Segmented Photodiodes (SPOT Series)

Position Sensing Detector (PSD)

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 / cm2 and typical uniformity of response for a 1 mm diameter spot is ±2%.

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.

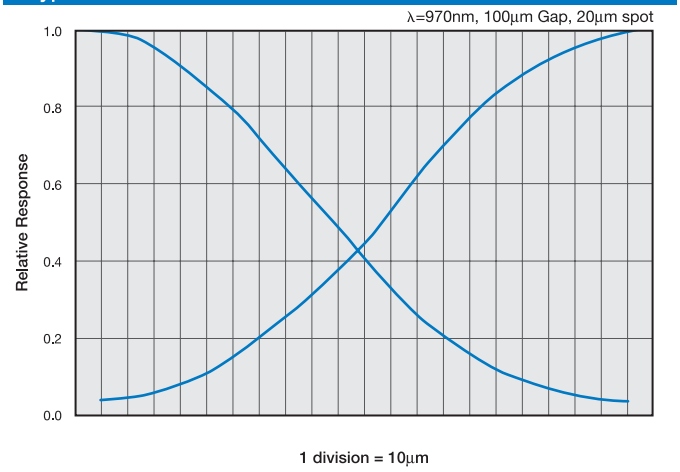
APPLICATIONS

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

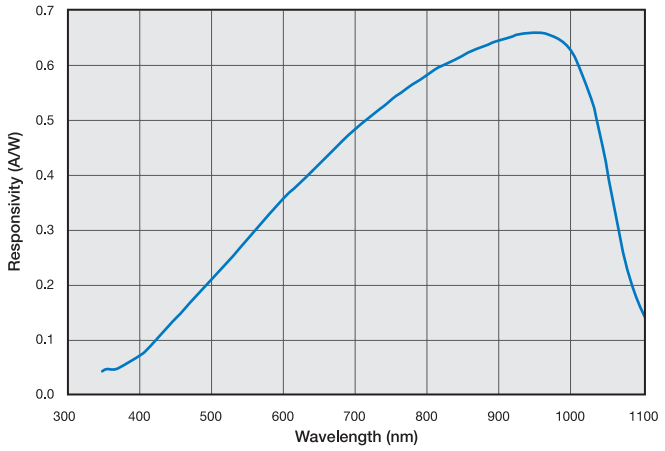
FEATURES

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

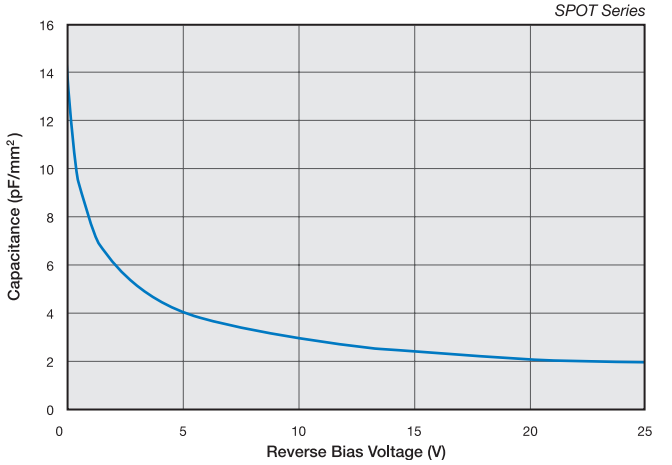
Typical Cross-Over Characteristics



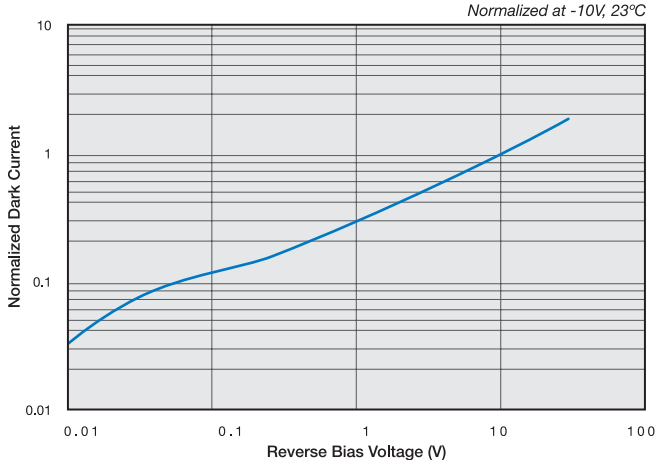
Typical Spectral Response



Typical Capacitance vs. Reverse Bias Voltage



Typical Dark Current vs. Reverse Bias



Segmented Photodiodes (SPOT Series)

Typical Electro-Optical Specifications at T_A=23°C

Model Number	Active Area Per Element		Element Gap (nm)	Responsivity (A/W)		Capacitance (pF)	Dark Current (nA)		NEP (W/√Hz)	Reverse Voltage (V)	Rise Time (ns)	Temp Range (°C)		Package Style ¶
	Area (mm²)	Dimensions (mm)		970 nm		-10 V	-10 V		-10 V 970 nm		-10 V 780 nm 50 Ω	Operating	Storage	
				min.	typ.	typ.	typ.	max.	typ.	max.	typ.			
Two-Element Series, Metal Package														
CD-25T	2.3	4.6 x 0.5	0.2	0.60	0.65	50@ -15V	20@ -15V		1.1 e-14	30	300@ -15V	-40 ~ +100	-55 ~ +125	2 / TO-5
SPOT-2D	3.3	1.3 x 2.5	0.127			11	0.15	2.0			5			41 / TO-5
SPOT-2DMI	0.7	0.6 x 1.2	0.013			3	0.05	1.0	6.2 e-15		7			40 / TO-18
SPOT-3D	2.8	0.6 x 4.6	0.025			7	0.13	2.0	9.9 e-15		4			41 / TO-5
Four Element Series, Metal Package														
SPOT-4D	1.61	1.3 sq	0.127	0.60	0.65	5	0.10	1.0	8.7 e-15	30	3	-40 ~ +100	-55 ~ +125	41 / TO-5
SPOT-4DMI	0.25	0.5 sq	0.013			1	0.01	0.5	2.8 e-15					
SPOT-9D	19.6	10 ϕ ‡	0.102			60	0.50	10.0	1.9 e-14					43 / LoProf
SPOT-9DMI	19.6		0.010											

Model Number	Active Area Per Element		Element Gap (nm)	Responsivity 257 nm		Capacitance 0 V	Shunt Resistance (MΩ)		NEP	Reverse Voltage (V)	Rise Time 0 V, 257 nm	Package Style ¶		
	Area (mm²)	Dimensions (mm)		A/W		pF			(W/√Hz)		µs			
				min.	typ.	typ.	min.	max.	typ.	max.	typ.			
UV-Enhanced Four Elements, Metal Package §														
SPOT-4DUV	1.61	1.3 sq	0.127	0.08	0.10	40	100	500	1.3 e-13	5	10	-10 ~ +60	-20 ~ +70	41 / TO-5

‡ Overall Diameter (All four Quads)
¶ For mechanical drawings please refer to pages 58 thru 69.
Chip centering within ±0.010".