Deep UV, Soft X-Ray Enhanced

Soft X-Ray Optimized Silicon Photodiodes

Our 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 the need of scintillator crystals or screens. They are sensitive over a wide spectral range from 0.07nm to 200nm (6eV to 17.6KeV), where one electron-hole pair is created per 3.63eV of incident energy which corresponds to extremely high stable quantum efficiencies. Applying a reverse bias reduces the capacitance and increases the speed of response. When unbiased, these detectors are suitable for low noise and low drift applications. They are also excellent choices for detecting light wavelengths between 350 to 1100nm. For measurement of radiation energies above 17.6 keV, refer to our Fully Depleted Radiation Detectors series.

Applications

- Electron Detection
- Medical Instrumentation
- Dosimetry
- Radiation Monitoring
- X-ray Spectroscopy
- Charged Particle Detection

Features

- Direct Detection
- No Bias Needed
- High Quantum Efficiency
- Low Noise
- High Vacuum Compatible
- Cryogenically Compatible
- 0.070 - 1100nm Wavelength Range

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Reverse Voltage	V_R	-	5	V
Operating Temperature*	T_{OP}	-20	+60	°C
Storage Temperature*	T_{STG}	-20	+80	°C

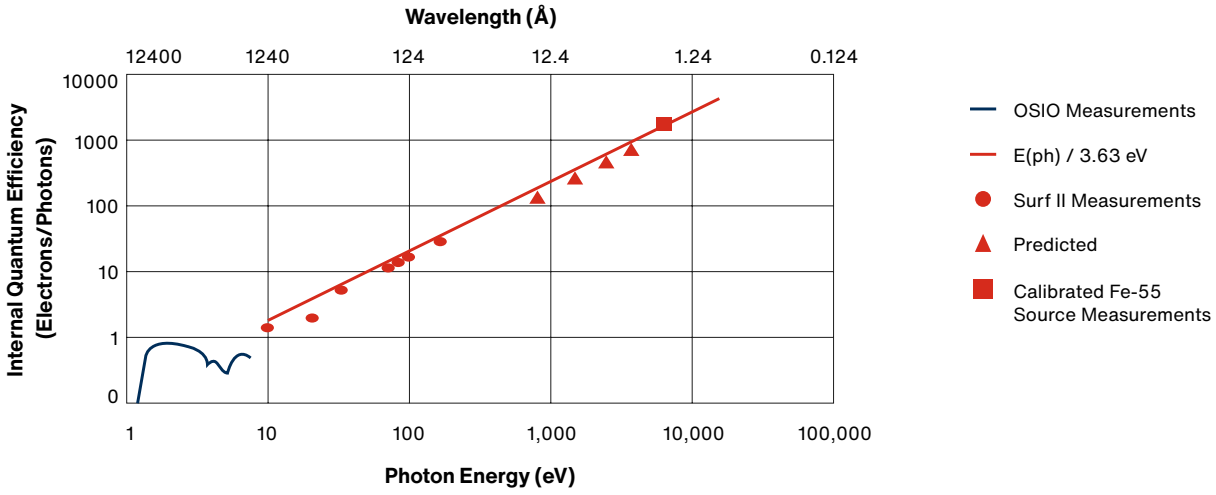
*Non-Condensing

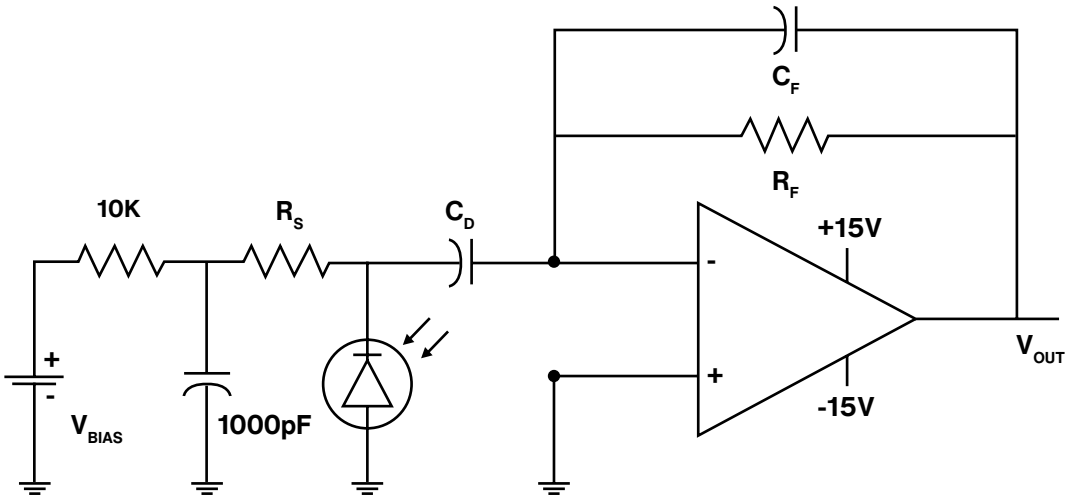
Typical Electro-Optical Specifications at T_A=23 °C

Model	Active Area	Active Area Dimension	Spectral Response	Shunt Resistance		Capacitance		NEP		Package
				MΩ		nF		(W/√HZ)		
	mm²	mm	nm	-10mV		0V		0V / 200nm		
				min	typ	typ	max	typ	max	
XUV-005	5	2.57 Φ	0.07 - 1100	200	2000	0.3	0.5	2.9×10^{-15}	9.1×10^{-15}	TO-5
XUV-020	20	5.00 Φ	0.07 - 1100	50	500	1.2	1.6	5.8×10^{-15}	1.8×10^{-14}	TO-8
XUV-035	35	6.78 x 5.59	0.07 - 1100	30	300	2	3	7.4×10^{-15}	2.3×10^{-14}	TO-8
XUV-50C	50	8.02	0.07 - 1100	20	200	2	3	9.1×10^{-15}	2.9×10^{-14}	CERAMIC
XUV-100	100	11.33 Φ	0.07 - 1100	10	100	6	8	7.4×10^{-15}	7.4×10^{-14}	BNC
XUV-100C	100	10.0 x 10.0	0.07 - 1100	10	100	6	8	1.3×10^{-14}	4.1×10^{-14}	CERAMIC

All XUV devices are supplied with removable windows.

Typical Quantum Efficiency





Circuit Example

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.

Amplifier: OPA-637, OPA-27 or similar

R_F: 10 MΩ to 10 GΩ

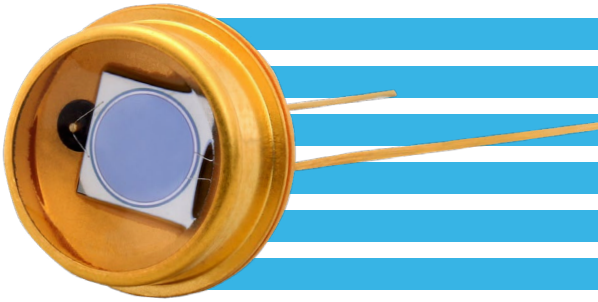
R_S: 1 MΩ; Smaller for High Counting Rates

C_F: 1pF

C_D: 1pF to 10μF

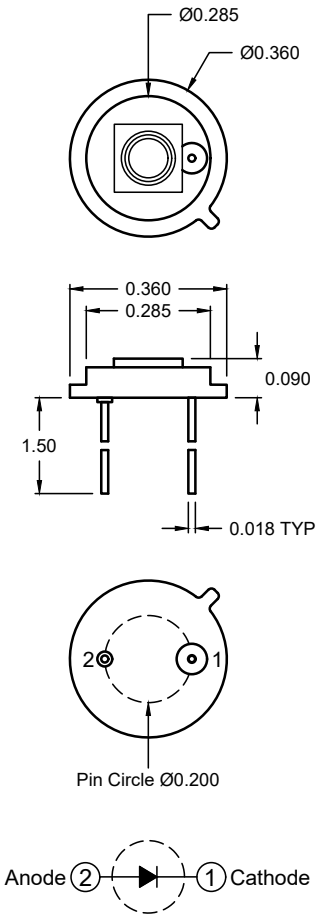
Output V_{OUT} = Q / CF

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

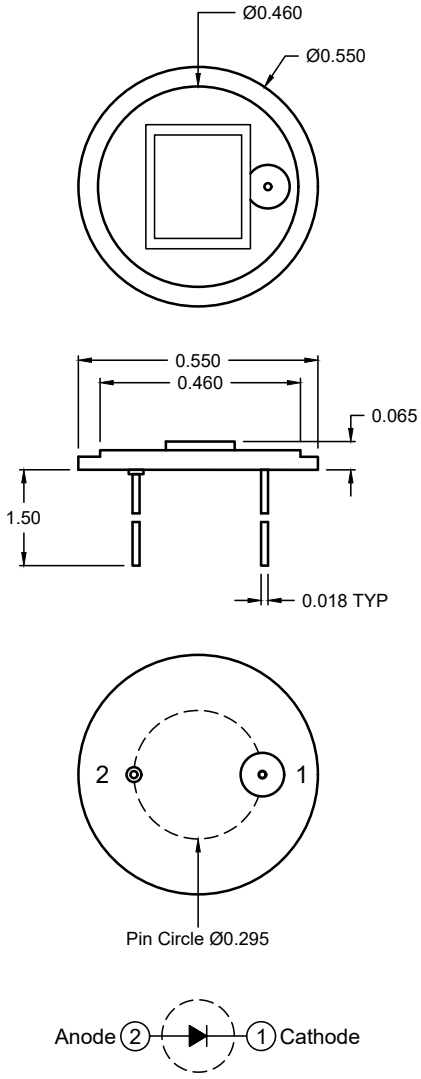


Mechanical Specifications

Units are in inches



XUV-005



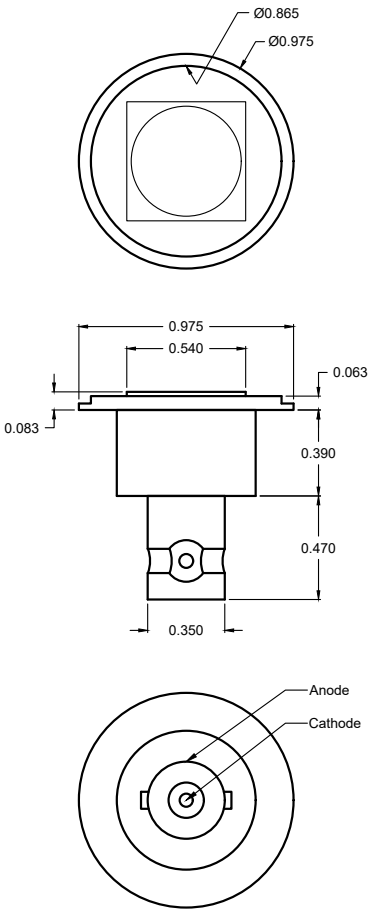
XUV-020
XUV-035

Tolerances (unless otherwise noted)

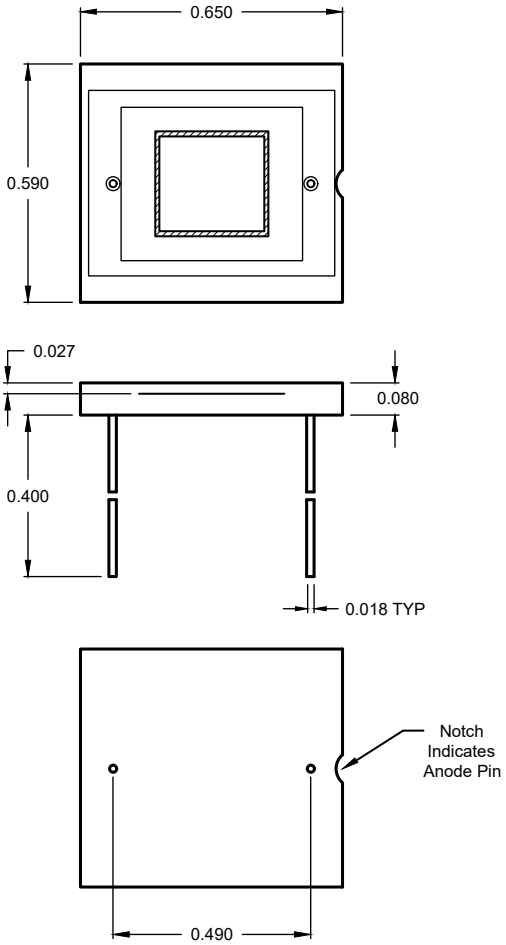
- General: 0.XX ±0.01", 0.XXX ±0.005"
- Chip Centering: ±0.010"
- Pin Diameters: 0.018 ± 0.002"

Mechanical Specifications

Units are in inches



XUV-100



XUV-50C
XUV-100C

Tolerances (unless otherwise noted)

- General: 0.XX ±0.01", 0.XXX ±0.005"
- Chip Centering: ±0.010"
- Pin Diameters: 0.018 ± 0.002"

Care and handling instructions

Your photodiodes are packaged and shipped in opaque, padded containers to avoid ambient light exposure and damage due to shock from dropping or jarring.

Care must be taken to avoid photodiode exposure to high ambient light levels, particularly from tungsten sources or sunlight.

- 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.
- Most windows on photodiodes are either silicon or quartz. They should be cleaned with isopropyl alcohol and a soft (optical grade) pad.
- Photodiode exposure to extreme high or low storage temperatures can affect the subsequent performance. Maintain a non-condensing environment for optimum performance and lifetime.
- All devices are considered ESD sensitive. The photodiodes are shipped in ESD protective packaging. When unpacking and using these products, anti-ESD precautions should be observed.
- Photodiode packages and/or operation may be impaired if exposed to CHLOROETHENE, THINNER, ACETONE, TRICHLOROETHYLENE or any harsh chemicals.
- 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 devices 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, Reflow Soldering: DO NOT USE

Legal Disclaimer

Information in this data sheet is believed to be correct and reliable. However, no responsibility is assumed for possible inaccuracies or omission. Specifications are subject to change without notice.

RoHS COMPLIANT

Most of our standard catalog products are RoHS Compliant. Please contact us for details.