OSI Optoelectronics’ 1990 R&D 100 award winning X-UV detector series are a unique class of silicon photodiodes designed for additional sensitivity in the X-Ray region of the electromagnetic spectrum without use of any scintillator crystals or screens. Over a wide range of sensitivity from 200 nm to 0.07 nm (6 eV to 17,600 eV), one electron-hole pair is created per 3.63eV of incident energy which corresponds to extremely high stable quantum efficiencies predicted by $E_{ph}/3.63eV$ (See graph below). For measurement of radiation energies above 17.6 keV, refer to the “Fully Depleted High Speed and High Energy Radiation Detectors” section.

A reverse bias can be applied to reduce the capacitance and increase speed of response. In the unbiased mode, these detectors can be used for applications requiring low noise and low drift. These detectors are also excellent choices for detecting light wavelengths between 350 to 1100 nm.

The detectors can be coupled to a charge sensitive preamplifier or low-noise op-amp as shown in the circuit on the opposite page.
### Typical Electro-Optical Specifications at $T_A=23^\circ\text{C}$

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Active Area (mm$^2$)</th>
<th>Capacitance (nF)</th>
<th>Shunt Resistance (MΩ)</th>
<th>NEP (W/√Hz)</th>
<th>Temp. Range* (°C)</th>
<th>Package Style ¶</th>
</tr>
</thead>
<tbody>
<tr>
<td>XUV-005</td>
<td>5</td>
<td>2.57</td>
<td>0 V -10 mV</td>
<td>200</td>
<td>9.1 e-15</td>
<td>22 / TO-5</td>
</tr>
<tr>
<td>XUV-020</td>
<td>20</td>
<td>5.00</td>
<td>1.2 1.6</td>
<td>50</td>
<td>1.8 e-14</td>
<td>23 / TO-8</td>
</tr>
<tr>
<td>XUV-035</td>
<td>35</td>
<td>6.78 x 5.59</td>
<td>2 3</td>
<td>30</td>
<td>2.3 e-14</td>
<td>22 ~ 60</td>
</tr>
<tr>
<td>XUV-100</td>
<td>100</td>
<td>11.33</td>
<td>6 8</td>
<td>10</td>
<td>4.1 e-14</td>
<td>28 / BNC</td>
</tr>
<tr>
<td>XUV-50C</td>
<td>50</td>
<td>8.02</td>
<td>2 3</td>
<td>20</td>
<td>9.1 e-15</td>
<td>22 / TO-5</td>
</tr>
<tr>
<td>XUV-100C</td>
<td>100</td>
<td>10.00 sq</td>
<td>6 8</td>
<td>10</td>
<td>4.1 e-14</td>
<td>25 / Ceramic</td>
</tr>
</tbody>
</table>

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

* All XUV devices are supplied with removable windows.

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

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In this circuit example, the pre-amplifier is a FET input op-amp or a commercial charge sensitive preamplifier. They can be followed by one or more amplification stages, if necessary. The counting efficiency is directly proportional to the incident radiation power. The reverse bias voltage must be selected so that the best signal-to-noise ratio is achieved.

For low noise applications, all components should be enclosed in a metal box. Also, the bias supply should be either simple batteries or a very low ripple DC supply.

![Circuit Diagram](attachment:image.png)

Amplifier: OPA-637, OPA-27 or similar

$R_S: 10 \text{ MΩ to } 10 \text{ GΩ}$

$R_B: 1 \text{ MΩ; Smaller for High Counting Rates}$

$C_F: 1 \text{pF}$

$C_B: 1 \text{pF to } 10 \mu\text{F}$

**OUTPUT $V_{OUT} = Q / C_F$**

Where $Q$ is the Charge Created By One Photon or One Particle.
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.

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

All units in inches. Pinouts are bottom view.

**TO-5**

Products:
- XUV-005

**TO-8**

Products:
- XUV-020
  - XUV-035
- PIN-DSiIn-TEC

**Special Ceramic / Plastic**

Products:
- RD-100
  - RD-100A
- UV-005EC
- UV-035EC
- UV-100EC
- UV-005DC
- UV-035DC
- UV-100DC
- XUV-005C
- XUV-100C
- RD-100
- RD-100A
- UV-35P

**TO-8**

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

**Special Plastic**

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

**BNC**

Products:
- XUV-100

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