

Segmented Photodiodes (SPOT Series)

Position Sensing Detector (PSD)

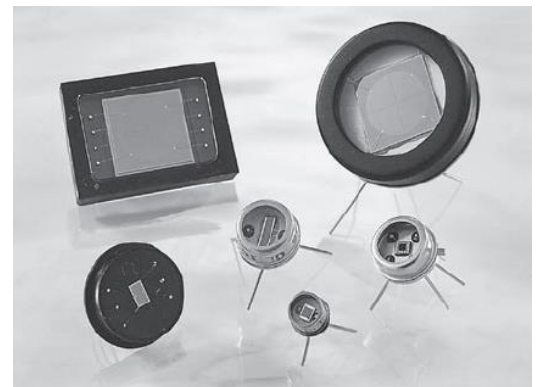
Features

- High Accuracy
- Excellent Resolution
- High-Speed Response
- Ultra Low Dark Current
- Excellent Response Match
- High Stability over Time and Temperature

Applications

- Machine Tool Alignment
- Position Measuring
- Beam Centering
- Surface Profiling
- Targeting
- Guidance Systems

The SPOT Series are common substrate photodetectors segmented into either two (2) or four (4) separate active areas. They are available with either a 0.005" or 0.0004" well defined gap between the adjacent elements resulting in high response uniformity between the elements. The SPOT series are ideal for very accurate nulling or centering applications. Position information can be obtained when the light spot diameter is larger than the spacing between the cells.



Spectral response range is from 350-1100nm. Notch or bandpass filters can be added to achieve specific spectral responses.

These detectors exhibit excellent stability over time and temperature, fast response times necessary for high speed or pulse operation, and position resolutions of better than 0.1 μm .

Maximum recommended power density is 10 mW/cm^2 and typical uniformity of response for a 1 mm diameter spot is $\pm 2\%$.

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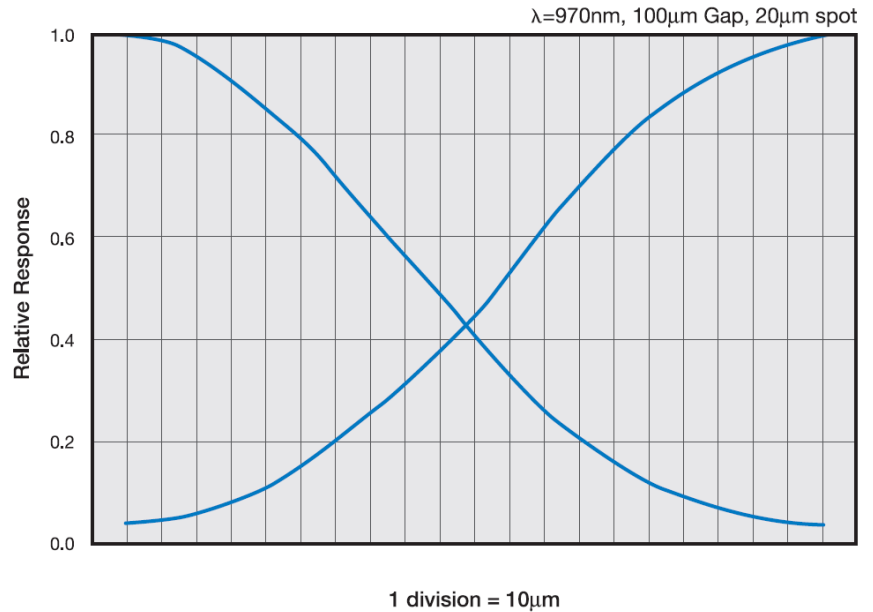
Opto-Electronic
Components



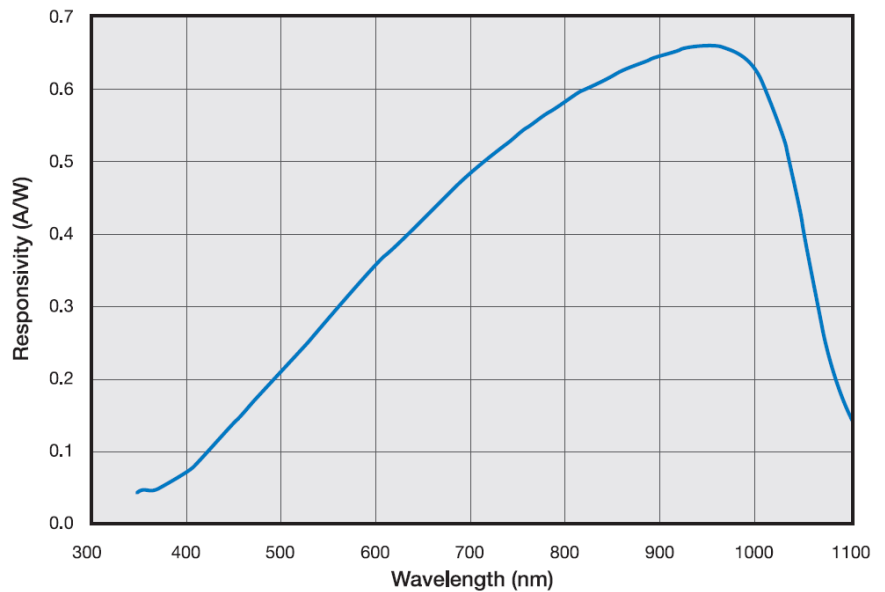
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The circuit on the opposite page represents a typical biasing and detection circuit set up for both bi-cells and quad-cells. For position calculations and further details, refer to "Photodiode Characteristics" section of the catalog.

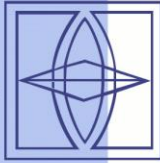
Typical Cross-Over Characteristics



Typical Spectral Reponse

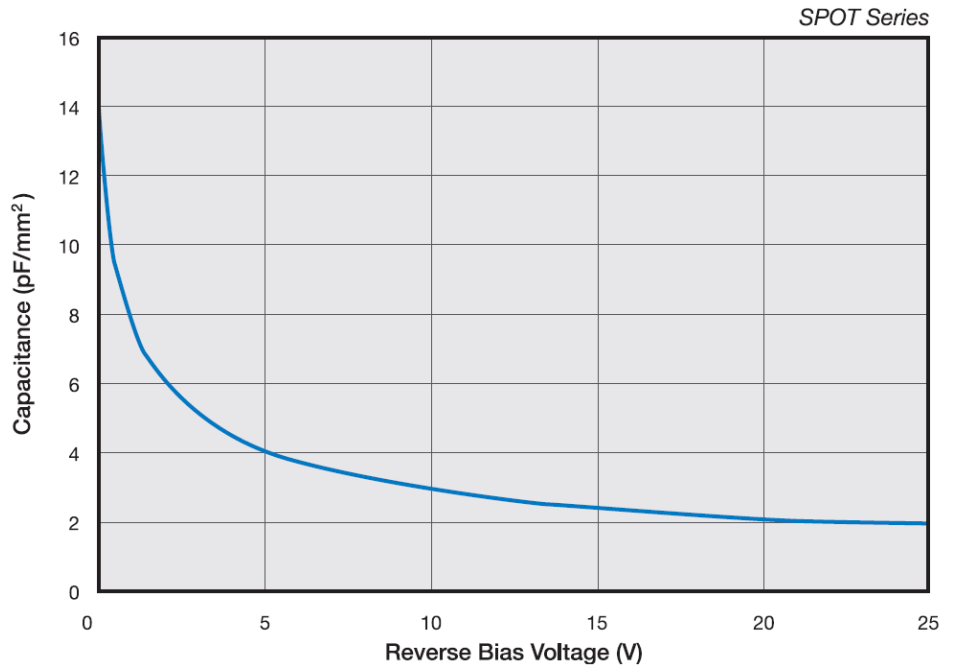


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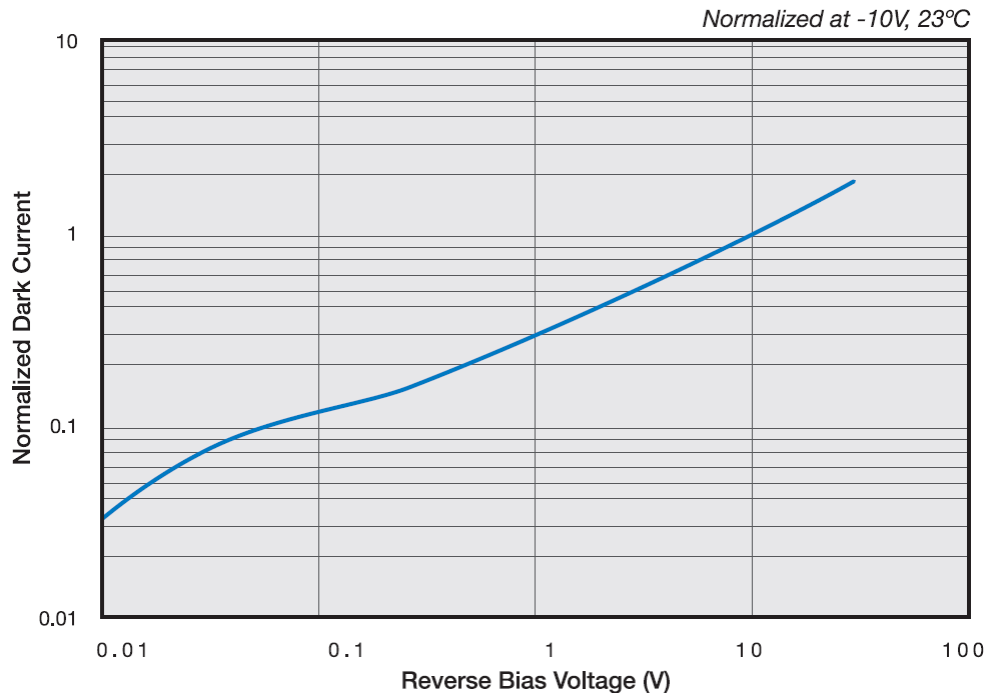


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Typical Capacitance vs. Reverse Bias Voltage



Typical Dark Current vs. Reverse Bias





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

Model Number	Active Area per Element		Element Gap (nm)	Responsivity (A/W) 970nm		Capacitance (pF) -10V	Dark Current (nA)	
	Area (mm ²)	Dimensions (mm)		Min	Typ	Typ	Typ	Max
Two-Element Series, Metal Package								
CD-25T	2.3	4.6 x 0.5	0.2	0.60	0.65	50 @ -15V	20 @ -15V	
SPOT-2D	3.3	1.3 x 2.5	0.127			11	0.15	2.0
SPOT-2DMI	0.7	0.6 x 1.2	0.013			3	0.05	1.0
SPOT-3D	2.8	0.6 x 4.6	0.025			7	0.13	2.0
Four-Element Series, Metal Package								
SPOT-4D	1.61	1.3 sq	0.127	0.60	0.65	5	0.10	1.0
SPOT-4DMI	0.25	0.5 sq	0.013			1	0.01	0.5
SPOT-9D	19.6	10 ϕ *	0.102			60	0.50	10.0
SPOT-9DMI	19.6		0.010					

Model Number	NEP (W/ $\sqrt{\text{Hz}}$) -10V, 970nm	Reverse Voltage (V)	Rise Time (ns) -10V, 780nm, 50 Ω	Temp. Range ($^\circ\text{C}$)		Package Style
	Typ	Max	Typ	Operating	Storage	
Two-Element Series, Metal Package						
CD-25T	1.1 e -14	30	300 @ -15V	-40 ~ +100	-55 ~ +125	2/ TO-5
SPOT-2D			5			41/ TO-5
SPOT-2DMI			7			40/ TO-18
SPOT-3D			4			41/ TO-5
Four-Element Series, Metal Package						
SPOT-4D	8.7 e -15	30	3	-40 ~ +100	-55 ~ +125	41/ TO-5
SPOT-4DMI	2.8 e -15					
SPOT-9D	1.9 e -14					
SPOT-9DMI						43/ LoProf

Model Number	Active Area per Element		Element Gap (nm)	Responsivity (A/W) 257nm		Capacitance (pF) 0V	Shunt Resistance (M Ω)	
	Area (mm ²)	Dimensions (mm)		Min	Typ	Typ	Min	Max
UV-Enhanced Four Elements, Metal Package								
SPOT-4DUV	1.61	1.3 sq	0.127	0.08	0.10	40	100	500

Model Number	NEP (W/ $\sqrt{\text{Hz}}$)	Reverse Voltage (V)	Rise Time (μs) 0V, 257nm	Temp. Range ($^\circ\text{C}$)		Package Style
	Typ	Max	Typ	Operating	Storage	
UV-Enhanced Four Elements, Metal Package						
SPOT-4DUV	1.3 e -13	5	10	-10 ~ +60	-20 ~ +70	41/ TO-5

* Overall Diameter (all four quads)

Chip centering within ± 0.010 ". For Mechanical Drawings please refer to "Mechanical Drawings".



Dimensions

