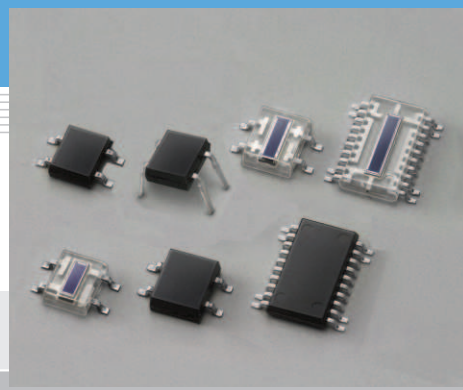


# One-dimensional PSD Plastic package

## 1-D PSD with 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 package is available
- High interelectrode resistance: S3274-05, S7105-05, S5629-02

### Applications

- Camera auto focus
- Range finder
- Optical proximity switch
- Displacement meter

#### ■ General ratings / Absolute maximum ratings

| ■ General ratings / Absolute maximum ratings |                     |             |                   | Absolute maximum ratings   |                               |                             |
|----------------------------------------------|---------------------|-------------|-------------------|----------------------------|-------------------------------|-----------------------------|
| Type No.                                     | Dimensional outline | Active area | Resistance length | Reverse voltage<br>VR Max. | Operating temperature<br>Topr | Storage temperature<br>Tstg |
|                                              |                     | (mm)        | (mm)              | (V)                        | (°C)                          | (°C)                        |
| S4581-04                                     | 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                                     |                     |             |                   |                            |                               |                             |
| S3274-05                                     | ②                   |             |                   |                            |                               |                             |
| S7105-04                                     | ③                   | 1 × 4.2     | 4.2               |                            |                               |                             |
| S7105-06                                     |                     |             |                   |                            |                               |                             |
| S7105-05                                     |                     |             |                   |                            |                               |                             |
| S5629                                        | ④                   | 1 × 6       | 6                 |                            |                               |                             |
| S5629-01                                     |                     |             |                   |                            |                               |                             |
| S5629-02                                     |                     |             |                   |                            |                               |                             |

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

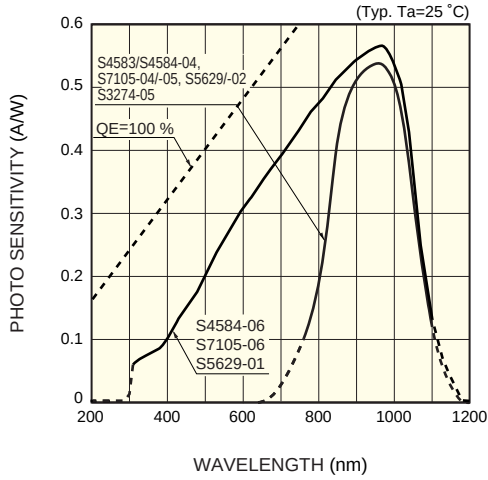
| Type No. | Spectral response range<br>λ<br>(nm) | Peak sensitivity wavelength<br>λp<br>(nm) | Photo sensitivity S |                   | Interelectrode resistance Rie<br>Vb=0.1 V |              |              | Position detection error *1<br>VR=1 V<br>spot light size = φ300 μm |              | Saturation photocurrent *2<br>Ist<br>VR=1 V<br>RL=1 kΩ<br>(μA) | Dark current ID<br>VR=1 V |              | Temp. coefficient of ID<br>TCID<br>(Times/°C) | Rise time *3<br>tr<br>VR=1 V<br>RL=1 kΩ<br>(μs) |                  | Terminal capacitance Ct<br>VR=1 V<br>f=10 kHz<br>(pF) |
|----------|--------------------------------------|-------------------------------------------|---------------------|-------------------|-------------------------------------------|--------------|--------------|--------------------------------------------------------------------|--------------|----------------------------------------------------------------|---------------------------|--------------|-----------------------------------------------|-------------------------------------------------|------------------|-------------------------------------------------------|
|          |                                      |                                           |                     |                   |                                           |              |              |                                                                    |              |                                                                |                           |              |                                               |                                                 |                  |                                                       |
|          |                                      |                                           | λ=650 nm<br>(A/W)   | λ=890 nm<br>(A/W) | Min.<br>(kΩ)                              | Typ.<br>(kΩ) | Max.<br>(kΩ) | Typ.<br>(μm)                                                       | Max.<br>(μm) |                                                                | Typ.<br>(nA)              | Max.<br>(nA) |                                               | λ=650 nm<br>(μs)                                | λ=890 nm<br>(μs) |                                                       |
| S4581-04 | 760 to 1060                          | 920                                       | -                   | 0.51              | 100                                       | 140          | 180          | ±10                                                                | ±20          | 30                                                             | 0.05                      | 1            | 1.15                                          | -                                               | 10               | 15                                                    |
| 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                          |                                           | 0.33                |                   |                                           |              |              |                                                                    |              |                                                                |                           |              |                                               | 3                                               |                  |                                                       |
| S3274-05 | 760 to 1100                          | 960                                       | -                   | 0.51              | 320                                       | 400          | 480          | ±15                                                                | ±40          | 15                                                             | 0.1                       | 2            | 1.15                                          | -                                               | 10               | 40                                                    |
| S7105-04 | 760 to 1100                          |                                           | -                   |                   | 100                                       | 140          | 180          |                                                                    |              | 30                                                             |                           |              |                                               | -                                               |                  |                                                       |
| S7105-06 | 320 to 1100                          |                                           | 0.38                |                   | 320                                       | 400          | 480          |                                                                    |              | 15                                                             |                           |              |                                               | 2                                               |                  |                                                       |
| S7105-05 | 760 to 1100                          |                                           | -                   |                   | 320                                       | 400          | 480          |                                                                    |              | 15                                                             |                           |              |                                               | -                                               |                  |                                                       |
| S5629    | 760 to 1100                          | 960                                       | -                   | 0.51              | 30                                        | 50           | 80           | ±20                                                                | ±60          | 80                                                             | 0.1                       | 2            | 1.15                                          | -                                               | 5                | 60                                                    |
| S5629-01 | 320 to 1100                          |                                           | 0.38                |                   |                                           |              |              |                                                                    |              | 20                                                             |                           |              |                                               | 2                                               |                  |                                                       |
| S5629-02 | 760 to 1100                          |                                           | -                   |                   |                                           |              |              |                                                                    |              | 20                                                             |                           |              |                                               | -                                               |                  |                                                       |
| S5629-02 | 760 to 1100                          |                                           | -                   |                   | 240                                       | 300          | 360          |                                                                    |              | 20                                                             |                           |              |                                               | -                                               | 10               |                                                       |

\*1: In the range 75 % from the center of the active area to the edge.

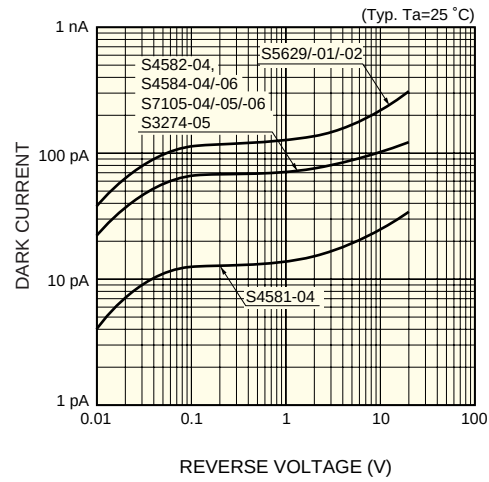
\*2: This indicates the upper limit of the photocurrent linearity over the entire incident light quantity and is defined as the photocurrent at a point where the linearity deviates by 10 %.

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

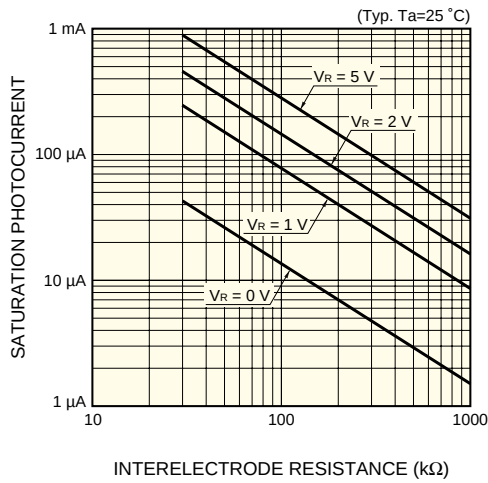
## ■ Spectral response



## ■ Dark current vs. reverse voltage



## ■ Saturation photocurrent vs. interelectrode resistance

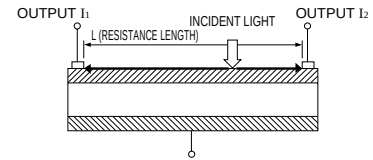


## ■ Definition of position detection error

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.

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

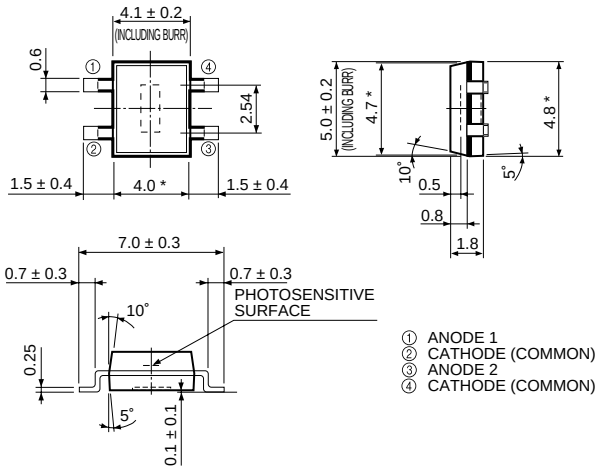
The electrical center is viewed as 0,  $I_1$  as (+), and  $I_2$  as (-).



KPSDC0001EA

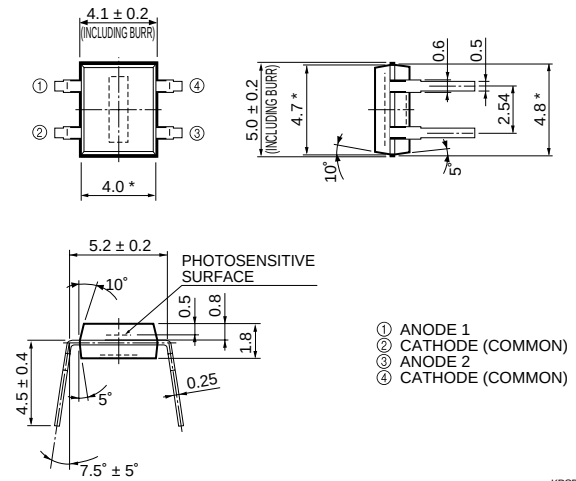
■ Dimensional outlines [unit: mm, tolerance unless otherwise noted:  $\pm 0.1$ , chip position accuracy (without ①) with respect to the package dimensions marked \* X,  $Y \leq \pm 0.2$ ,  $\theta \leq \pm 2^\circ$ ]

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



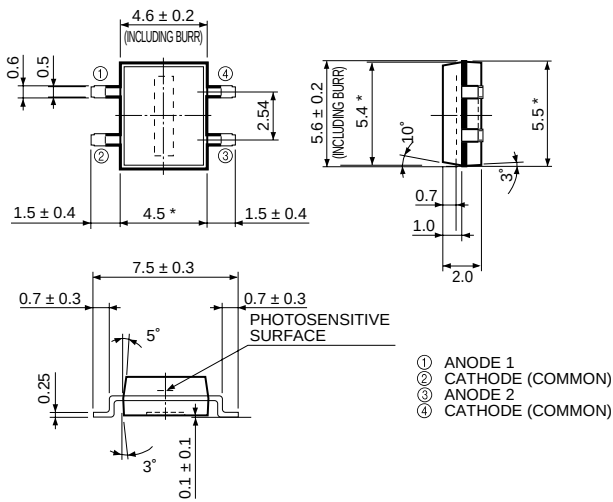
KPSDA0022EA

② S3274-05



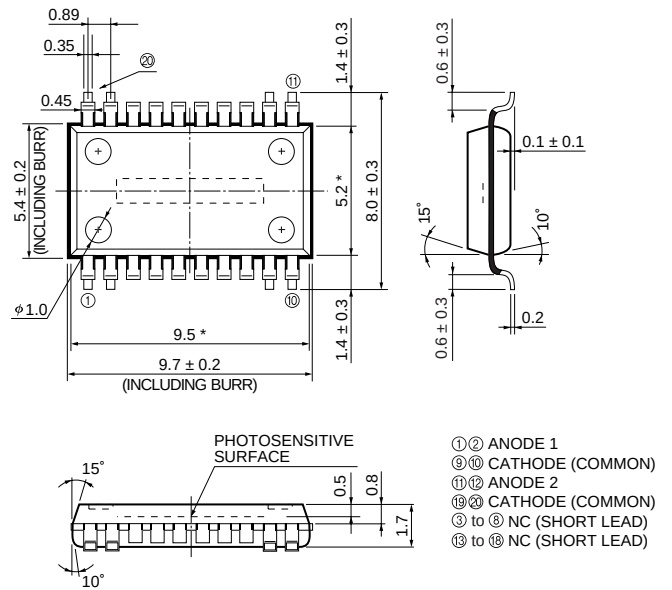
KPSDA0063EA

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



KPSDA0047EA

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



KPSDA0023EA

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