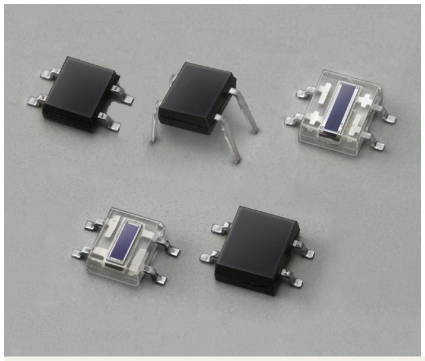
HAMAMATSU
PHOTON IS OUR BUSINESS

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**

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 VR max (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)
S4583-04	Surface mount type, visible-cut	(1)	1 × 3	3	20	-25 to +85	-40 to +100
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						

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)

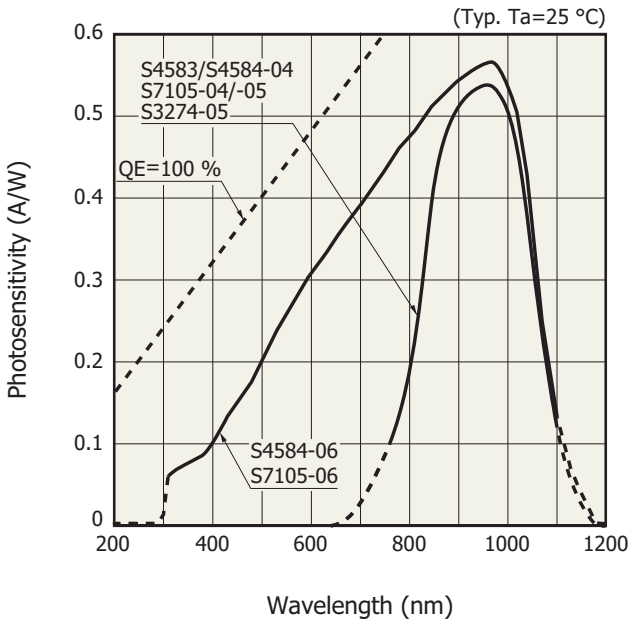
Type no.	Spectral response range λ (nm)	Peak sensitivity wavelength λp (nm)	Photosensitivity S λ=650 nm (A/W)	Photosensitivity S λ=890 nm (A/W)	Interelectrode resistance Rie Vb=0.1 V Min. (kΩ)	Interelectrode resistance Rie Vb=0.1 V Typ. (kΩ)	Interelectrode resistance Rie Vb=0.1 V Max. (kΩ)	Position detection error *1 VR=1 V Light spot size=ϕ300 μm Typ. (μm)	Position detection error *1 VR=1 V Light spot size=ϕ300 μm Max. (μm)	Saturation photocurrent *2 Ist VR=1 V RL=1 kΩ (μA)	Dark current ID VR=1 V Typ. (nA)	Dark current ID VR=1 V Max. (nA)	Temp. coefficient of ID TCID (times/°C)	Rise time *3 tr VR=1 V RL=1 kΩ λ=650 nm (μs)	Rise time *3 tr VR=1 V RL=1 kΩ λ=890 nm (μs)	Terminal capacitance Ct VR=1 V f=10 kHz (pF)
S4583-04	760 to 1100	960	-	0.51	100	140	180	±10	±30	30	0.05	1	1.15	-	10	15
S4584-04	760 to 1100	960	-	0.51	100	140	180	±15	±35	30	0.05	1	1.15	-	10	15
S4584-06	320 to 1100		0.38	0.55										3		
S3274-05	760 to 1100		-	0.51	320	400	480			15				-	15	
S7105-04	760 to 1100	960	-	0.51	100	140	180	±15	±40	30	0.1	2	1.15	-	5	40
S7105-06	320 to 1100		0.38	0.55										2		
S7105-05	760 to 1100		-	0.51	320	400	480			15				-	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%.

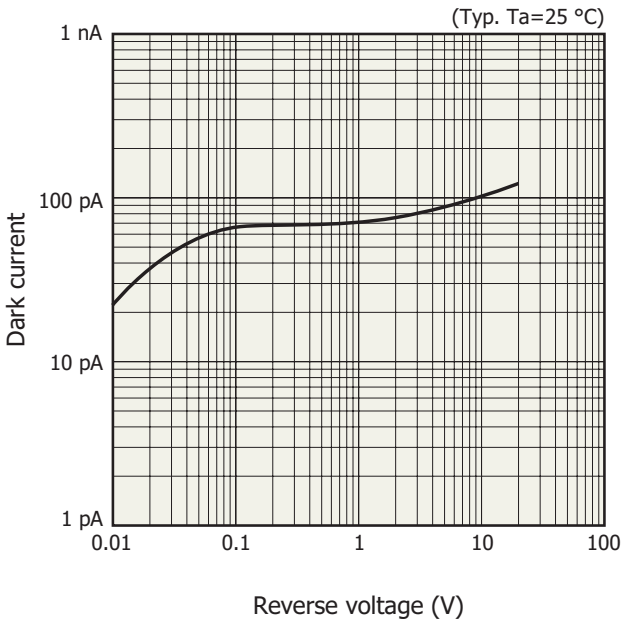
*3: Time required for output change from 10 to 90% of the steady output value when stepped function light is input to the PSD

Spectral response



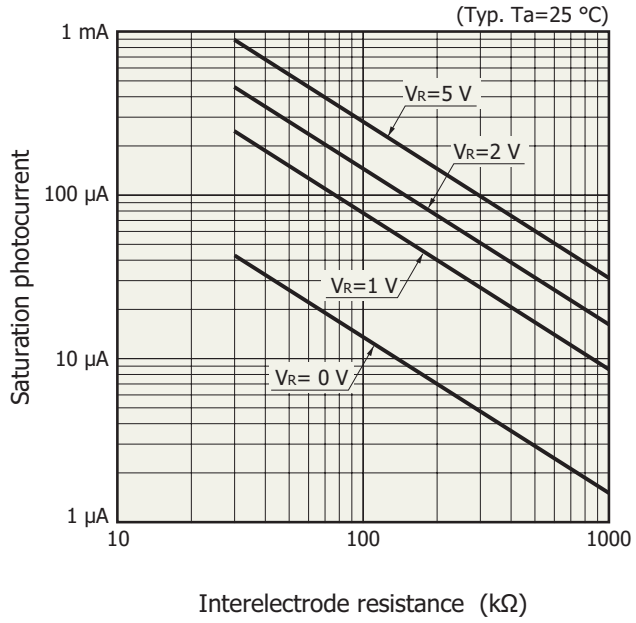
KPSDB0079ED

Dark current vs. reverse voltage



KPSDB0004EG

Saturation photocurrent vs. interelectrode resistance



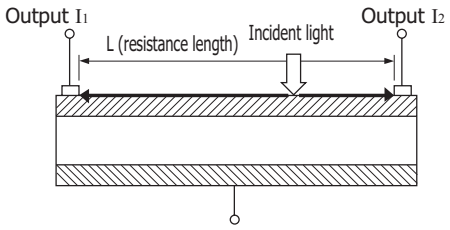
KPSDB0003EA

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.

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

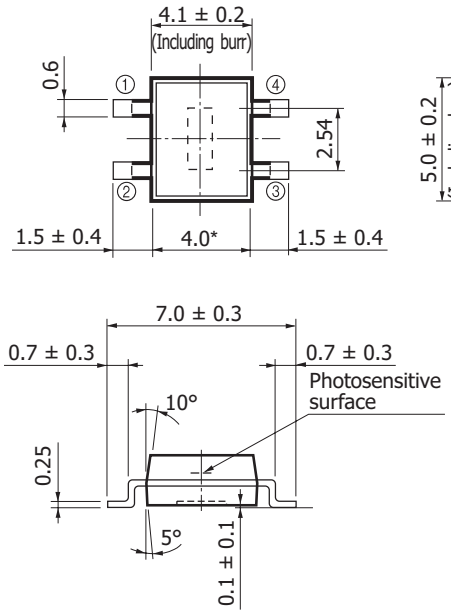
The electrical center is viewed as 0, I_1 as (+), and I_2 as (-).

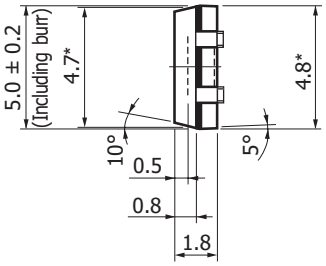


KPSDC0001EA

Dimensional outlines (unit: mm)

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





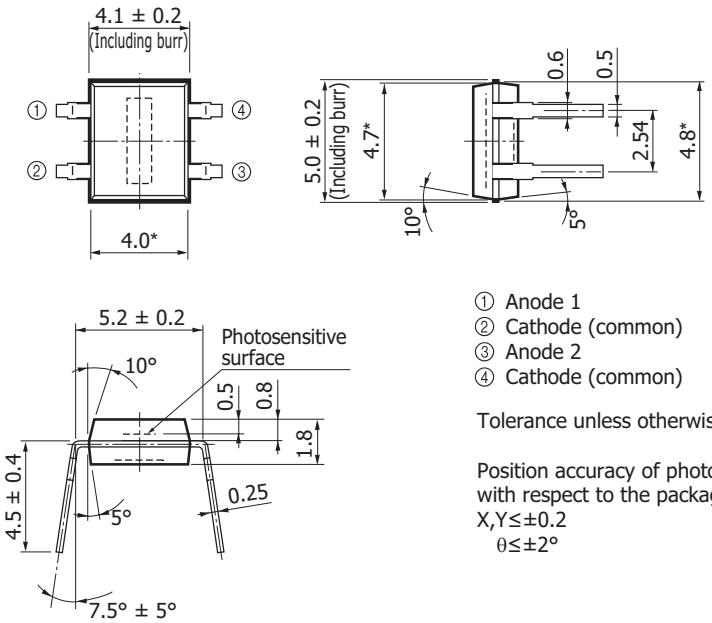
① Anode 1
② Cathode (common)
③ Anode 2
④ Cathode (common)

Tolerance unless otherwise noted: ±0.1

Position accuracy of photosensitive area center with respect to the package dimensions marked *
X,Y≤±0.2
θ≤±2°

KPSDA0022EA

(2) S3274-05



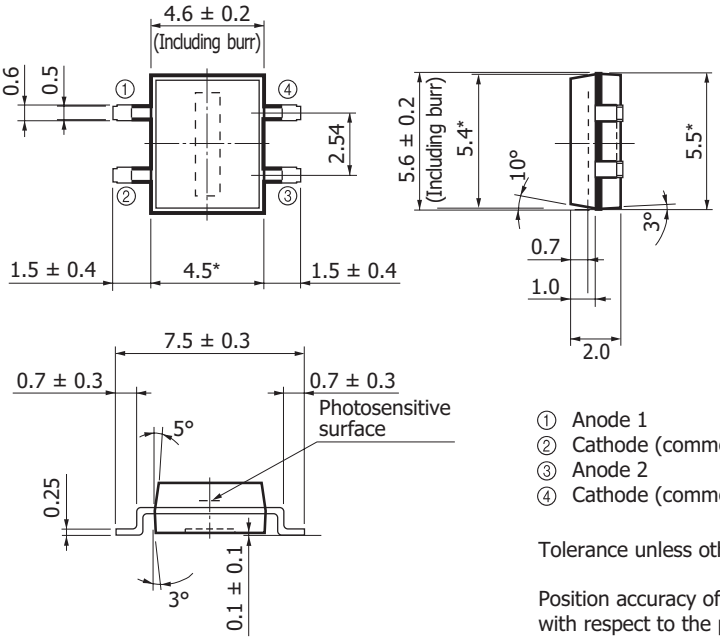
① Anode 1
② Cathode (common)
③ Anode 2
④ Cathode (common)

Tolerance unless otherwise noted: ±0.1

Position accuracy of photosensitive area center with respect to the package dimensions marked *
X,Y≤±0.2
θ≤±2°

KPSDA0063EA

(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≤±0.2
θ≤±2°

KPSDA0047EA

Related information

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

■ Precautions

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

■ Technical information

· PSD

HAMAMATSU www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Solid State Division
1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81)53-434-3311, Fax: (81)53-434-5184
U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218, E-mail: usa@hamamatsu.com
Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8, E-mail: info@hamamatsu.de
France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10, E-mail: infos@hamamatsu.fr
United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44)1707-294888, Fax: (44)1707-325777, E-mail: info@hamamatsu.co.uk
North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509 031 00, Fax: (46)8-509 031 01, E-mail: info@hamamatsu.se
Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41, E-mail: info@hamamatsu.it
China: Hamamatsu Photonics (China) Co., Ltd.: B1201, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, 100020 Beijing, P.R.China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866, E-mail: hpc@hamamatsu.com.cn
Taiwan: Hamamatsu Photonics Taiwan Co., Ltd.: 8F-3, No. 158, Section2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081, E-mail: info@hamamatsu.com.tw

Cat. No. KPSD1009E11 Apr. 2019 DN