

■ 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.



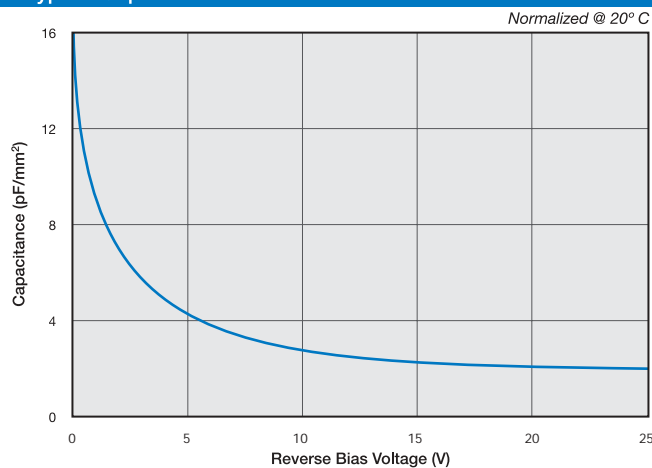
■ APPLICATIONS

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

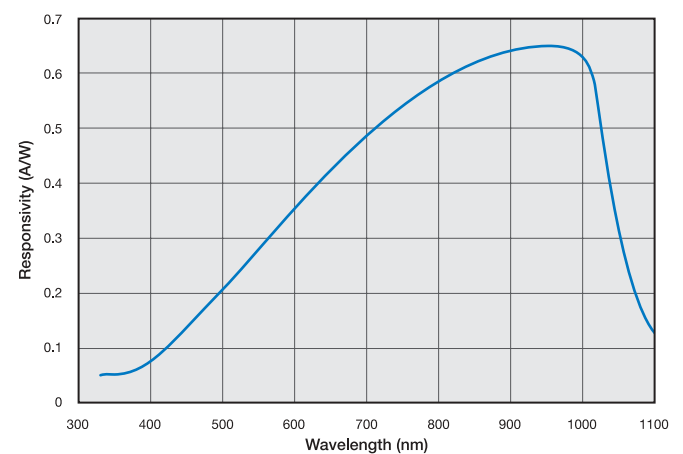
■ FEATURES

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

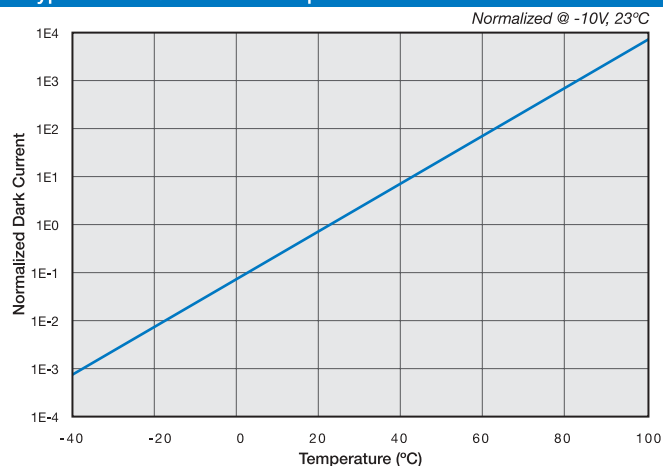
■ Typical Capacitance vs. Reverse Bias



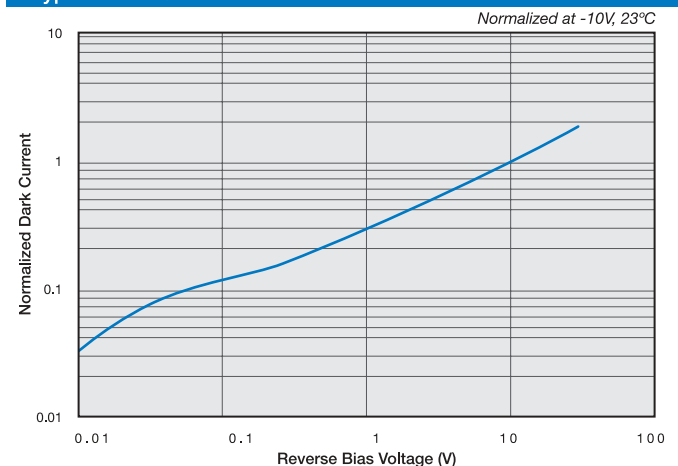
■ Typical Spectral Response



■ Typical Dark Current vs. Temperature



■ Typical Dark Current vs. Reverse Bias



■ Photoconductive Series

Typical Electro-Optical Specifications at T_A=23°C

Model Number	Active Area		Peak Responsivity Wavelength	Responsivity at λ_p		Capacitance (pF)		Dark Current (nA)		NEP (W/ $\sqrt{\text{Hz}}$)	Reverse Voltage (V)	Rise Time (ns)	Temp.* Range (°C)		Package Style ¶
	Area (mm ²)	Dimension (mm)	λ_p (nm)	(A/W)		0 V	-10 V	-10 V		-10V 970 nm		-10 V 632 nm 50 Ω	Operating	Storage	
			typ.	min.	typ.	typ.	typ.	typ.	max.	typ.		max.			

'D' Series, Metal Package

PIN-020A	0.20	0.51 ϕ	970	0.60	0.65	4	1	0.01	0.15	2.8 e -15	30	26	-40 ~ +100	-55 ~ +125	1 / TO-18
PIN-040A	0.81	1.02 ϕ				8	2	0.05	0.50	6.2 e -15		24			
PIN-2DI ‡	1.1	0.81 x 1.37				25	5	0.10	1.0	8.7 e -15		13			
PIN-3CDI	3.2	1.27 x 2.54				45	12	0.15	2	1.1 e -14					
PIN-3CD						85	15	0.25	3	1.4 e -14		12			2 / TO-5
PIN-5DI	5.1	2.54 ϕ				225	40	0.35	6	1.6 e -14		14			
PIN-5D															330
PIN-13DI	13	3.6 sq				700	130	1	15	2.8 e -14		24			
PIN-13D															16.4
PIN-6DI	44	6.6 sq				9500	1800	15	1000	1.1 e -13		250			
PIN-6D															100
PIN-44DI	613	27.9 ϕ													
PIN-44D															
PIN-10DI															
PIN-10D															
PIN-25D															

'D' Series, Plastic Package §

FIL-3C	3.2	1.27 x 2.54	970	0.60	0.65	45	12	0.15	2	1.1 e -14	30	13	-10 ~ +60	-20 ~ +70	14 / Plastic
FIL-5C	5.1	2.54 ϕ				85	15	0.25	3	1.4 e -14		12			
FIL-20C	16.4	4.57 ϕ				330	60	0.5	10	1.9 e -14		17			
FIL-44C	44	6.6 sq				700	130	1	15	2.8 e -14		24			15 / Plastic
FIL-100C	100	11.28 ϕ				1500	300	2	25	3.9 e -14		43			
PIN-220D	200	10 x 20				3200	600	5	100	6.2 e -14		75			27 / Plastic

‡ 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.

§ The photodiode chips in "FIL" series are isolated in a low profile plastic package. They have a large field of view as well as "in line" pins.

¶ For mechanical drawings please refer to pages 55 thru 66.

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

■ Photodiode Care and Handling Instructions

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 UDT Sensors, 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 UDT Sensors 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

UDT Sensors 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 UDT Sensors Applications group at (310)978-0516 before forming a product's leads. Product warranties could be voided.

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 ± 0.002 " unless otherwise specified.

4. Tolerances (unless otherwise noted)

General: $0.XX \pm 0.01$ "

$0.XXX \pm 0.005$ "

Chip Centering: ± 0.010 "

Dimension 'A': ± 0.015 "

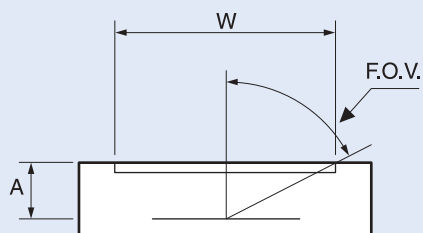
5. Windows

All 'UV' Enhanced products are provided with QUARTZ glass windows, 0.027 ± 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



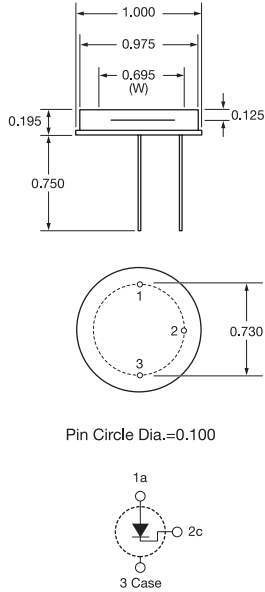
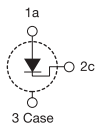
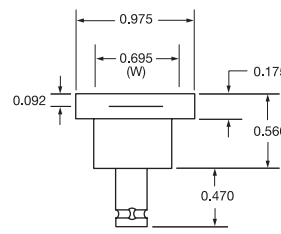
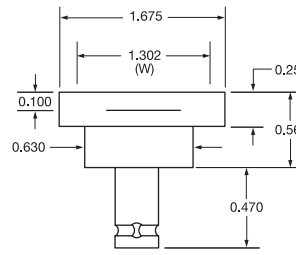
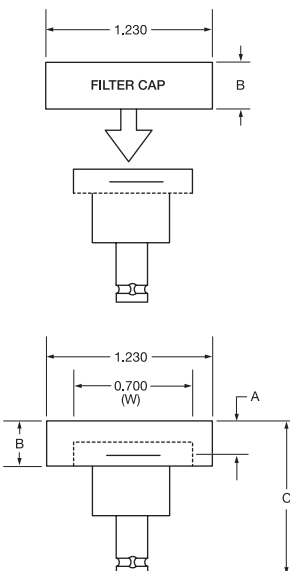
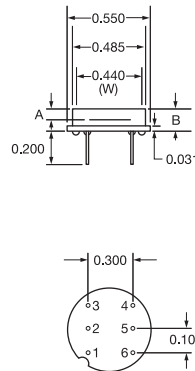
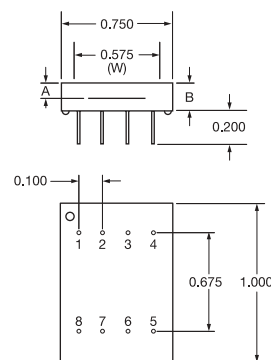
- Or -
On the Internet at

www.udt.com

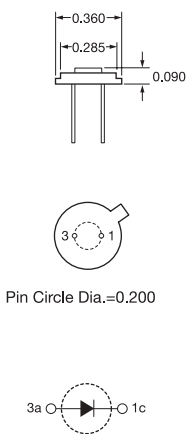
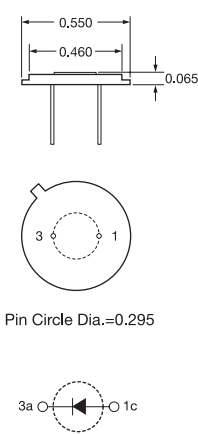
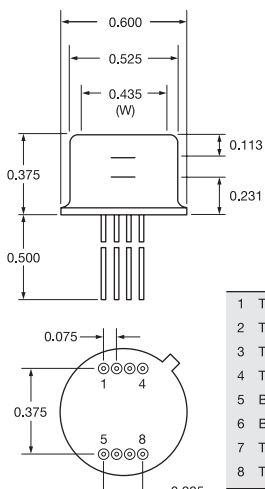
Mechanical Specifications

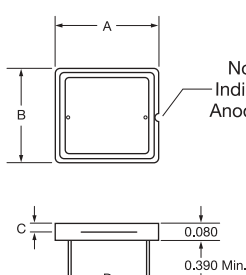
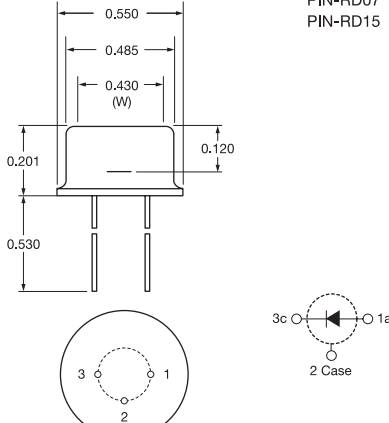
All units in inches. Pinouts are bottom view.

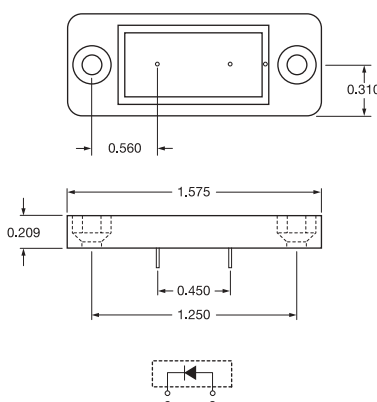
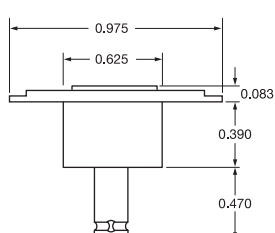
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FIL-S9DG	a	c	c	a	a	c	c	a																																																																																																																																										
FIL-C10DG	c	a	a	c	c	a	a	c																																																																																																																																										

All units in inches. Pinouts are bottom view.

22 TO-5		23 TO-8		24 TO-8																			
Products:		Products:		Products:																			
XUV-005		XUV-020 XUV-035		PIN-DSIn-TEC																			
																							
Pin Circle Dia.=0.200		Pin Circle Dia.=0.295		<table><tr><th colspan="2">Pinout</th></tr><tr><td>1</td><td>TEC (-)</td></tr><tr><td>2</td><td>Thermistor</td></tr><tr><td>3</td><td>Thermistor</td></tr><tr><td>4</td><td>TEC (+)</td></tr><tr><td>5</td><td>Bottom InGaAs, Cathode</td></tr><tr><td>6</td><td>Bottom InGaAs, Anode</td></tr><tr><td>7</td><td>Top Silicon, Anode</td></tr><tr><td>8</td><td>Top Silicon, Cathode</td></tr></table>		Pinout		1	TEC (-)	2	Thermistor	3	Thermistor	4	TEC (+)	5	Bottom InGaAs, Cathode	6	Bottom InGaAs, Anode	7	Top Silicon, Anode	8	Top Silicon, Cathode
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25 Special Ceramic / Plastic		26 TO-8																																																																		
Products:		Products:																																																																		
		RD-100 RD-100A UV-35P UV-005EC UV-035EC UV-100EC UV-005DC UV-035DC UV-100DC XUV-50C XUV-100C																																																																		
<table><tr><th></th><th colspan="4">Dimensions</th></tr><tr><th>P/N</th><th>A</th><th>B</th><th>C</th><th>D</th></tr><tr><td>UV-005EC</td><td>0.400</td><td>0.350</td><td>0.030</td><td>0.180</td></tr><tr><td>UV-035EC</td><td>0.400</td><td>0.350</td><td>0.030</td><td>0.290</td></tr><tr><td>UV-100EC</td><td>0.650</td><td>0.590</td><td>0.048</td><td>0.500</td></tr><tr><td>UV-005DC</td><td>0.400</td><td>0.350</td><td>0.030</td><td>0.180</td></tr><tr><td>UV-035DC</td><td>0.400</td><td>0.350</td><td>0.030</td><td>0.290</td></tr><tr><td>UV-100DC</td><td>0.650</td><td>0.590</td><td>0.053</td><td>0.500</td></tr><tr><td>XUV-50C</td><td>0.490</td><td>0.590</td><td>0.027</td><td>0.490</td></tr><tr><td>XUV-100C</td><td>0.490</td><td>0.590</td><td>0.027</td><td>0.490</td></tr><tr><td>RD-100</td><td>0.650</td><td>0.590</td><td>0.027</td><td>0.490</td></tr><tr><td>RD-100A</td><td>0.650</td><td>0.590</td><td>0.027</td><td>0.490</td></tr><tr><td>UV-35P</td><td>0.390</td><td>0.345</td><td>0.050</td><td>0.275</td></tr></table>			Dimensions				P/N	A	B	C	D	UV-005EC	0.400	0.350	0.030	0.180	UV-035EC	0.400	0.350	0.030	0.290	UV-100EC	0.650	0.590	0.048	0.500	UV-005DC	0.400	0.350	0.030	0.180	UV-035DC	0.400	0.350	0.030	0.290	UV-100DC	0.650	0.590	0.053	0.500	XUV-50C	0.490	0.590	0.027	0.490	XUV-100C	0.490	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		
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27 Special Plastic		28 BNC	
Products:		Products:	
PIN-220D PIN-220DP PIN-220DP/SB		XUV-100	
			
Pin Diameter=0.040		BNC Connector Outer Contact = Cathode	