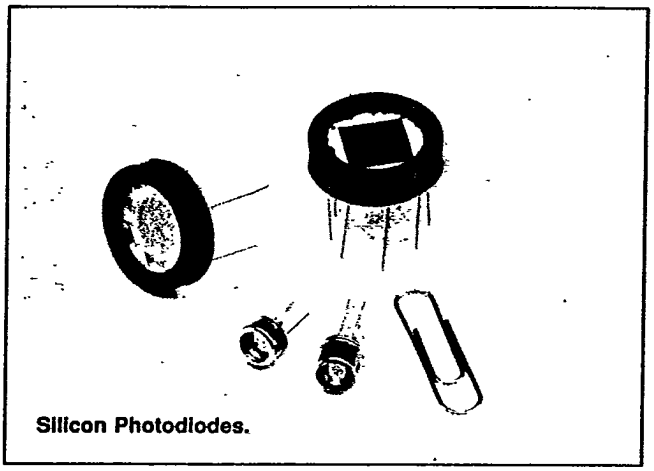
ORIEL SILICON PHOTODIODES



Silicon Photodiodes.

- **Wide Spectral Response**
- **High Responsivity**
- **Decades of Linearity**
- **Compact Units**
- **Hermetically Sealed Cases**

These sensitive detectors for the UV to near IR are supplied in two sizes (0.1 and 0.44 inches diameter). We offer models with or without internal transimpedance amplifiers, and for either biased or unbiased use.

You will find the principles of operation of photodiodes on page 300.

UNBIASED DETECTORS

Unbiased (also called photovoltaic) detectors are designed to be used with zero bias. When operated into a transimpedance amplifier, (see page 315) they offer 11 decades of linearity. The unbiased cells have larger junction capacitance than the biased. They exhibit no 1/f noise at zero bias and are useful for low frequency, low noise operation.

BIASED DETECTORS

Biased (also called photoconductive) detectors are designed to be used with reverse bias. They have smaller junction capacitance than the photovoltaic detectors, and therefore are suitable for higher frequency operation. The output voltage levels are better suited for use with an oscilloscope.

Both types, although optimized for use in one mode, may be operated in either the biased or unbiased mode. For best linearity both should be operated into a transimpedance amplifier. The amplifier may be an internal one or for unbiased detectors it may be our Model 70710 Pre-amplifier.

DETECTOR HOUSINGS

For unbiased detectors without internal pre-amplifiers, order the 71920 Detector Housing. For unbiased detectors with internal pre-amplifier, and biased with or without pre-amplifier, choose the 71925 Detector Housing. Or, select a complete detector system which comes with the detector mounted in the appropriate housing.

See page 322 for complete information on the Detector Housings.

SPECIFICATIONS/ORDERING INFORMATION

Photosensitive Area		Spectral	Wavelength of	Responsivity	Dark Current @ Bias		Capacitance**	Shunt	Rise
Area (mm²)	Diam. (inches)	Range (nm)	Peak Response (nm)	at peak (A/W)	(nA)	(V)	(pF)	Resistance (MΩ)	Time*** (ns)
Unbiased Photovoltaic Detectors									@ 0 V
5	0.1	300-1100	850	0.50	$<10^{-2}$	0	510	400	75
5	0.1	200-1100*	850	0.50	$<10^{-2}$	0	510	400	75
100	0.44	300-1100	850	0.50	$<10^{-2}$	0	10,000	40	1100
100	0.44	200-1100*	850	0.50	$<10^{-2}$	0	10,000	40	1100
Biased Photoconductive Detectors									(@ 0 V)
5	0.1	300-1100	950	0.55	<35	50	11	70	8.6
5	0.1	200-1100*	950	0.55	<35	50	11	70	8.6
100	0.44	300-1100	950	0.55	<500	10	500	7	230
100	0.44	200-1100*	950	0.55	<500	10	500	7	230

* UV enhanced models.
** Specifications with 0 volts bias on photovoltaic cells, 50 V on 5 mm² and 10 V on 100 mm² photoconductive cells.
*** For detectors without preamp only at 50 V bias.
****Photodiodes saturate at about 10X this value.

1349 E-14

250 LONG BEACH BLVD., P.O. BOX 872, STRATFORD, CT. U.S.A. 06497 ■ (203) 377-8282 ■ TWX 710-453-8719 ■ FAX (203) 378-2457

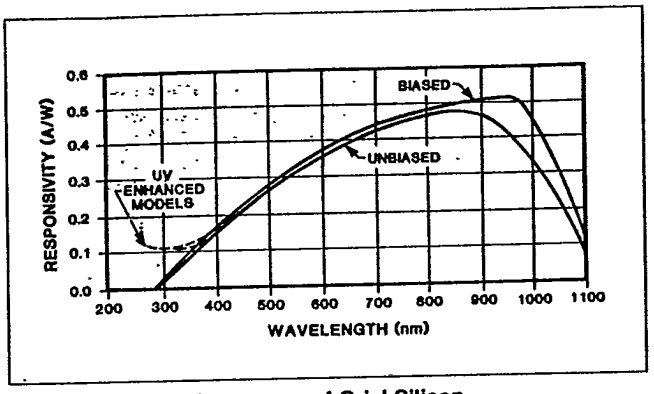


Fig. 1 Spectral response of Oriel Silicon Photodiodes.

The high frequency response and rise time are ultimately limited by the R_sC_j Time Constant. This limits the bandwidth to $1/2\pi R_sC_j$. Often, however, the external circuit will cause the bandwidth to be much less than this.

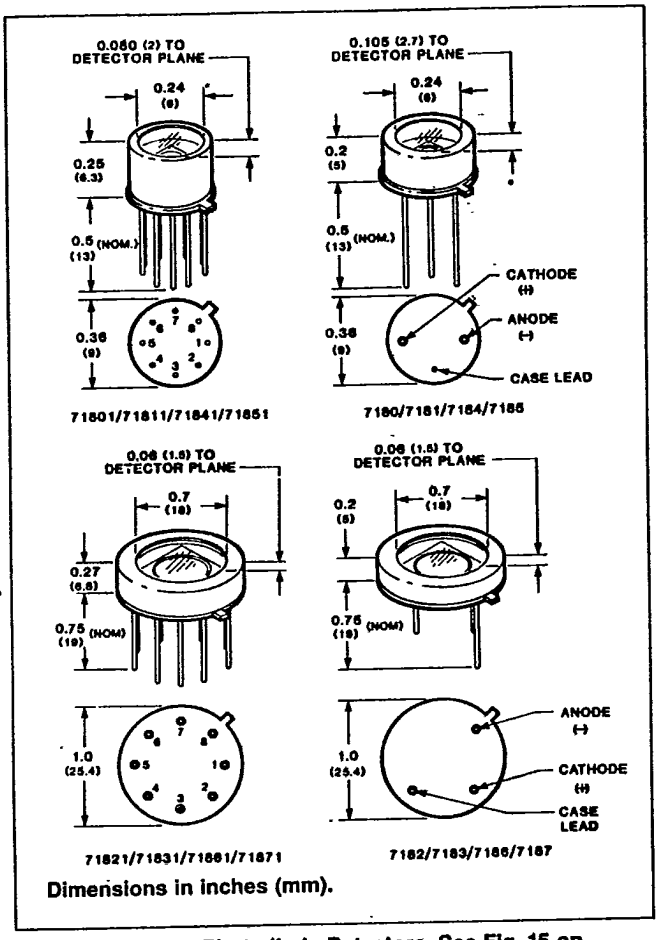


Fig. 2 Silicon Photodiode Detectors. See Fig. 15 on page 302 for pin assignation for the detector-amplifiers.

NEP at peak (W/Hz 1/2)	Max Linear Current**** (mA)	Detector only		Detector in 71920 Housing		Detector/Pre-amp only		Detector/Pre-amp in 71925 Housing	
		Model No.	Price ($)	Model No.	Price ($)	Model No.	Price ($)	Model No.	Price ($)
1.7×10^{-14}	0.42	7180	$ 55.00	71802	$413.00	71801	$139.00	71803	$734.00
1.7×10^{-14}	0.42	7181	$104.00	71812	$462.00	71811	$211.00	71813	$806.00
5.1×10^{-14}	2.0	7182	$171.00	71822	$529.00	71821	$280.00	71823	$875.00
5.1×10^{-14}	2.0	7183	$258.00	71832	$616.00	71831	$390.00	71833	$985.00
				Detector in 71925 Housing					
1.4×10^{-13}	0.18	7184	$ 55.00	71845	$650.00	71841	$139.00	71843	$734.00
1.4×10^{-13}	0.18	7185	$104.00	71846	$699.00	71851	$211.00	71853	$806.00
5.3×10^{-13}	2.0	7186	$171.00	71847	$766.00	71861	$280.00	71863	$875.00
5.3×10^{-13}	2.0	7187	$258.00	71848	$853.00	71871	$390.00	71873	$985.00

See page 322 for 71920 and 71925 Housings.