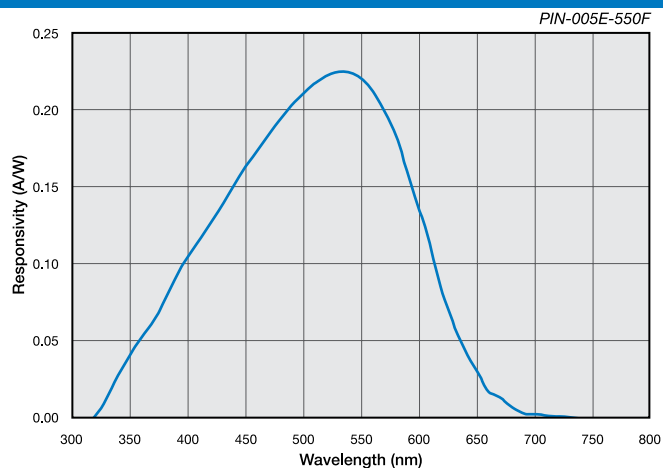
\*\* Non-condensing temperature and storage range, Non-condensing environment.

\*\*\* Area within CIE Curve

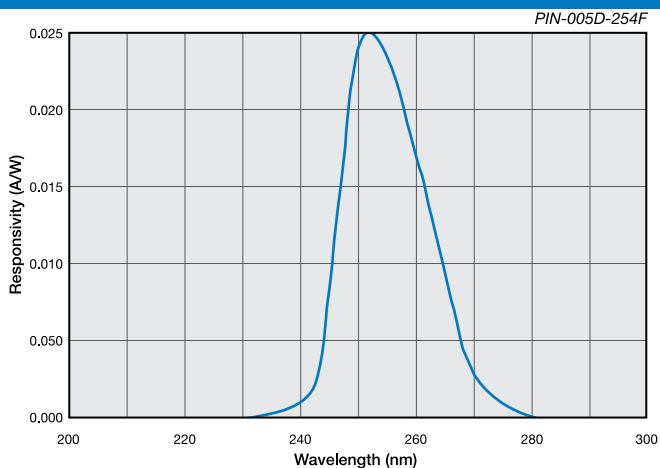
## Typical Spectral Response



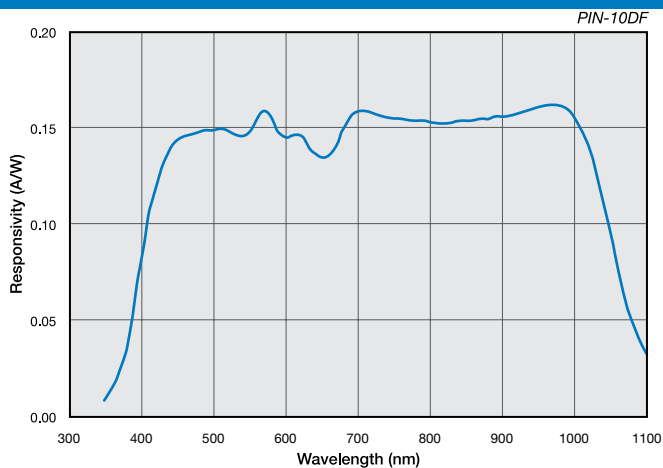
## Typical Spectral Response



## Typical Spectral Response



## Typical Spectral Response



## 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. = Field of View (see definition below).

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

## 3. Pin diameters are $0.018 \pm 0.002$ " unless otherwise specified.

## 4. Tolerances (unless otherwise noted)

General:  $0.XX \pm 0.01$ "

$0.XXX \pm 0.005$ "

Chip Centering:  $\pm 0.010$ "

Dimension 'A':  $\pm 0.015$ "

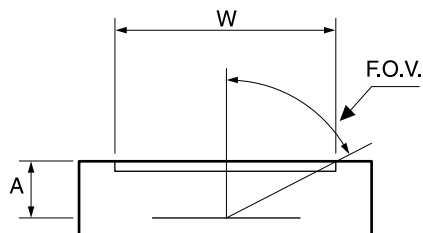
## 5. Windows

All '**UV**' Enhanced products are provided with QUARTZ glass windows,  $0.027 \pm 0.002$ " 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.



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

**OSI Optoelectronics**  
An OSI Systems Company

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

**310-978-0516**

- Or -

visit our website at

**[www.osioptoelectronics.com](http://www.osioptoelectronics.com)**

# Mechanical Specifications

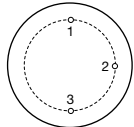
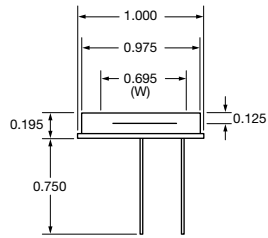
All units in inches. Pinouts are bottom view.

1 TO-18		2 TO-5		3 TO-8																																		
<div><p>Pin Circle Dia.=0.100</p><table><tr><th>P/N</th><th>A</th><th>B</th><th>W</th></tr><tr><td>PIN-020A</td><td>0.075</td><td>0.200</td><td>0.155</td></tr><tr><td>PIN-040A</td><td>0.075</td><td>0.200</td><td>0.155</td></tr></table></div>		P/N	A	B	W	PIN-020A	0.075	0.200	0.155	PIN-040A	0.075	0.200	0.155	<div><p>Pin Circle Dia.=0.200</p><table><tr><th>P/N</th><th>A</th><th>B</th><th>W</th></tr><tr><td>All Others</td><td>0.094</td><td>0.180</td><td>0.240</td></tr><tr><td>CD-25T</td><td>0.050</td><td>0.130</td><td>0.23</td></tr></table></div>		P/N	A	B	W	All Others	0.094	0.180	0.240	CD-25T	0.050	0.130	0.23	<div><p>Pin Circle Dia.=0.295</p><table><tr><th>P/N</th><th>A</th></tr><tr><td>PIN-6DI/6DPI APD50-8-150-T08</td><td>0.115</td></tr><tr><td>PIN-44DI/44DPI</td><td>0.125</td></tr><tr><td>OSD35-0</td><td>0.130</td></tr></table></div>		P/N	A	PIN-6DI/6DPI APD50-8-150-T08	0.115	PIN-44DI/44DPI	0.125	OSD35-0	0.130	
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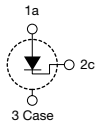
# Mechanical Specifications

All units in inches. Pinouts are bottom view.

## 10 Low Profile



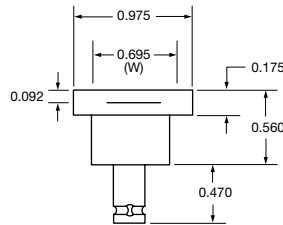
Pin Circle Dia.=0.73



### Products:

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

## 11 BNC

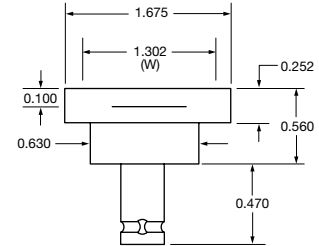


Outer Contact — Anode	PIN-10D, PIN-10DP, PIN-10DP/SB UV-100DQ, UV-100EQ
Outer Contact — Cathode	UV-50, UV-100

### Products:

PIN-10D  
PIN-10DP  
PIN-10DP/SB  
UV-50  
UV-100  
UV-100DQ  
UV-100EQ

## 12 BNC

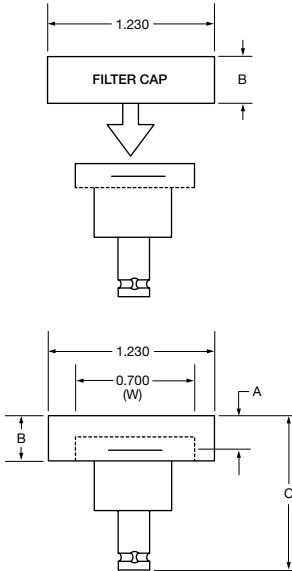


Outer Contact — Anode

### Products:

PIN-25D  
PIN-25DP

## 13 Special BNC

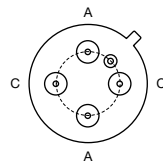
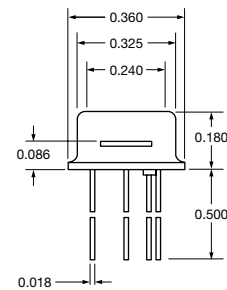


Dimensions			
P/N	A	B	C
PIN-10DF	0.217	0.330	1.020
PIN-10AP	0.386	0.550	1.415

### Products:

PIN-10AP  
PIN-10DF

## 14 TO-5

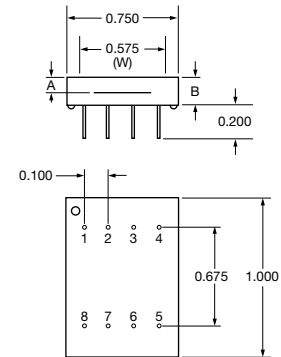


Pin Circle Dia.= 0.200  
Bottom View

### Products:

DLS-2S

## 15 Special Plastic



### Dimensions

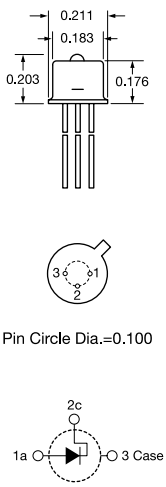
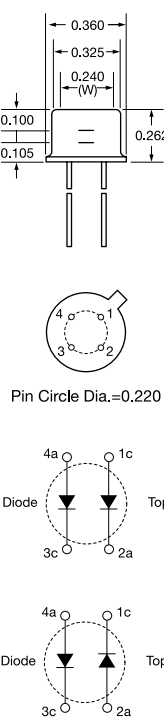
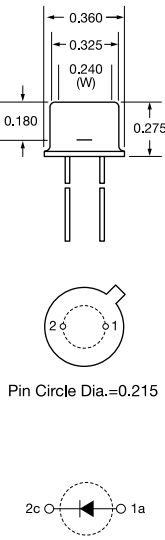
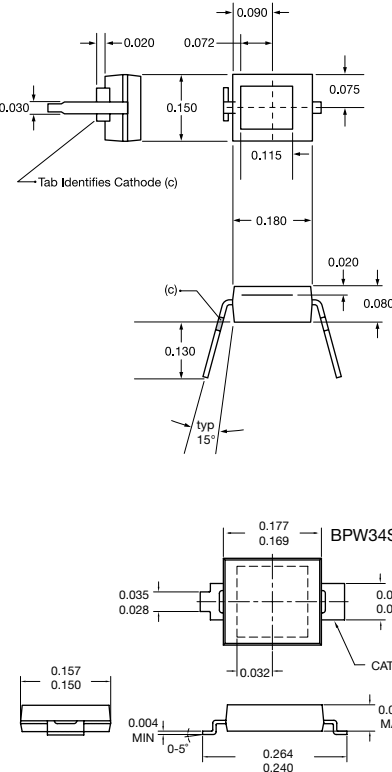
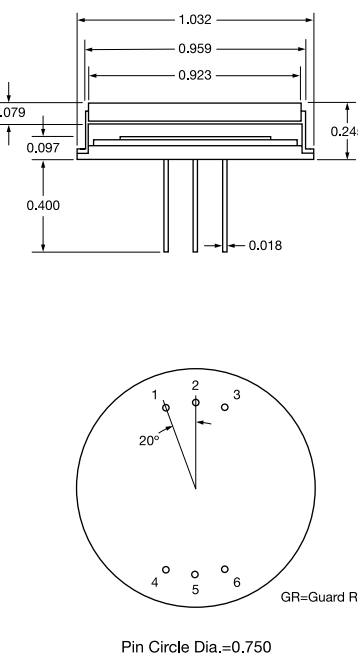
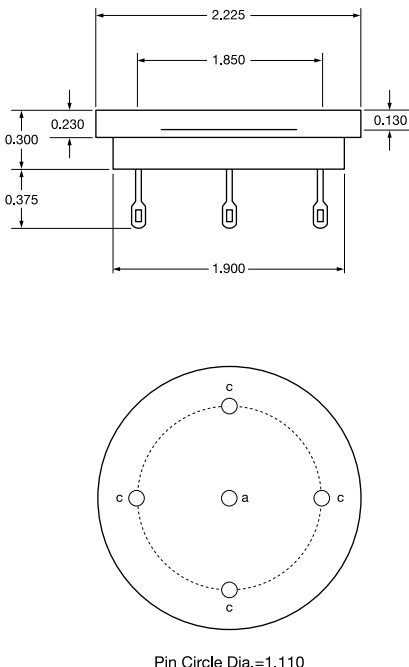
P/N	A	B
FIL-UV50	0.090	0.155

### Pinouts

P/N	1	2	3	4	5	6	7	8
FIL-UV50	c	-	-	a	c	-	-	a

# 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><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 BPW34S</p>  <p>Tab Identifies Cathode (c)</p> <p>Pin Circle Dia.=0.100</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><b>Products:</b></p> <p>SC-50D</p>  <p>Pin Circle Dia.=1.110</p>																																				
<table><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><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></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	--
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PIN-100-YAG	--	C	--	--	A	--																																		

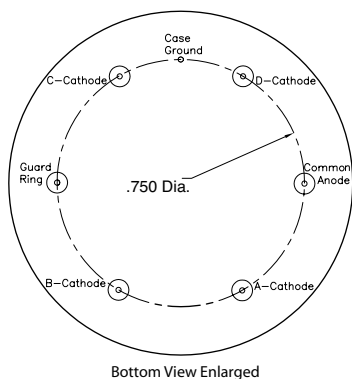
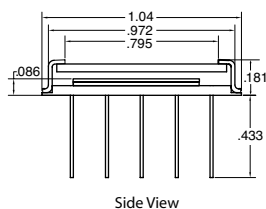
# Mechanical Specifications

All units in inches. Pinouts are bottom view.

## 29 Metal

### Products:

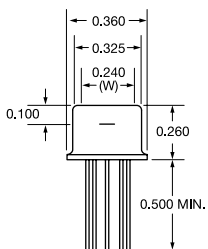
SPOT-13-YAG-FL  
SPOT-11-YAG-FL



## 30 TO-5

### Products:

UDT-455  
UDT-455UV  
OSI-515



Pin Circle Dia.=.023

### Pinout

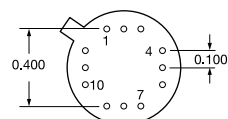
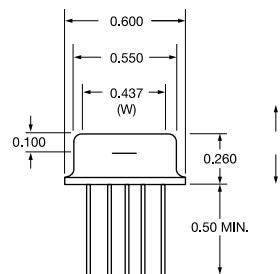
1	Offset Null
2	Inverting Input Detector Cathode
3	Noninverting Input
4	V (-)
5	Offset Null
6	Output
7	V (+)
8	Detector Anode

OSI-515 pin 1 & 5 are N/C

## 31 TO-8

### Products:

UDT-020D  
PIN-020UV



Pin Circle Dia.=.0295

### UDT-020D Pinout

1	Not Used
2	Not Used
3	Not Used
4	Not Used
5	Inverting Input
6	Noninverting Input
7	Detector Cathode
8	Case Ground
9	Detector Anode
10	V (-)
11	Output
12	V (+)

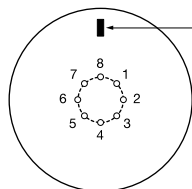
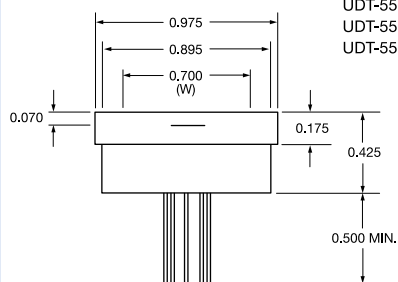
### PIN-020UV

1	Not Used
2	Not Used
3	Not Used
4	Not Used
5	Inverting Input
6	Noninverting Input
7	Detector Cathode
8	Case Ground
9	Detector Anode
10	V (-)
11	Output
12	V (+)

## 32 Special

### Products:

UDT-055UV  
UDT-555D  
UDT-555UV  
UDT-555UV/LN



Pin Circle Dia.=.0230

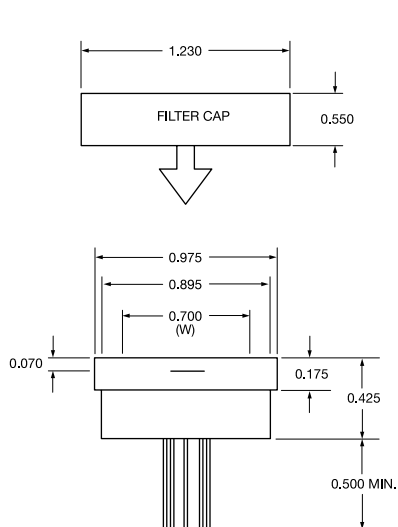
### Pinout

1	Offset Null
2	Inverting Input Detector Cathode
3	Noninverting Input
4	V (-)
5	Offset Null
6	Output
7	V (+)
8	Detector Anode and Case

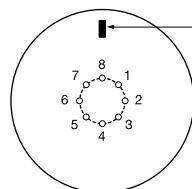
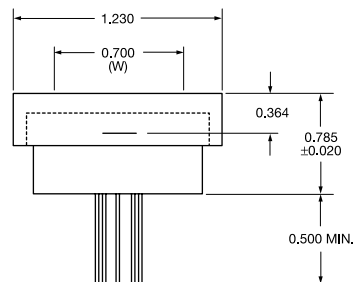
## 33 Special

### Products:

PIN-555AP



### UDT-555D



Pin Circle Dia.=.0230

### Pinout

1	Offset Null
2	Inverting Input Detector Cathode
3	Noninverting Input
4	V (-)
5	Offset Null
6	Output
7	V (+)
8	Detector Anode and Case