

# Photoconductive Series

## Planar Diffused Silicon Photodiodes

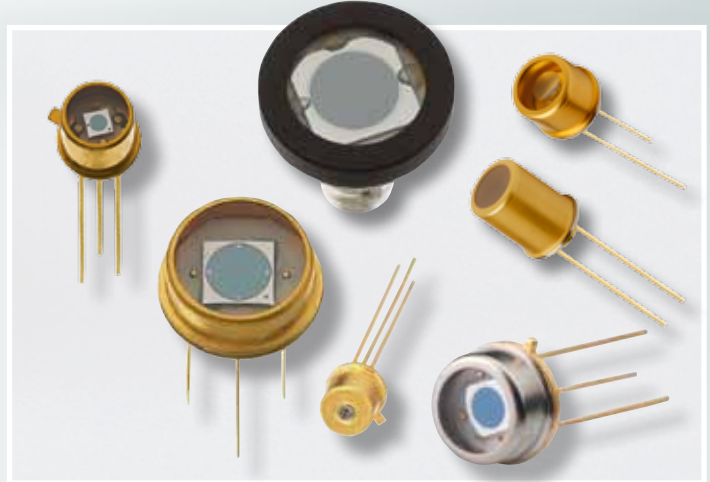
The **Photoconductive Detector Series** are suitable for high speed and high sensitivity applications. The spectral range extends from 350 to 1100 nm, making these photodiodes ideal for visible and near IR applications, including such AC applications as detection of pulsed LASER sources, LEDs, or chopped light.

To achieve high speeds, these detectors should be reverse biased. Typical response times from 10 ns to 250 ns can be achieved with a 10V reverse bias, for example. When a reverse bias is applied, capacitance decreases (as seen in the figure below) corresponding directly to an increase in speed.

**As indicated in the specification table, the reverse bias should not exceed 30 volts. Higher bias voltages will result in permanent damage to the detector.**

Since a reverse bias generates additional dark current, the noise in the device will also increase with applied bias. For lower noise detectors, the Photovoltaic Series should be considered.

**Refer to the Photoconductive Mode (PC) paragraph in the "Photodiode Characteristics" section of this catalog for detailed information on electronics set up.**



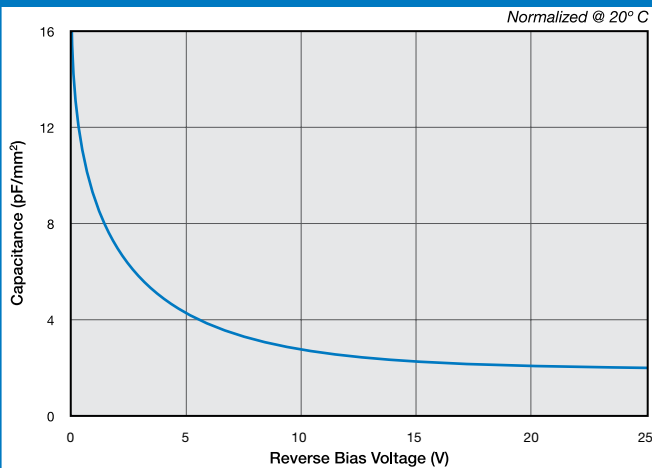
### APPLICATIONS

- Pulse Detectors
- Optical Communications
- Bar Code Readers
- Optical Remote Control
- Medical Equipment
- High Speed Photometry

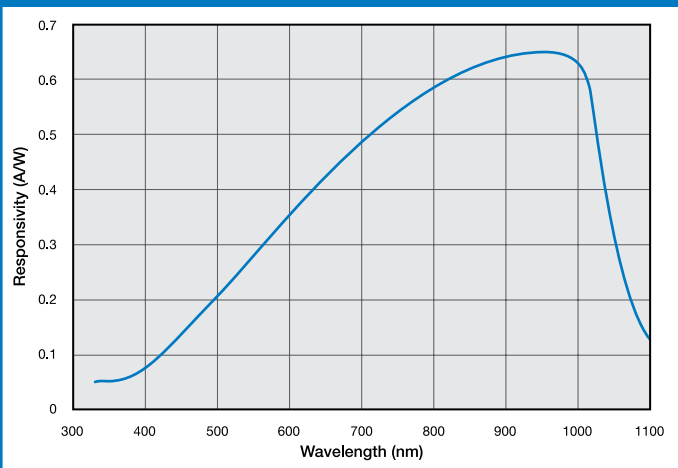
### FEATURES

- High Speed Response
- Low Capacitance
- Low Dark Current
- Wide Dynamic Range
- High Responsivity

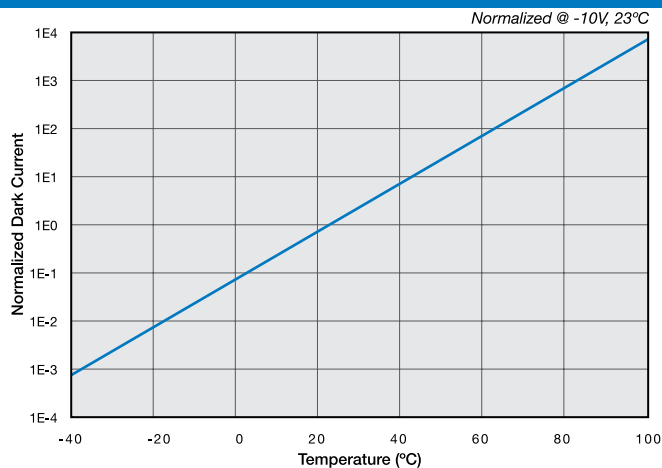
Typical Capacitance vs. Reverse Bias



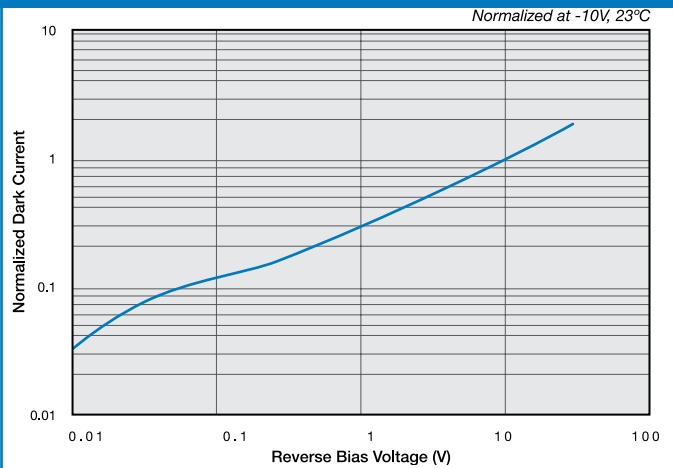
Typical Spectral Response



Typical Dark Current vs. Temperature



Typical Dark Current vs. Reverse Bias



# Photoconductive Series

Typical Electro-Optical Specifications at T<sub>A</sub>=23°C

Model Number	Active Area		Peak Responsivity Wavelength	Responsivity at λ <sub>p</sub>		Capacitance (pF)		Dark Current (nA)		NEP (W/√Hz)	Reverse Voltage (V)	Rise Time (ns)	Temp.* Range (°C)		Package Style †
	Area (mm <sup>2</sup> )	Dimensions (mm)		λ <sub>p</sub> (nm)	(A/W)		0 V	-10 V	-10 V				-10V 970nm	-10V 632nm 50 Ω	
			typ.		min.	typ.	typ.	typ.	max.	typ.	max.	typ.			

## 'D' Series, Metal Package

<b>PIN-020A</b>	0.20	0.51 φ	970	0.60	0.65	4	1	0.01	0.15	2.8 e-15	30	6	-40 ~ +100	-55 ~ +125	1 / TO-18
<b>PIN-040A</b>	0.81	1.02 φ				8	2	0.05	0.50	6.2 e-15		8			4 / TO-18
<b>PIN-2DI ‡</b>	1.1	0.81 x 1.37				25	5	0.10	1.0	8.7 e-15		10			7 / TO-18
<b>PIN-3CDI</b>	3.2	1.27 x 2.54				45	12	0.15	2	1.1 e-14		12			2 / TO-5
<b>PIN-3CD</b>						85	15	0.25	3	1.4 e-14					5 / TO-5
<b>PIN-5DI</b>	5.1	2.54 φ				225	40	0.35	6	1.6 e-14		14			2 / TO-5
<b>PIN-5D</b>															330
<b>PIN-13DI</b>	13	3.6 sq				700	130	1	15	2.8 e-14		24			3 / TO-8
<b>PIN-13D</b>															1500
<b>PIN-6DI</b>	16.4	4.57 φ				9500	1800	15	1000	1.1 e-13		43			3 / TO-8
<b>PIN-6D</b>															17
<b>PIN-44DI</b>	44	6.6 sq				10	300	2	25	3.9 e-14		250			3 / TO-8
<b>PIN-44D</b>															24
<b>PIN-10DI</b>	100	11.28 φ				10	300	2	25	3.9 e-14		43			10 / Lo-Prof
<b>PIN-10D</b>															43
<b>PIN-25D</b>	613	27.9 φ	10	300	2	25	3.9 e-14	250	12 / BNC						

## 'O' Series, Metal Package

<b>OSD1-0</b>	1	1.0 sq	900	0.47	0.54	12	3	1	3	4.5 e-14	50	10	-25 ~ +75	-40 ~ +100	7 / TO-18
<b>OSD5-0</b>	5	2.5 φ				50	8	5	10	1.0 e-13		8			5 / TO-5
<b>OSD15-0</b>	15	3.8 sq				150	20	8	15	1.3 e-13		9			5 / TO-5
<b>OSD60-0</b>	58	7.6 sq				600	75	15	50	1.7 e-13		14			69 / TO-8
<b>OSD100-0A</b>	100	11.3 φ				1000	130	30	70	2.5 e-13		19			55 / Special

## 'D' Series, Plastic Package

<b>PIN-220D«</b>	200	10 x 20	970	0.60	0.65	3200	600	5	100	6.2 e-14	30	75	-10 ~ +60	20 ~ +70	27 / Plastic
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‡ The 'I' suffix on the model number is indicative of the photodiode chip being isolated from the package by an additional pin connected to the case.

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

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

« Minimum order quantities apply

## 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 $0.018 \pm 0.002$ " 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.



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

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

# Mechanical Specifications

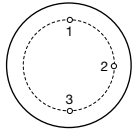
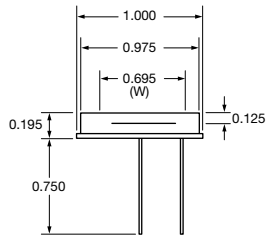
All units in inches. Pinouts are bottom view.

1 TO-18	2 TO-5	3 TO-8																																		
<p><b>Products:</b> PIN-020A PIN-040A PIN-040-DP/SB</p> <p>Pin Circle Dia.=0.100</p> <table border="1"> <thead> <tr> <th>P/N</th> <th>A</th> <th>B</th> <th>W</th> </tr> </thead> <tbody> <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> </tbody> </table>	P/N	A	B	W	PIN-020A	0.075	0.200	0.155	PIN-040A	0.075	0.200	0.155	<p><b>Products:</b> PIN-5DI PIN-5DPI PIN-13DI PIN-13DPI PIN-5-YAG CD-25T</p> <p>Pin Circle Dia.=0.200</p> <table border="1"> <thead> <tr> <th>P/N</th> <th>A</th> <th>B</th> <th>W</th> </tr> </thead> <tbody> <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> </tbody> </table>	P/N	A	B	W	All Others	0.094	0.180	0.240	CD-25T	0.050	0.130	0.23	<p><b>Products:</b> PIN-6DI PIN-6DPI PIN-44DI PIN-44DPI</p> <p>APD50-8-150-TO8</p> <p>Pin Circle Dia.=0.295</p> <table border="1"> <thead> <tr> <th>P/N</th> <th>A</th> </tr> </thead> <tbody> <tr> <td>PIN-6DI/6DPI APD50-8-150-TO8</td> <td>0.115</td> </tr> <tr> <td>PIN-44DI/44DPI</td> <td>0.125</td> </tr> </tbody> </table>	P/N	A	PIN-6DI/6DPI APD50-8-150-TO8	0.115	PIN-44DI/44DPI	0.125				
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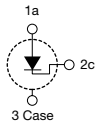
# Mechanical Specifications

All units in inches. Pinouts are bottom view.

## 10 Low Profile



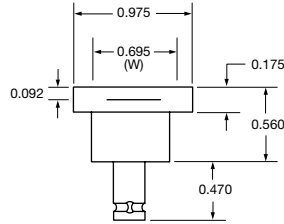
Pin Circle Dia.=0.73



### Products:

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

## 11 BNC

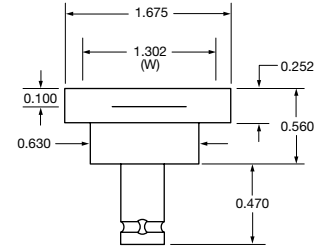


Outer Contact — Anode	PIN-10D, PIN-10DP, PIN-10DP/SB UV-100DQ, UV-100EQ
Outer Contact — Cathode	UV-50, UV-100

### Products:

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

## 12 BNC

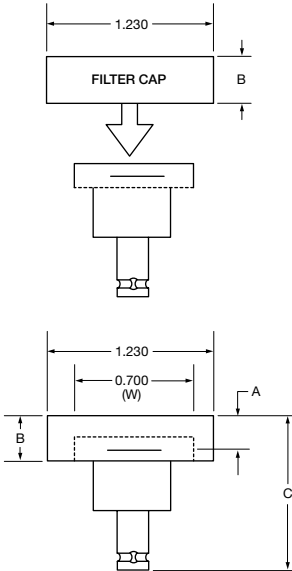


Outer Contact — Anode

### Products:

PIN-25D  
PIN-25DP

## 13 Special BNC

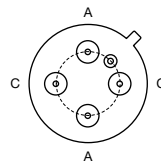
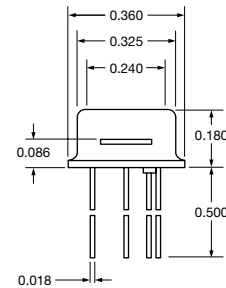


Dimensions			
P/N	A	B	C
PIN-10DF	0.217	0.330	1.020
PIN-10AP	0.386	0.550	1.415

### Products:

PIN-10AP  
PIN-10DF

## 14 TO-5

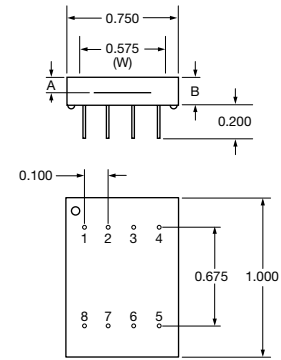


Pin Circle Dia.= 0.200  
Bottom View

### 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

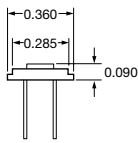
# Mechanical Specifications

All units in inches. Pinouts are bottom view.

## 22 TO-5

Products:

XUV-005



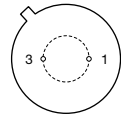
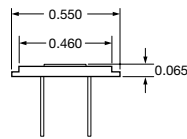
Pin Circle Dia.=0.200



## 23 TO-8

Products:

XUV-020  
XUV-035



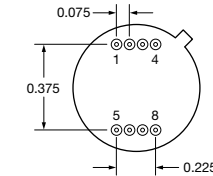
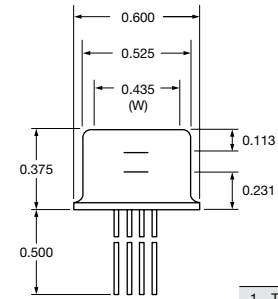
Pin Circle Dia.=0.295



## 24 TO-8

Products:

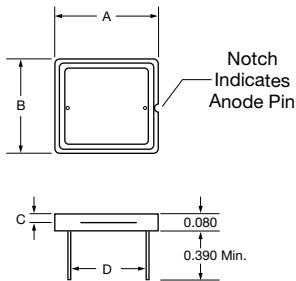
PIN-DSIn-TEC



Pinout

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

## 25 Special Ceramic / Plastic



Notch Indicates Anode Pin

Dimensions

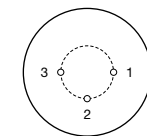
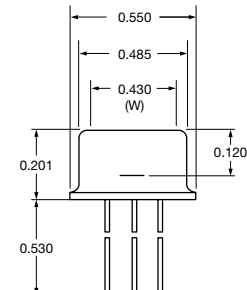
P/N	A	B	C	D
UV-005EQC	0.300	0.236	0.024	0.177
UV-035EQC	0.400	0.350	0.028	0.290
UV-100EQC	0.650	0.590	0.028	0.490
UV-005DQC	0.300	0.236	0.035	0.177
UV-035DQC	0.400	0.350	0.039	0.290
UV-100DQC	0.650	0.590	0.039	0.490
XUV-50C	0.650	0.590	0.027	0.490
XUV-100C	0.650	0.590	0.027	0.490
RD-100	0.650	0.590	0.027	0.490
RD-100A	0.650	0.590	0.027	0.490
UV-35P	0.390	0.345	0.050	0.275
OSD35-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

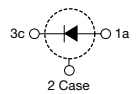
## 26 TO-8

Products:

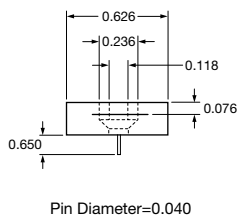
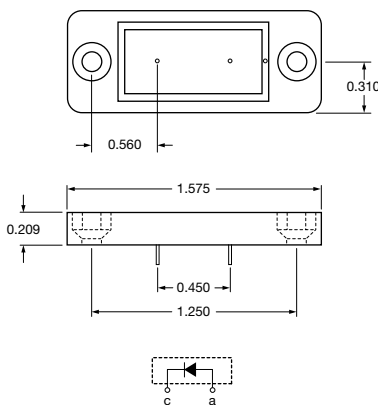
RD-100  
RD-100A  
UV-35P  
UV-005EQC  
UV-035EQC  
UV-100EQC  
UV-005DQC  
UV-035DQC  
UV-100DQC  
XUV-50C  
XUV-100C  
OSD35-LR-A  
OSD35-LR-D



Pin Circle Dia.=0.295



## 27 Special Plastic



Pin Diameter=0.040



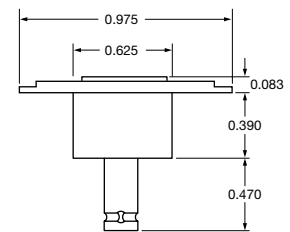
## 28 BNC

Products:

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

Products:

XUV-100



BNC Connector  
Outer Contact = Cathode

# Mechanical Specifications

All units in inches. Pinouts are bottom view.

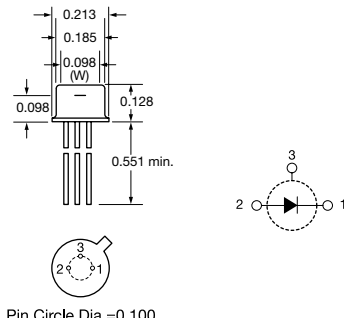
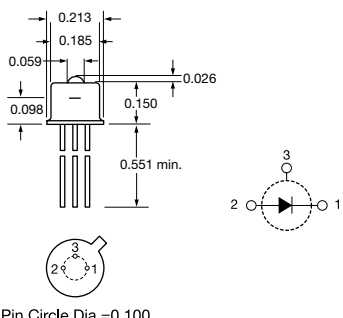
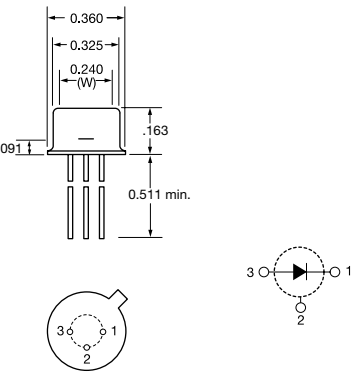
51 Low Cost Ceramic	52 Special	53 Special																		
<p><b>Products:</b> SL-30</p>	<p><b>Products:</b> A2V-76</p> <p>Pin Diameter = 0.025</p>	<p><b>Products:</b> A2V-16</p> <table border="1"> <thead> <tr> <th colspan="6">Dimensions</th> </tr> <tr> <th>P/N</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>A2V-16</td> <td>1</td> <td>0.1</td> <td>0.212</td> <td>0.2</td> <td>0.062   0.06</td> </tr> </tbody> </table>	Dimensions						P/N	A	B	C	D	F	A2V-16	1	0.1	0.212	0.2	0.062   0.06
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A2V-16	1	0.1	0.212	0.2	0.062   0.06															

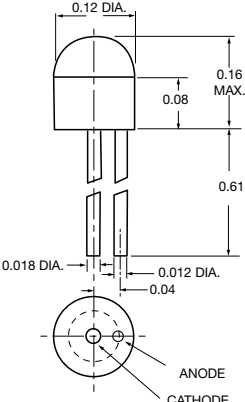
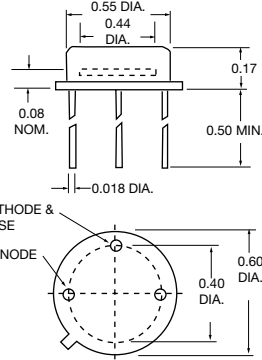
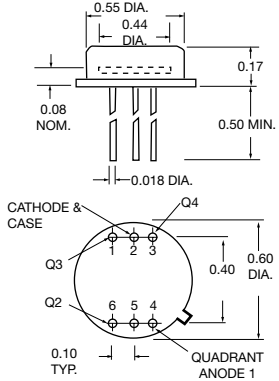
54 40-PIN-DIP	55 Special																																																																																																																																																																																
<p><b>Products:</b> A5V-35UV A5C-35, A5C-38 A5V-35, A5V-38</p> <table border="1"> <thead> <tr> <th colspan="4">35 Element Array</th> </tr> <tr> <th>Pin Number</th> <th>Element Number</th> <th>Pin Number</th> <th>Element Number</th> </tr> </thead> <tbody> <tr><td>1</td><td>C</td><td>21</td><td>C</td></tr> <tr><td>2</td><td>2</td><td>22</td><td>35</td></tr> <tr><td>3</td><td>4</td><td>23</td><td>33</td></tr> <tr><td>4</td><td>6</td><td>24</td><td>31</td></tr> <tr><td>5</td><td>8</td><td>25</td><td>29</td></tr> <tr><td>6</td><td>10</td><td>26</td><td>27</td></tr> <tr><td>7</td><td>12</td><td>27</td><td>25</td></tr> <tr><td>8</td><td>14</td><td>28</td><td>23</td></tr> <tr><td>9</td><td>16</td><td>29</td><td>21</td></tr> <tr><td>10</td><td>18</td><td>30</td><td>19</td></tr> <tr><td>11</td><td>--</td><td>31</td><td>17</td></tr> <tr><td>12</td><td>20</td><td>32</td><td>15</td></tr> <tr><td>13</td><td>22</td><td>33</td><td>13</td></tr> <tr><td>14</td><td>24</td><td>34</td><td>11</td></tr> <tr><td>15</td><td>26</td><td>35</td><td>9</td></tr> <tr><td>16</td><td>28</td><td>36</td><td>7</td></tr> <tr><td>17</td><td>30</td><td>37</td><td>5</td></tr> <tr><td>18</td><td>32</td><td>38</td><td>3</td></tr> <tr><td>19</td><td>34</td><td>39</td><td>1</td></tr> <tr><td>20</td><td>C</td><td>40</td><td>C</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="4">38 Element Array</th> </tr> <tr> <th>Pin Number</th> <th>Element Number</th> <th>Pin Number</th> <th>Element Number</th> </tr> </thead> <tbody> <tr><td>1</td><td>C</td><td>21</td><td>C</td></tr> <tr><td>2</td><td>2</td><td>22</td><td>37</td></tr> <tr><td>3</td><td>4</td><td>23</td><td>35</td></tr> <tr><td>4</td><td>6</td><td>24</td><td>33</td></tr> <tr><td>5</td><td>8</td><td>25</td><td>31</td></tr> <tr><td>6</td><td>10</td><td>26</td><td>29</td></tr> <tr><td>7</td><td>12</td><td>27</td><td>27</td></tr> <tr><td>8</td><td>14</td><td>28</td><td>25</td></tr> <tr><td>9</td><td>16</td><td>29</td><td>23</td></tr> <tr><td>10</td><td>18</td><td>30</td><td>21</td></tr> <tr><td>11</td><td>20</td><td>31</td><td>19</td></tr> <tr><td>12</td><td>22</td><td>32</td><td>17</td></tr> <tr><td>13</td><td>24</td><td>33</td><td>15</td></tr> <tr><td>14</td><td>26</td><td>34</td><td>13</td></tr> <tr><td>15</td><td>28</td><td>35</td><td>11</td></tr> <tr><td>16</td><td>30</td><td>36</td><td>9</td></tr> <tr><td>17</td><td>32</td><td>37</td><td>7</td></tr> <tr><td>18</td><td>34</td><td>38</td><td>5</td></tr> <tr><td>19</td><td>36</td><td>39</td><td>3</td></tr> <tr><td>20</td><td>38</td><td>40</td><td>1</td></tr> </tbody> </table>	35 Element Array				Pin Number	Element Number	Pin Number	Element Number	1	C	21	C	2	2	22	35	3	4	23	33	4	6	24	31	5	8	25	29	6	10	26	27	7	12	27	25	8	14	28	23	9	16	29	21	10	18	30	19	11	--	31	17	12	20	32	15	13	22	33	13	14	24	34	11	15	26	35	9	16	28	36	7	17	30	37	5	18	32	38	3	19	34	39	1	20	C	40	C	38 Element Array				Pin Number	Element Number	Pin Number	Element Number	1	C	21	C	2	2	22	37	3	4	23	35	4	6	24	33	5	8	25	31	6	10	26	29	7	12	27	27	8	14	28	25	9	16	29	23	10	18	30	21	11	20	31	19	12	22	32	17	13	24	33	15	14	26	34	13	15	28	35	11	16	30	36	9	17	32	37	7	18	34	38	5	19	36	39	3	20	38	40	1	<p><b>Products:</b> OSD100-0A OSD100-5TA</p> <p>RED DOT INDICATES CATHODE LEAD</p>
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# Mechanical Specifications

All units in inches. Pinouts are bottom view.

65 TO-52	66 TO-52L	67 TO-5
<p><b>Products:</b> APD02-8-150-T52 APD05-8-150-T52 APD10-8-150-T52</p>  <p>Pin Circle Dia.=0.100</p>	<p><b>Products:</b> APD02-8-150-T52L APD05-8-150-T52L APD10-8-150-T52L</p>  <p>Pin Circle Dia.=0.100</p>	<p><b>Products:</b> APD15-8-150-T05 APD30-8-150-T05</p>  <p>Pin Circle Dia.=0.200</p>

68 Plastic	69 TO-8	70 TO-8
<p><b>Products:</b> CD-1705</p>  <p>ANODE CATHODE</p>	<p><b>Products:</b> OSD60-0 OSD60-ST OSD60-E</p>  <p>CATHODE &amp; CASE ANODE</p>	<p><b>Products:</b> QD50-0</p>  <p>CATHODE &amp; CASE Q4 Q3 Q2 Q1 6 5 4 QUADRANT ANODE 1</p>