

APX-SL2011APD Series

**16mm diameter, 120-1000nm Silicon Large Area
Avalanche Photodiode (LAAPD)**

The APX-2010APD series features the industry's largest active area Avalanche Photodiodes (APD) with active area diameters up to 16mm. These patented Deep UV LAAPD devices operate up to 2000V and offer gains up to 300. Known for their extremely low noise and stable high gain, they can detect light as low as 120nm with 120% quantum efficiency. The 16mm active area devices come in three performance versions: non-cooled, windowless, and packaged in an SHV.

Applications

Instrumentation

Medical

Features

120-1000nm Spectral Range

Low Dark Current

Very Large Active Area

Windowless

108% Quantum Efficiency

Absolute Maximum Ratings at $T_A = 23^\circ\text{C}$

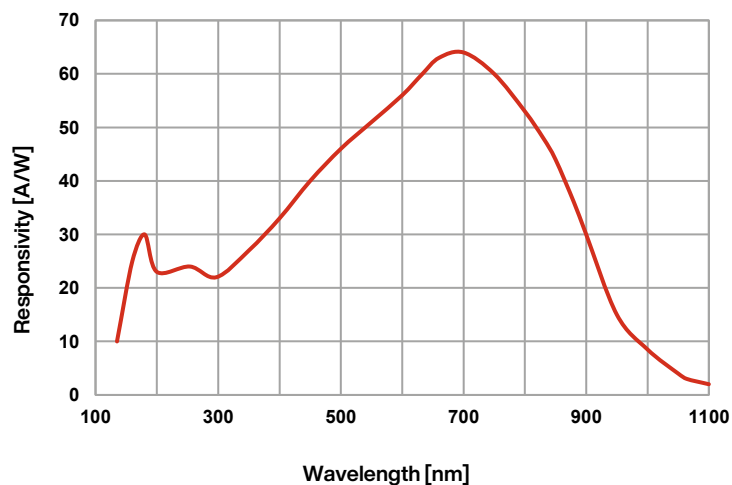
Parameter	Symbol	Min	Max	Unit
Operating Temperature	T_{OP}	-55	+45	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55	+70	$^\circ\text{C}$
Package	SHV			

Note: The specified operating and storage temperature ranges apply when the device is at a gain of 250 in a non-condensing environment, and exceeding these limits may cause damage.

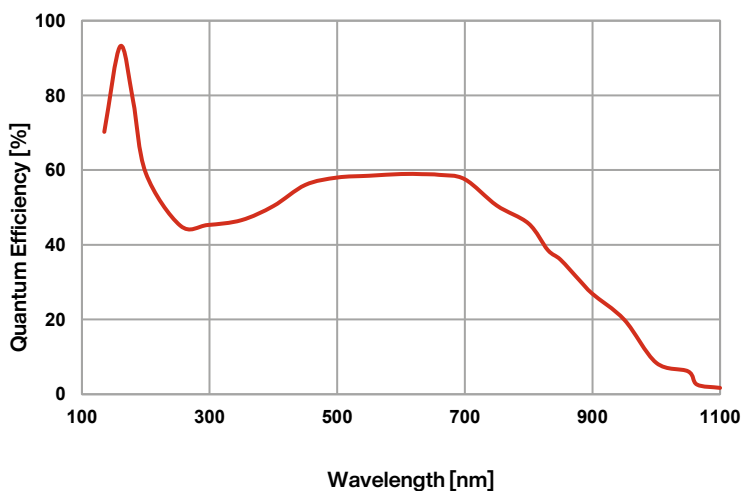
Typical Electro-Optical Specifications at $T_A = 23^\circ\text{C}$

Parameters	Conditions	Symbol	APX-SL2011APD-001			APX-SL2011APD-002			APX-SL2011APD-003			Units
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Active Area	-	A.A.	-	201.1	-	-	201.1	-	-	201.1	-	mm^2
Active Area Diameter	-	$A.A._\phi$	-	16	-	-	16	-	-	16	-	mm
Spectral Range	Spot Scan	$\Delta\lambda$	120	-	1000	120	-	1000	120	-	1000	nm
Peak Wavelength	-	λ_{Peak}	-	700	-	-	700	-	-	700	-	nm
Responsivity	$\lambda=135\text{nm}$, $M=200$	R_λ	-	10	-	-	10	-	-	10	-	A/W
	$\lambda=350\text{nm}$, $M=200$		-	27	-	-	27	-	-	27	-	A/W
Operating Voltage	-	V_{OP}	1700	-	2000	1700	-	2000	1750	-	2050	V
Excess Noise Factor	$M=200$	F	-	2	-	-	2	-	-	2	-	V
Terminal Capacitance	$f=1\text{MHz}$	C_T	-	130	-	-	130	-	-	130	-	pF
Dark Current	$M=200$	I_D	-	-	600	-	-	1200	-	-	600	nA
Noise Current Spectral Density	$f=100\text{kHz}$	i_n	-	2.5	10	-	2.5	10	-	2.5	10	$\text{pA}/\sqrt{\text{Hz}}$
Temp. Coefficient of Breakdown Voltage	-55°C to $+45^\circ\text{C}$	Γ	-	1	-	-	1	-	-	1	-	$\text{V}/^\circ\text{C}$
Rise Time	$M=200$, $R_L=50\Omega$, $\lambda=675\text{nm}$	T_R	-	15	22	-	15	22	-	15	22	ns

Typical Spectral Response at M=200

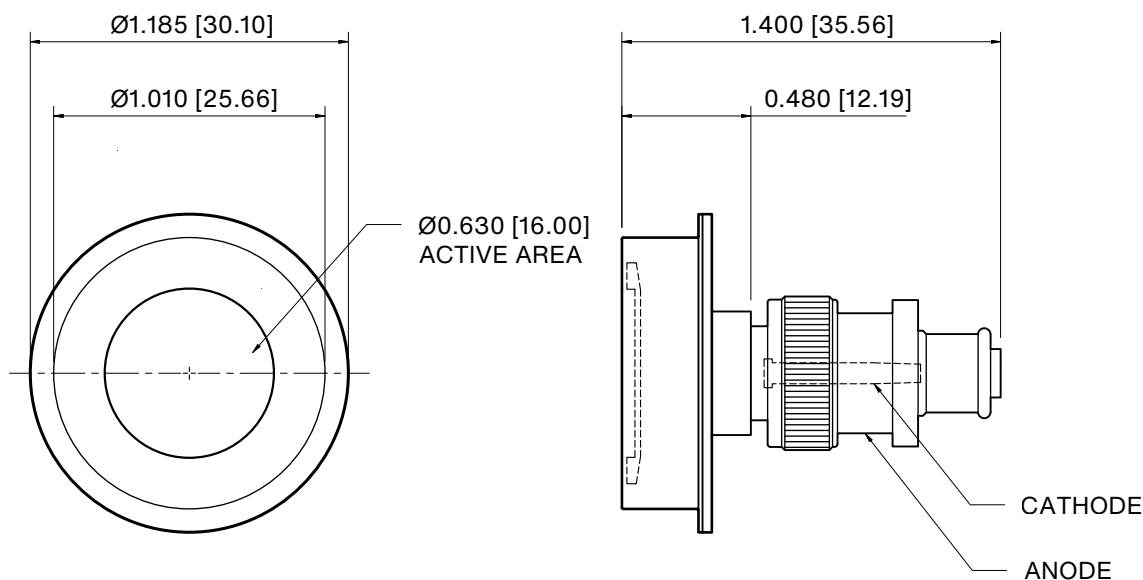


Typical External QE



Mechanical Specifications

Units are in inches [mm]



General Care and Handling Instructions

Photodiodes:

Handling and Storage

- Handle Photodiodes gently to prevent damage.
- Avoid exposing Photodiodes to temperatures exceeding the storage temperature rating of the device.
- Maintain a non-condensing environment for optimum performance and lifetime.

Cleaning

- Gently clean the glass (borosilicate or quartz window) using a 50/50 mixture of Methanol and isopropyl alcohol and a soft, optical-grade pad.

Special Considerations for Plastic or Epoxy Encapsulated Photodiodes

- Protect from intense light sources such as direct sunlight.
- Avoid exposure to harsh chemicals like THINNERS, ACETONE, and TRICHLOROETHYLENE.
- Cleaning with a 50/50 mixture of Methanol and isopropyl alcohol (IPA) is recommended. Cleaning in an ultrasonic bath is generally not recommended.

CdS Photocells:

Handling and Storage

- Handle CdS Photocells gently to prevent damage.
- Avoid exposing CdS Photocells to temperatures exceeding the storage temperature rating of the device.
- Maintain a non-condensing environment for optimum performance and lifetime.

Cleaning

- Gently clean the glass or plastic covering using a 50/50 mixture of Methanol and isopropyl alcohol and a soft, optical-grade pad.

Special Considerations

- DO NOT use Vapor Phase Soldering or Reflow Soldering for CdS components.

Optocouplers and LEDs:

Handling and Storage

- Handle Optocouplers and LEDs gently to prevent damage.
- Avoid exposing the devices to temperatures exceeding the storage temperature rating of the device.
- Maintain a non-condensing environment for optimum performance and lifetime.

Cleaning

- For plastic molded devices, cleaning with a 50/50 mixture of Methanol and isopropyl alcohol is recommended. Cleaning in an ultrasonic bath is generally not recommended.

Special Considerations

- Avoid exposing plastic molded devices or epoxy glob top devices to harsh chemicals like THINNERS, ACETONE, and TRICHLOROETHYLENE.

Electrostatic Discharge (ESD) Sensitivity:

- All devices are considered ESD-sensitive. They are shipped in ESD protective packaging. When unpacking and using these products, anti-ESD precautions should be observed.

Lead Trimming and Bending:

- Standard lead trimming after soldering is an acceptable practice; however, do not attempt to bend or modify the leads incorrectly, as it can damage the glass feed-through or the plastic encapsulant.

Soldering Instructions:

- Use a soldering iron with a tip temperature of 300°C max.
- Consult with your preferred solder manufacturer to determine a solder alloy and flux combination, as well as the reflow profile appropriate for your application.

General Precautions for all Devices

1. Moisture Prevention:

Ensure devices are stored in a dry environment to prevent moisture ingress, which can cause damage during soldering. Refer to J-STD-20 for guidance on proper baking procedures to prevent moisture related damage.

2. Lead Splaying:

If required, carefully splay the leads of the devices according to the specific application needs. Be cautious when splaying leads, as improper techniques may damage the device. Consult technical support or device datasheets for guidance on lead splaying.

3. Mechanical Stress:

Handle devices with care throughout the installation process to prevent damage.

4. Circuit Protection and Layout:

Optimize the circuit design and layout to ensure proper functioning and prevent damage to the devices. Include appropriate protection measures like ESD protection diodes, current-limiting resistors, and voltage regulation.

5. After-Sale Support:

For troubleshooting and device-specific inquiries, please consult with our technical support team. They can offer valuable guidance and suggestions on handling, operation, and application-related questions. To reach them, please contact the Advanced Photonix Applications group at Techsupport@advancedphotonix.com.

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.

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