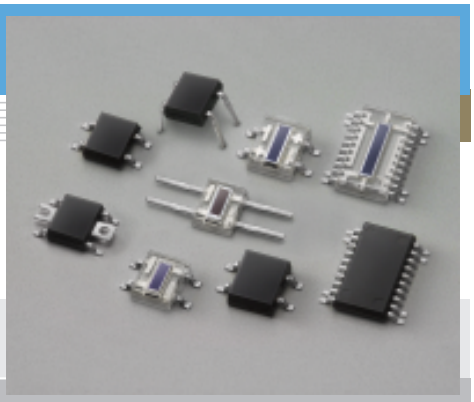
One-dimensional PSD
Plastic package



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	1.2			
S4580-04	②	0.8 × 1.5	1.5			
S4580-06						
S4581-04	②	1 × 2	2			
S4581-06						
S3271-05	③					
S4582-04	②	1 × 2.5	2.5			
S4582-06						
S3272-05	③					
S4583-04	②	1 × 3	3			
S4583-06						
S3273-05	③					
NEW S7879	④	1 × 3	3			
NEW S8361						
S4584-04	②	1 × 3.5	3.5			
S4584-06						
S3274-05	③					
S7105-04	⑤	1 × 4.2	4.2			
S7105-06						
S7105-05						
S5629	⑥	1 × 6	6			
S5629-01						
S5629-02						

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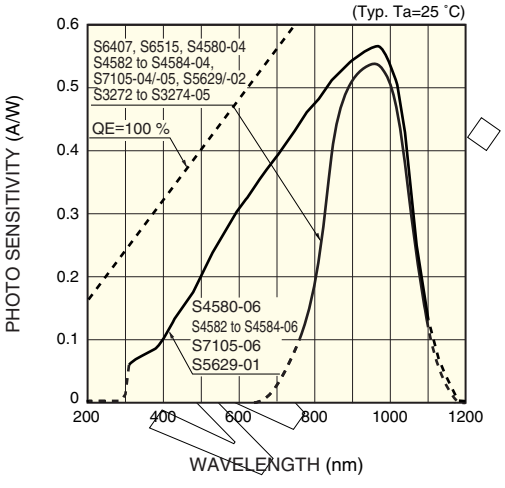
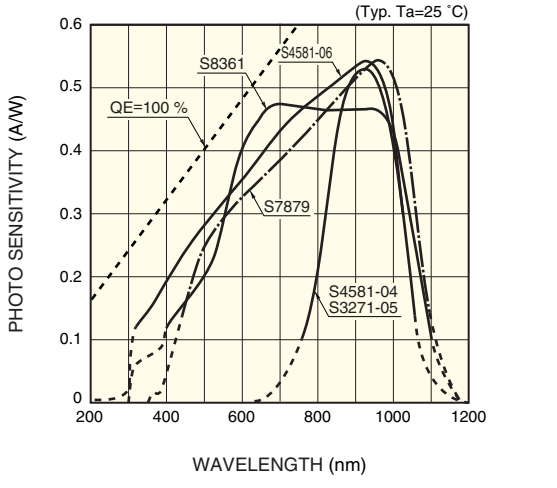
■ Electrical and optical characteristics (Typ. Ta=25 °C, unless otherwise noted)

Type No.	Spectral response range λ (nm)	Peak sensitivity wavelength λp (nm)	Photo sensitivity S λ=650 nm (A/W)	Photo sensitivity 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 spot light size =ϕ300 μm Typ. (μm)	Position detection error *1 VR=1 V spot light 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)
S6407	760 to 1100	960	-	0.51	160	200	240	±5	±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	±10	±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	±10	±20	30	0.05	1	1.15	-	10	15
S4581-06	320 to 1060		0.38	0.53										3		
S3271-05	760 to 1060		-	0.51	320	400	480			15				-	15	
S4582-04	760 to 1100	960	-	0.51	100	140	180	±10	±25	30	0.05	1	1.15	-	10	15
S4582-06	320 to 1100		0.33											3		
S3272-05	760 to 1100		-		320	400	480			15				-	15	
S4583-04	760 to 1100	960	-	0.51	100	140	180	±10	±30	30	0.05	1	1.15	-	10	15
S4583-06	320 to 1100		0.33											3		
S3273-05	760 to 1100		-		320	400	480			15				-	15	
S7879	440 to 1100		0.36		70	110	150	±15	±60	40				1	4	30
S8361	400 to 1100	680	0.45	0.45												
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		-		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	
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	0.55										2		
S5629-02	760 to 1100		-	0.51	240	300	360			20				-	10	

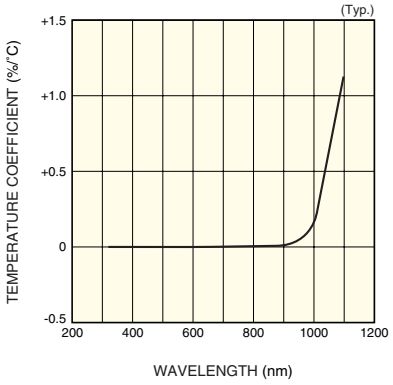
*1: In the range 75 % from the center of the active area to the edge.
*2: This indicates the upper limit of the photocurrent linearity over the entire incident light quantity and is defined as the photocurrent at a point where the linearity deviates by 10 %.
*3: Time required for output change from 10 to 90 % of the steady output value when stepped function light is input to the PSD.

■ Spectral response





■ Photo sensitivity temperature characteristic (S4581-06)



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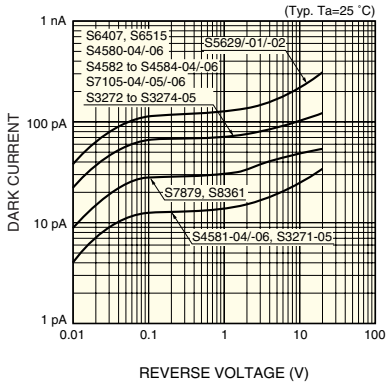
■ Dark current vs. reverse voltage



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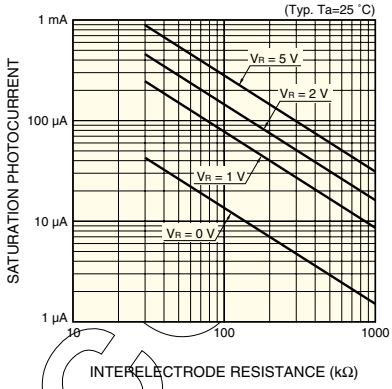
■ Saturation photocurrent vs. interelectrode resistance



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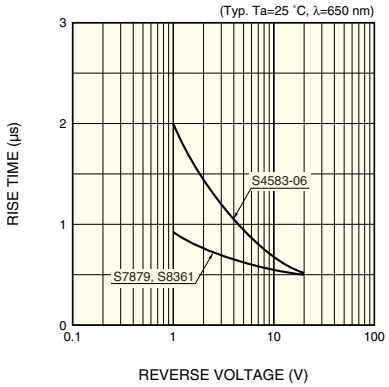
■ Rise time vs. reverse voltage



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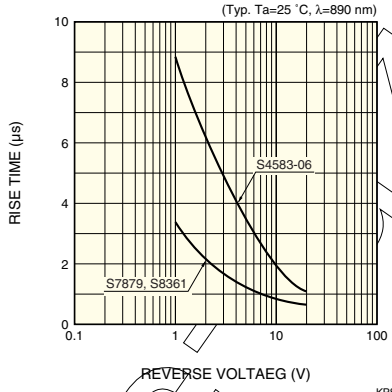

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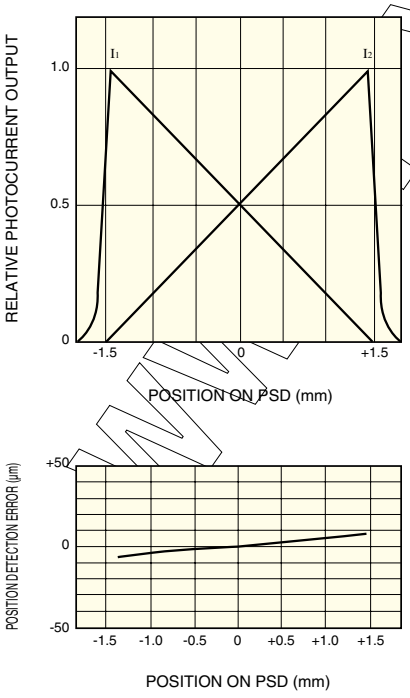
■ Position detection characteristic example (S4583-04, active area size: 1 × 3 mm)



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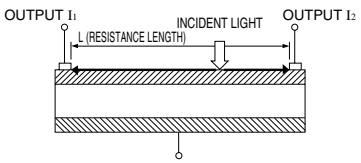
■ Definition of position detection error

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.

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

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



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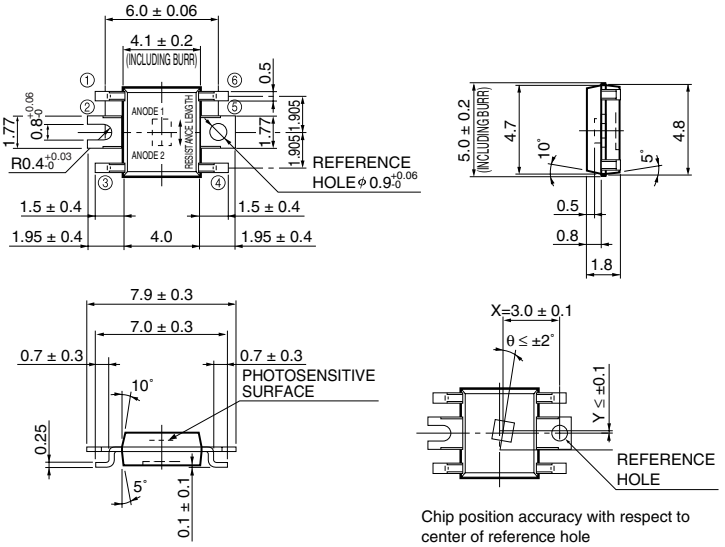
■ Dimensional outlines [unit: mm, tolerance unless otherwise noted: ±0.1, chip position accuracy (without ①) with respect to the package dimensions marked * X, Y ≤ ±0.2, θ ≤ ±2°]

① S6407, S6515 (Surface mounting type)



Chip position accuracy with respect to center of reference hole

① ANODE 1
② CATHODE (COMMON)
③ NC
④ ANODE 2
⑤ CATHODE (COMMON)
⑥ CATHODE (COMMON)

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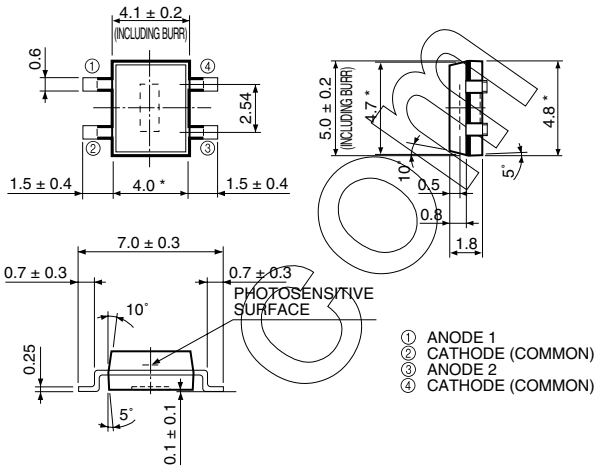
② S4580 to S4584-04/-06 (Surface mounting type)



① ANODE 1
② CATHODE (COMMON)
③ ANODE 2
④ CATHODE (COMMON)

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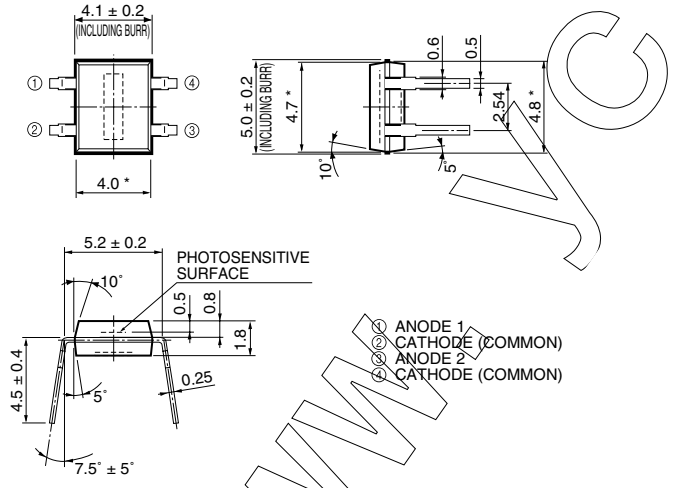
③ S3271 to S3274-05



① ANODE 1
② CATHODE (COMMON)
③ ANODE 2
④ CATHODE (COMMON)

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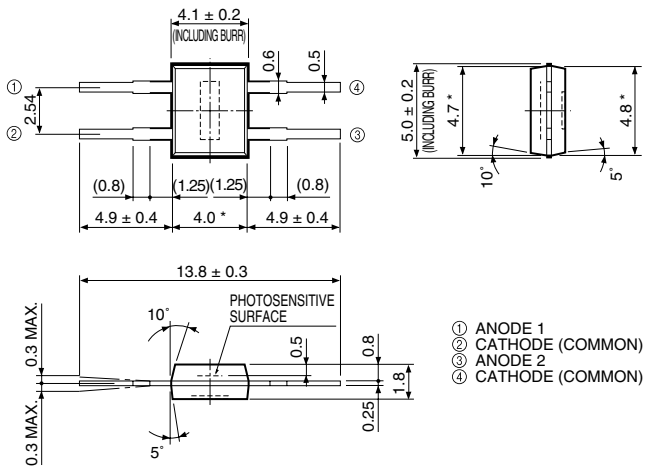
④ S7879, S8361



① ANODE 1
② CATHODE (COMMON)
③ ANODE 2
④ CATHODE (COMMON)

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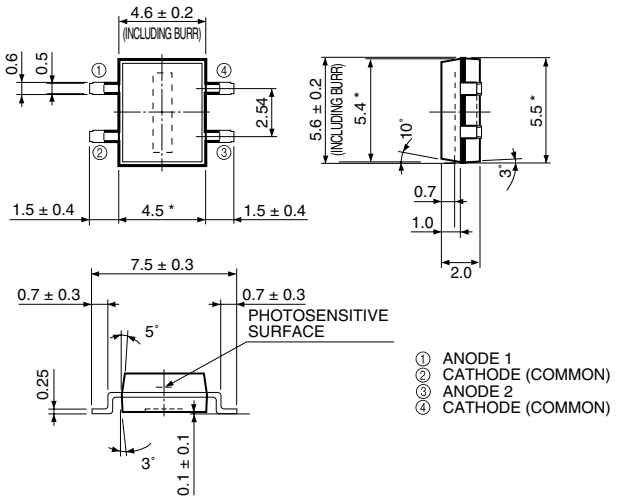
⑤ S7105-04/-05/-06 (Surface mounting type)



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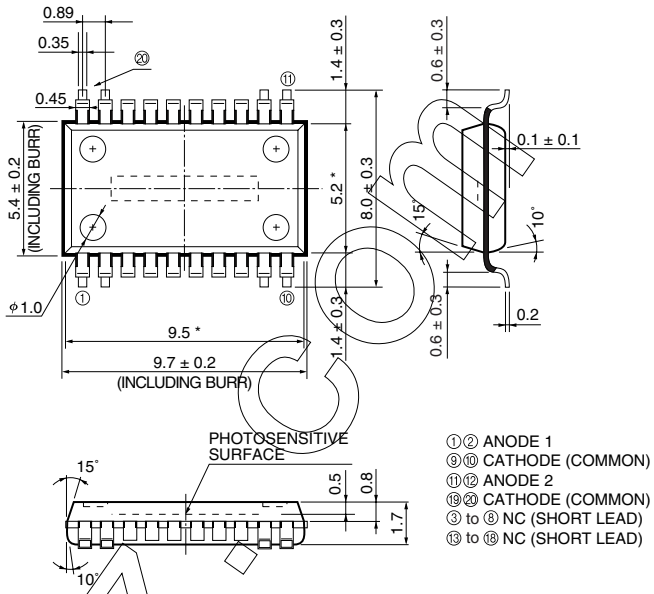
⑥ S5629/-01/-02 (Surface mounting type)



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