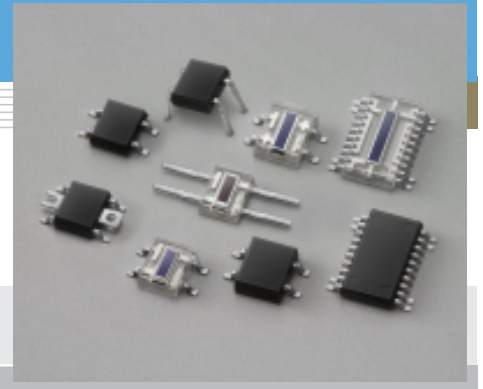


# One-dimensional PSD Plastic package

## 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
- Suitable for high-speed, microscopic spot light: S7879, S8361
- High sensitivity in the red region: S8361
- High interelectrode resistance: S3271 to S3274-05, S7105-05, S5629-02

### Applications

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

### ■ General ratings / Absolute maximum ratings

Type No.	Dimensional outline	Active area (mm)	Resistance length (mm)	Absolute maximum ratings		
				Reverse voltage VR Max. (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)
S6407	①	1 × 1	1	20	-25 to +85	-40 to +100
S6515		1 × 1.2				
S4580-04	②	0.8 × 1.5	1.5			
S4580-06						
S4581-04	②	1 × 2	2			
S4581-06						
S3271-05	③	1 × 2.5	2.5			
S4582-04	②					
S4582-06	③	1 × 3	3			
S3272-05	③					
S4583-04	②	1 × 3	3			
S4583-06						
S3273-05	③	1 × 3.5	3.5			
S7879	④					
S8361	②	1 × 3.5	3.5			
S4584-04						
S4584-06	③	1 × 4.2	4.2			
S3274-05	⑤					
S7105-04	⑤	1 × 4.2	4.2			
S7105-06						
S7105-05	⑥	1 × 6	6			
S5629						
S5629-01						
S5629-02						

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

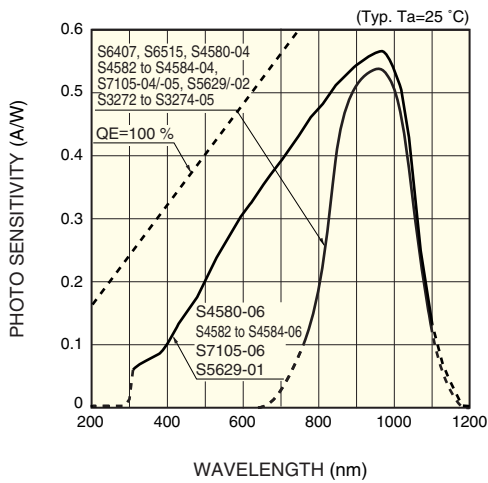
Type No.	Spectral response range $\lambda$ (nm)	Peak sensitivity wavelength $\lambda_p$ (nm)	Photo sensitivity S		Interelectrode resistance Rie Vb=0.1 V			Position detection error *1 VR=1 V spot light size = $\phi$ 300 $\mu$ m		Saturation photocurrent *2 Ist VR=1 V RL=1 k $\Omega$	Dark current Id VR=1 V		Temp. coefficient of Id TCID (Times/°C)	Rise time tr *3 VR=1 V RL=1 k $\Omega$		Terminal capacitance Ct VR=1 V f=10 kHz (pF)					
			$\lambda=650$ nm (A/W)	$\lambda=890$ nm (A/W)	Min. (k $\Omega$ )	Typ. (k $\Omega$ )	Max. (k $\Omega$ )	Typ. ( $\mu$ m)	Max. ( $\mu$ m)	( $\mu$ A)	Typ. (nA)	Max. (nA)		$\lambda=650$ nm ( $\mu$ s)	$\lambda=890$ nm ( $\mu$ s)						
S6407	760 to 1100	960	-	0.51	160	200	240	$\pm$ 5	$\pm$ 15	25	0.05	1	1.15	-	10	15					
S6515					100	140	180			30											
S4580-04	760 to 1100	960	-	0.51	100	140	180	$\pm$ 10	$\pm$ 20	30	0.05	1	1.15	-	10	15					
S4580-06	320 to 1100		0.35											3							
S4581-04	760 to 1060	920	-	0.51	100	140	180	$\pm$ 10	$\pm$ 20	30	0.05	1	1.15	-	10	15					
S4581-06	320 to 1060		0.38											3							
S3271-05	760 to 1060		-											0.51			320	400	480	-	15
S4582-04	760 to 1100	960	-	0.51	100	140	180	$\pm$ 10	$\pm$ 25	30	0.05	1	1.15	-	10	15					
S4582-06	320 to 1100		0.33											3							
S3272-05	760 to 1100		-											0.51			320	400	480	-	15
S4583-04	760 to 1100	960	-	0.51	100	140	180	$\pm$ 10	$\pm$ 30	30	0.05	1	1.15	-	10	15					
S4583-06	320 to 1100		0.33											3							
S3273-05	760 to 1100		-											0.51			320	400	480	-	15
S7879	440 to 1100		0.36											1			4				
S8361	400 to 1100	680	0.45	0.45	70	110	150	$\pm$ 15	$\pm$ 60	40				1	4	30					
S4584-04	760 to 1100	960	-	0.51	100	140	180	$\pm$ 15	$\pm$ 35	30	0.05	1	1.15	-	10	15					
S4584-06	320 to 1100		0.33											3							
S3274-05	760 to 1100		-											0.51			320	400	480	-	15
S7105-04	760 to 1100	960	-	0.51	100	140	180	$\pm$ 15	$\pm$ 40	30	0.1	2	1.15	-	5	40					
S7105-06	320 to 1100		0.38											2							
S7105-05	760 to 1100		-											0.51			320	400	480	-	15
S5629	760 to 1100	960	-	0.51	30	50	80	$\pm$ 20	$\pm$ 60	80	0.1	2	1.15	-	5	60					
S5629-01	320 to 1100		0.38											2							
S5629-02	760 to 1100		-											0.51			240	300	360	-	20

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

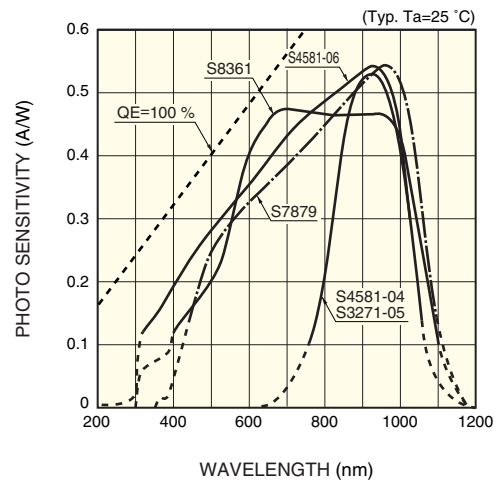
\*2: This indicates the upper limit of the photocurrent linearity over the entire incident light quantity and is defined as the photocurrent at a point where the linearity deviates by 10 %.

\*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

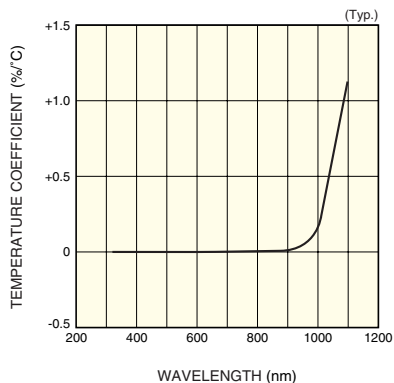


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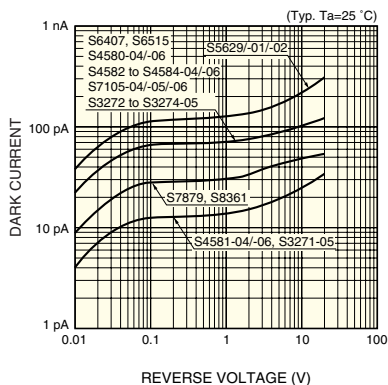
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### Photo sensitivity temperature characteristic (S4581-06)



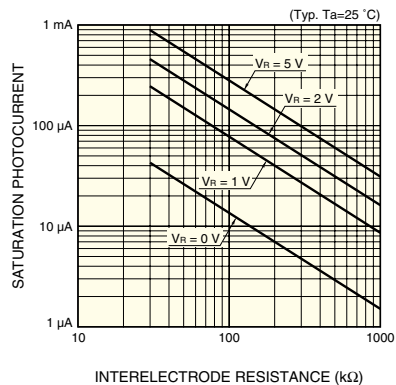
KPSDB0002EE

### Dark current vs. reverse voltage



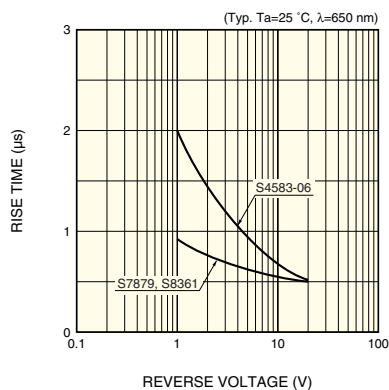
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### Saturation photocurrent vs. interelectrode resistance

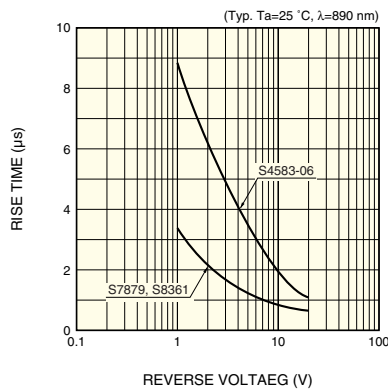


KPSDB0003EA

### Rise time vs. reverse voltage

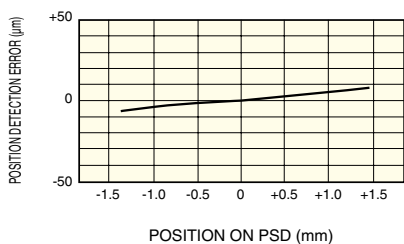
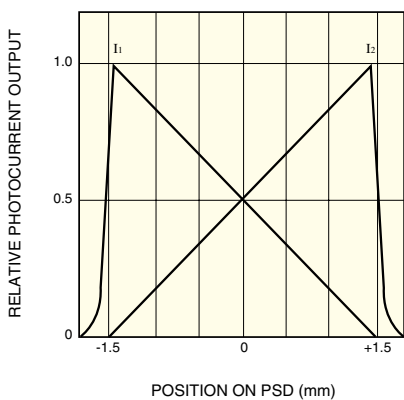


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### Position detection characteristic example (S4583-04, active area size: 1 × 3 mm)



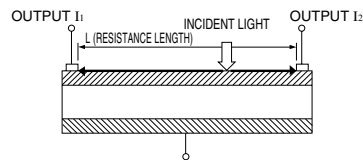
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### Definition of position detection error

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.

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

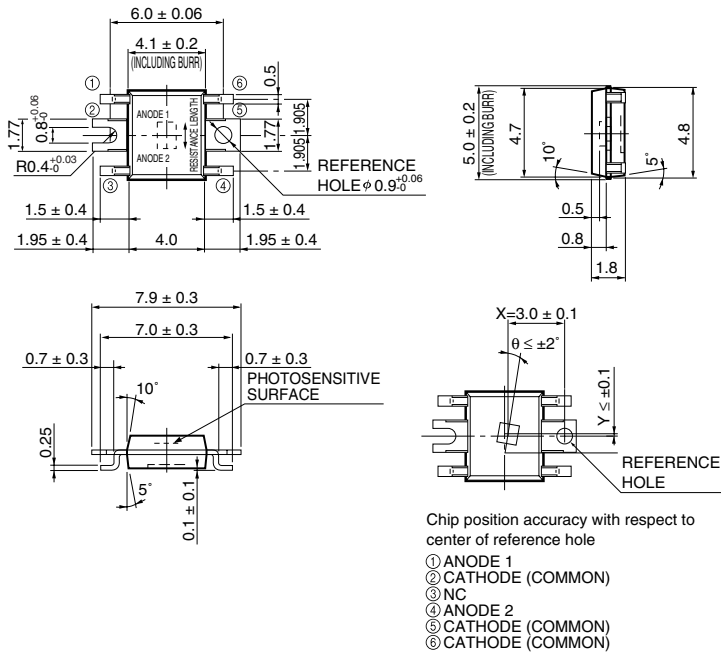
The electrical center is viewed as 0,  $I_1$  as (+), and  $I_2$  as (-).



KPSDC0001EA

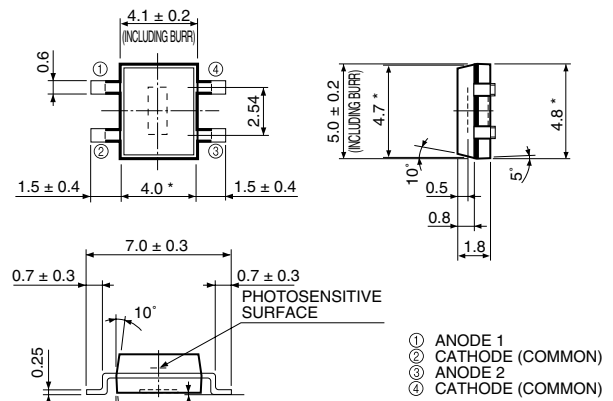
■ Dimensional outlines [unit: mm, tolerance unless otherwise noted:  $\pm 0.1$ , chip position accuracy (without ①) with respect to the package dimensions marked \* X,  $Y \leq \pm 0.2$ ,  $\theta \leq \pm 2^\circ$ ]

## ① S6407, S6515 (Surface mounting type)



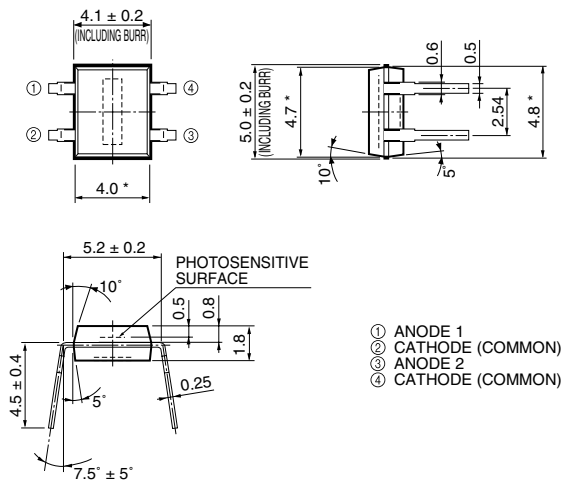
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## ② S4580 to S4584-04/-06 (Surface mounting type)



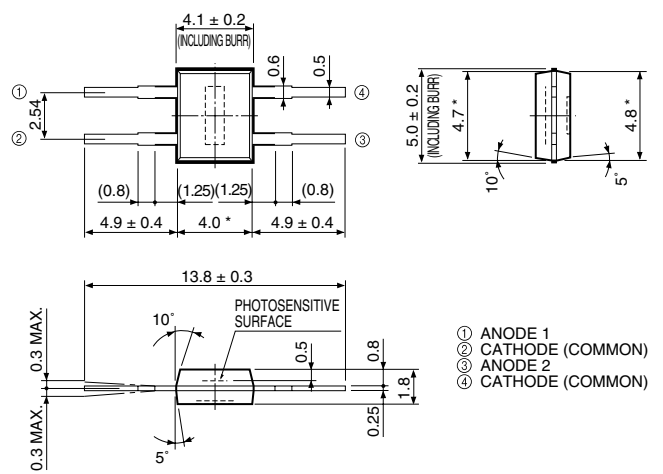
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## ③ S3271 to S3274-05



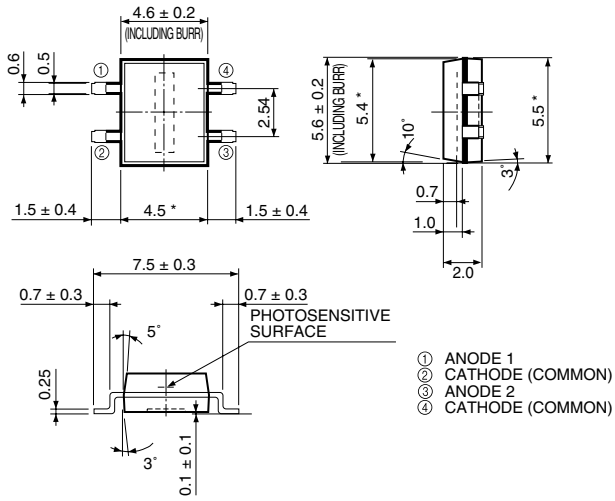
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## ④ S7879, S8361



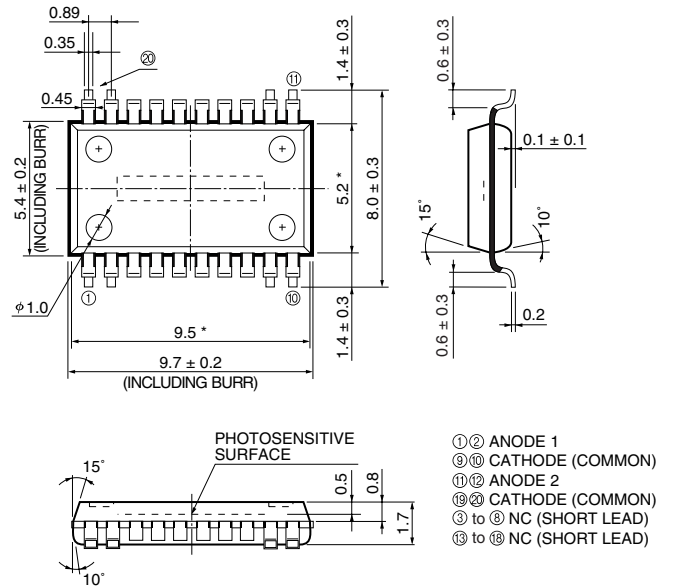
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⑤ S7105-04/-05/-06 (Surface mounting type)



KPSDA0047EA

⑥ S5629-01/-02 (Surface mounting type)



KPSDA0023EA

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