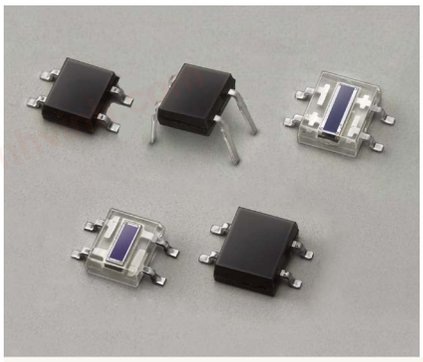
chanhvinh.com

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 $V_R$ 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.

For details on soldering conditions, please contact our sales office.

chanhvinh.com



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

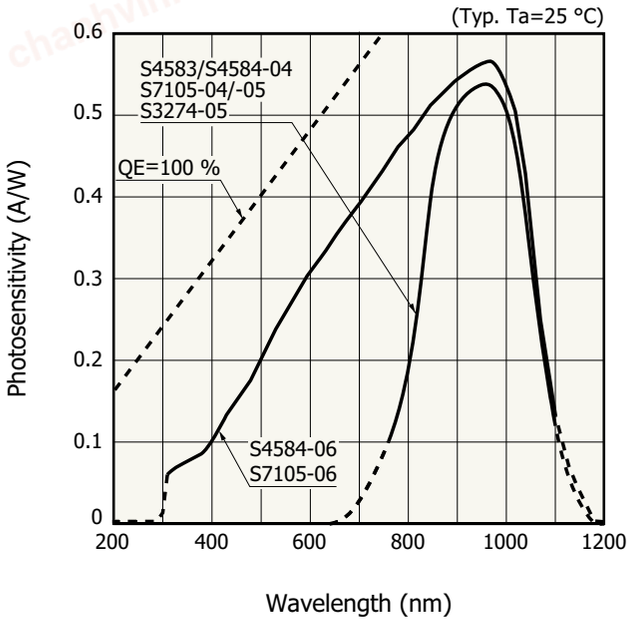
| Type no. | Spectral response range λ (nm) | Peak sensitivity wavelength λp (nm) | Photosensitivity S λ=650 nm (A/W) | Photosensitivity S λ=890 nm (A/W) | Interelectrode resistance Rie Vb=0.1 V Min. (kΩ) | Interelectrode resistance Rie Vb=0.1 V Typ. (kΩ) | Interelectrode resistance Rie Vb=0.1 V Max. (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%.

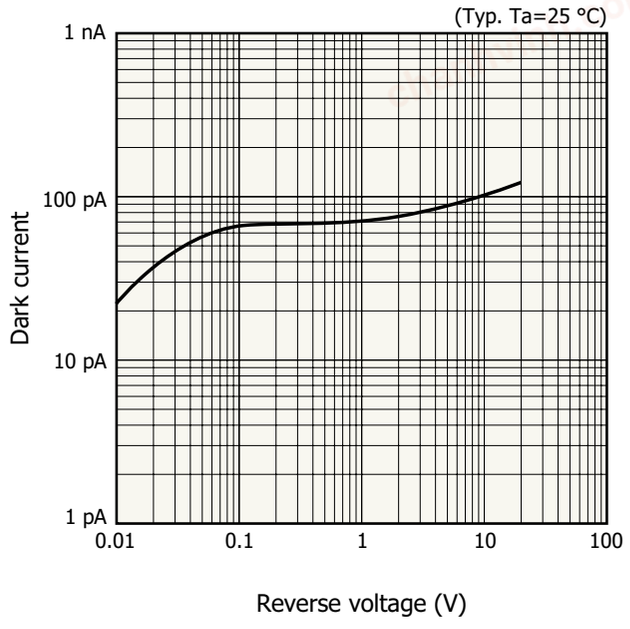
*3: Time required for output change from 10 to 90% of the steady output value when stepped function light is input to the PSD

## Spectral response




KPSDB0079ED

## Dark current vs. reverse voltage

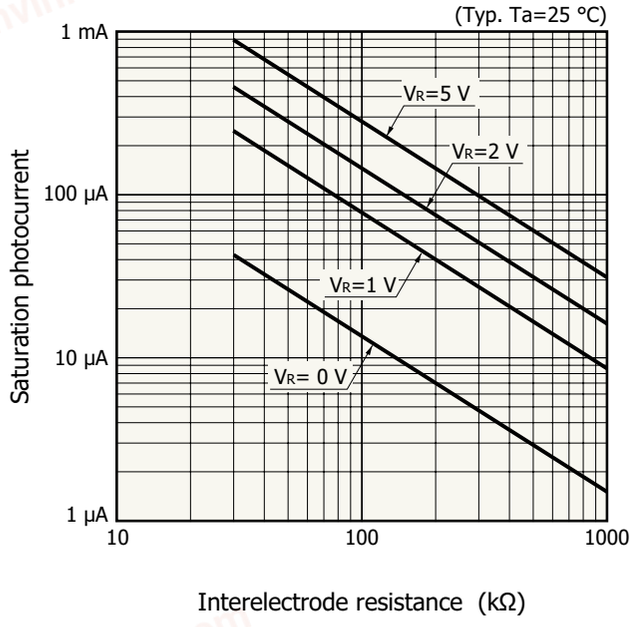



KPSDB0004EG

chanhvinh.com



## Saturation photocurrent vs. interelectrode resistance



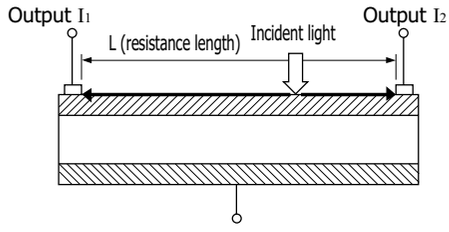

KPSDB0003EA

## 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.

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

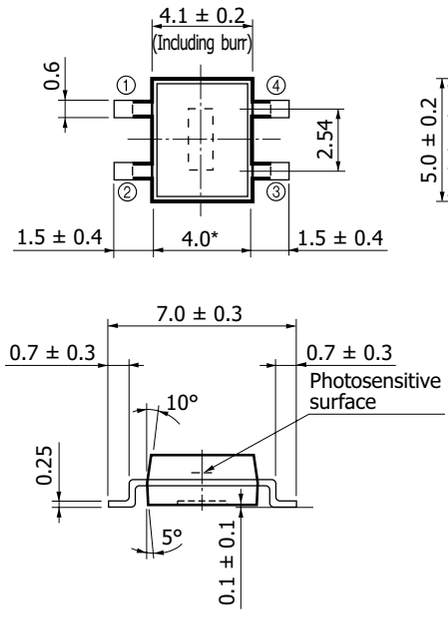
The electrical center is viewed as 0, $I_1$ as (+), and $I_2$ as (-).

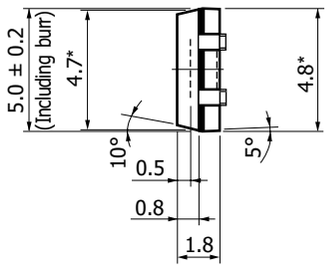



KPSDC0001EA

## 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

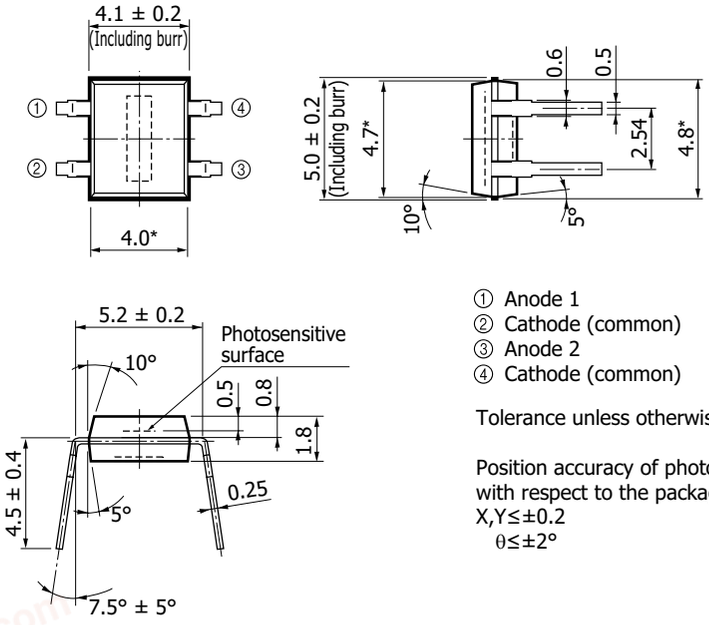
Position accuracy of photosensitive area center with respect to the package dimensions marked *
X,Y≤±0.2
θ≤±2°

KPSDA0022EA

chanhvinh.com



## (2) S3274-05



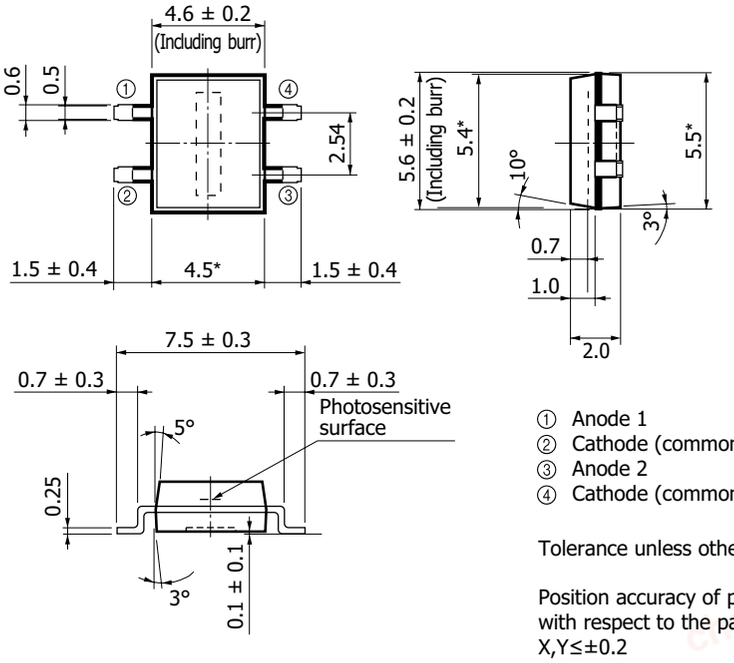

① Anode 1
② Cathode (common)
③ Anode 2
④ Cathode (common)

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

chanhvinh.com



## 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 October 2020.
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.
Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

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, NJ 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, 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, UK, 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, 20044 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.: 1201 Tower B, Jiaming Center, 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, Section 2, 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. KPSD1009E12 Oct. 2020 DN