

One-dimensional PSD

Plastic package

1-D PSD with small plastic package

Hamamatsu offers a variety of 1-D PSDs (position sensitive detectors) molded into plastic packages. These PSDs feature excellent position detection resolution, high resistance to disturbance background light and high reliability.

Features

- Excellent position detection resolution
- High reliability
- Thin, miniature plastic package
- Clear package passing wide wavelength range or visible-cut package reducing background light noise
- Surface mount packages are available.
- High interelectrode resistance: S3274-05, S7105-05, S5629-02

Applications

- Auto focus camera
- Range finders
- Optical proximity switches
- Displacement meters

Structure / Absolute maximum ratings

Type no.	Package	Dimensional outline	Photosensitive area (mm)	Resistance length (mm)	Absolute maximum ratings		
					Reverse voltage V _R max (V)	Operating temperature T _{opr} (°C)	Storage temperature T _{stg} (°C)
S4581-04	Surface mount type, visible-cut	(1)	1 × 2	2	20	-25 to +85	-40 to +100
S4583-04		(1)	1 × 3	3			
S4584-04		(1)	1 × 3.5	3.5			
S4584-06	Surface mount type, clear						
S3274-05	DIP type, visible-cut	(2)					
S7105-04	Surface mount type, visible-cut	(3)	1 × 4.2	4.2			
S7105-06	Surface mount type, clear						
S7105-05	Surface mount type, visible-cut						
S5629	Surface mount type, visible-cut	(4)	1 × 6	6			
S5629-01	Surface mount type, clear						
S5629-02	Surface mount type, visible-cut						

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

This product does not support lead-free soldering. For details on reflow soldering conditions for surface-mount components, please contact our sales office.

Electrical and optical characteristics (Typ. Ta=25 °C, unless otherwise noted)

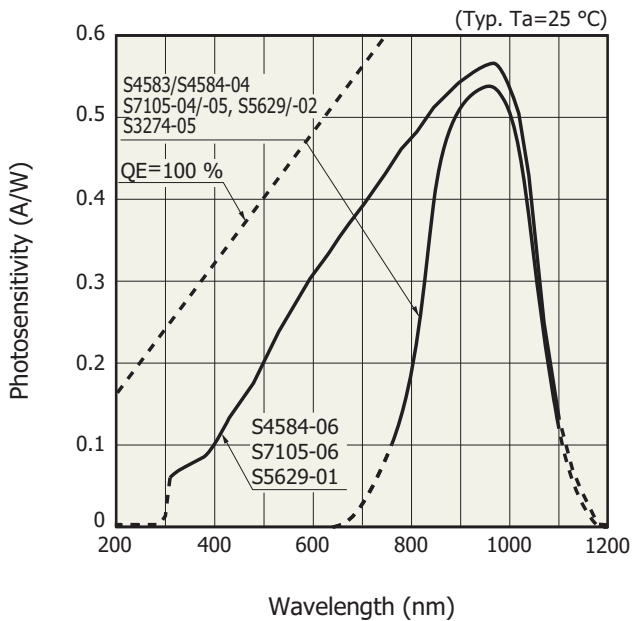
Type no.	Spectral response range λ (nm)	Peak sensitivity wavelength λ_p (nm)	Photosensitivity S		Interelectrode resistance Rie Vb=0.1 V			Position detection error *1 VR=1 V Light spot size= ϕ 300 μ m		Saturation photocurrent *2 Ist VR=1 V RL=1 k Ω (μ A)	Dark current ID VR=1 V		Temp. coefficient of ID TCID (times/°C)	Rise time *3 tr VR=1 V RL=1 k Ω λ =650 nm λ =890 nm		Terminal capacitance Ct VR=1 V f=10 kHz (pF)
			λ =650 nm (A/W)	λ =890 nm (A/W)	Min. (k Ω)	Typ. (k Ω)	Max. (k Ω)	Typ. (μ m)	Max. (μ m)		Typ. (nA)	Max. (nA)		λ =650 nm (μ s)	λ =890 nm (μ s)	
S4581-04	760 to 1060	920	-	0.51	100	140	180	\pm 10	\pm 20	30	0.05	1	1.15	-	10	15
S4583-04	760 to 1100	960	-	0.51	100	140	180	\pm 10	\pm 30	30	0.05	1	1.15	-	10	15
S4584-04	760 to 1100		-	0.51	100	140	180			30				-	10	
S4584-06	320 to 1100	960	0.38	0.55				\pm 15	\pm 35	30	0.05	1	1.15	3	10	15
S3274-05	760 to 1100		-	0.51	320	400	480			15				-	15	
S7105-04	760 to 1100		-	0.51	100	140	180			30				-		
S7105-06	320 to 1100	960	0.38	0.55				\pm 15	\pm 40	30	0.1	2	1.15	2	5	40
S7105-05	760 to 1100		-	0.51	320	400	480			15				-	10	
S5629	760 to 1100		-	0.51						80				-		
S5629-01	320 to 1100	960	0.38	0.55	30	50	80	\pm 20	\pm 60	80	0.1	2	1.15	2	5	60
S5629-02	760 to 1100		-	0.51	240	300	360			20				-	10	

*1: In the range 75% from the center of the photosensitive area to the edge

*2: This indicates the upper limit of the photocurrent linearity over the entire incident light quantity and is defined as the photocurrent at a point where the linearity deviates by 10%.

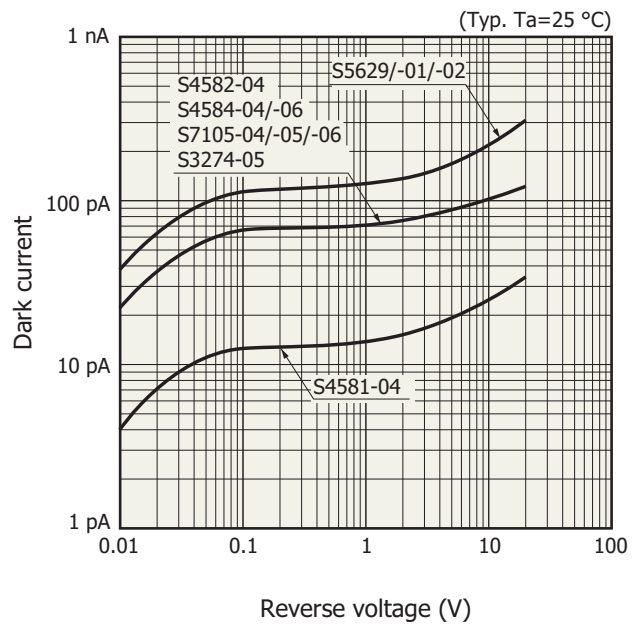
*3: Time required for output change from 10 to 90% of the steady output value when stepped function light is input to the PSD

Spectral response



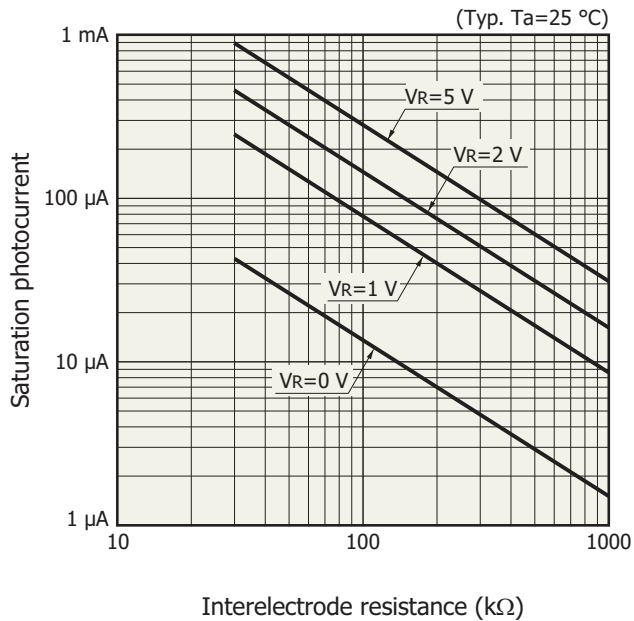
KPSDB0079EC

Dark current vs. reverse voltage



KPSDB0004EF

Saturation photocurrent vs. interelectrode resistance



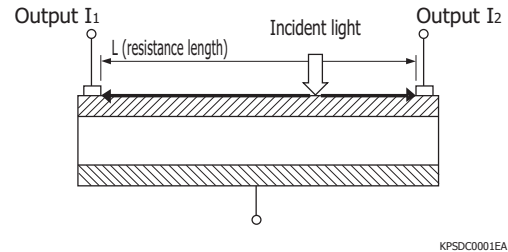
KPSD80003EA

Definition of position detection error

When the electrical center of a PSD is assumed to be the position of incident light where light current I_1 equals I_2 , position detection error at each incident position can be defined by the following equation.

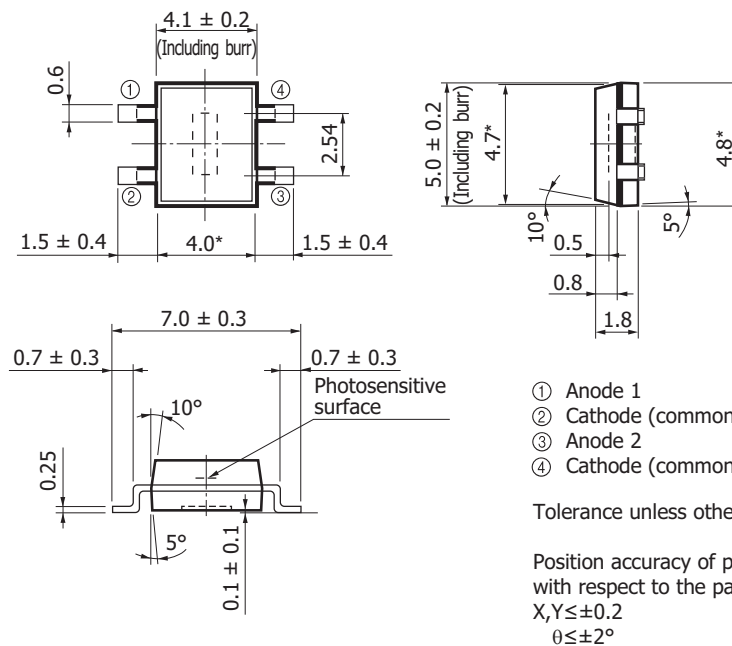
$$\text{Position detection error } (\mu\text{m}) = \text{Incident position} - \frac{I_2 - I_1}{I_1 + I_2} \times \frac{L}{2}$$

The electrical center is viewed as 0, I_1 as (+), and I_2 as (-).



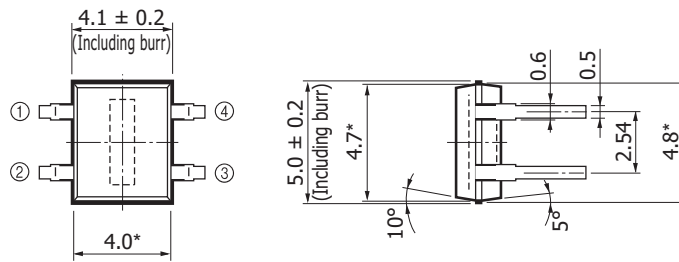
Dimensional outlines (unit: mm)

(1) S4581-04, S4583-04, S4584-04/-06 (Surface mount type)



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(2) S3274-05



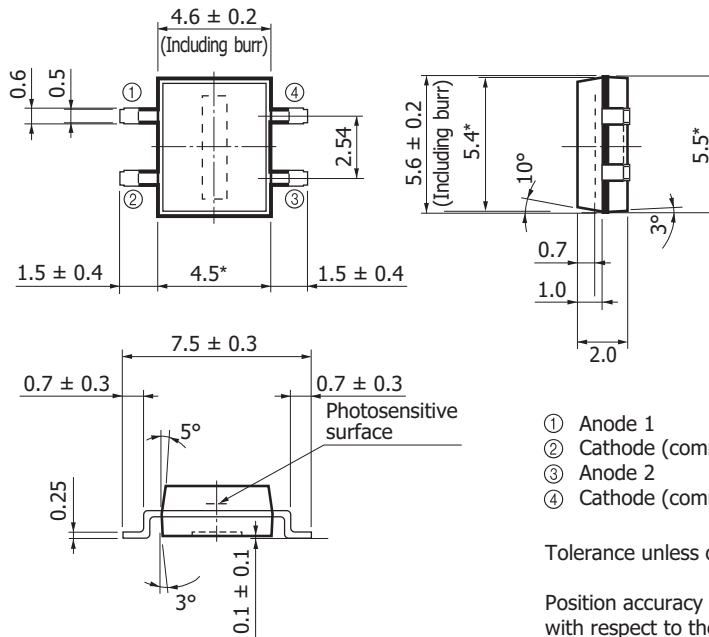
- ① Anode 1
- ② Cathode (common)
- ③ Anode 2
- ④ Cathode (common)

Tolerance unless otherwise noted: ±0.1

Position accuracy of photosensitive area center with respect to the package dimensions marked *
 $X, Y \leq \pm 0.2$
 $\theta \leq \pm 2^\circ$

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(3) S7105-04/-05/-06 (Surface mount type)



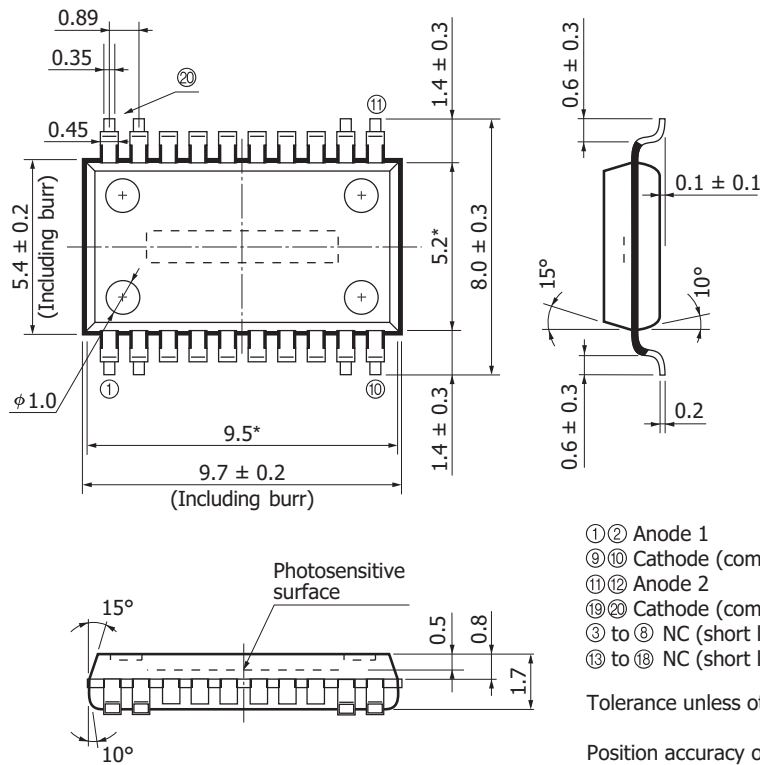
- ① Anode 1
- ② Cathode (common)
- ③ Anode 2
- ④ Cathode (common)

Tolerance unless otherwise noted: ±0.1

Position accuracy of photosensitive area center with respect to the package dimensions marked *
 $X, Y \leq \pm 0.2$
 $\theta \leq \pm 2^\circ$

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(4) S5629/-01/-02 (Surface mount type)



Tolerance unless otherwise noted: ± 0.1

Position accuracy of photosensitive area center
 with respect to the package dimensions marked *
 $X, Y \leq \pm 0.2$
 $\theta \leq \pm 2^\circ$

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Related information

www.hamamatsu.com/sp/ssd/doc_en.html

Precautions

- Disclaimer
- Metal, ceramic, plastic package products
- Surface mount type products

Technical information

- PSD

Information described in this material is current as of February, 2015.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use.

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