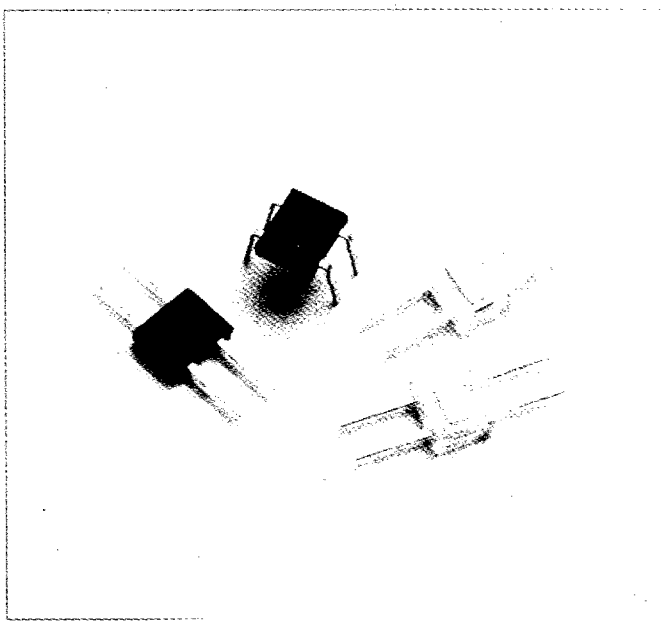
HAMAMATSU

TECHNICAL DATA

EPOXY-MOLDED PACKAGE PSD (POSITION-SENSITIVE DETECTORS) S3271, S3272, S3273, S3274

New one-dimensional PSD with superior performance in position detection and disturbance light noise

The Hamamatsu S3271, S3272, S3273, and S3274 series are new types of one-dimensional PSD (position-sensitive detectors) designed with improved position detection error, high resistivity of interelectrode resistance, special visible-cut filter for reducing fluorescent lamp noise, and partial light shield on the sensitive surface against disturbance light. The package achieves a greater degree of miniaturization than the S2153 series (size 4×4.8 mm).



■FEATURES

- **Superior position detectability**
- **Reduction in noise from disturbance light and fluorescent lamps**
- **High interelectrode resistance**
- **High reliability**
- **Miniature size epoxy-molded package**

■APPLICATIONS

- **Auto-focus**
- **Distance measurement**
- **Proximity switching**
- **Displacement measurement**

■SELECTION GUIDE (Any combination is available from the following.)

Interelectrode Resistance	Active Area (see figure 1)	Partial Light Shield on Sensitive Surface	Spectral Response Range	Lead Configuration
● 140kΩ ● 400kΩ	● 1×2mm ⓐ ● 1×2.5mm ⓑ ● 1×3mm ⓒ ● 1×3.5mm ⓓ	● Without light shield ● With light shield	● 760 to 1100nm (Visible-cut epoxy package) ● 320 to 1100nm (Clear epoxy package)	● Straight ● Forming

※Specifications in shaded boxes are special-order products. For details, please see page 4. Other package of the same size with the conventional type S2153 series (4.5×5.5mm), special configuration and multielement types are also available.

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Figure 1: Dimension of Chip (Unit: mm)

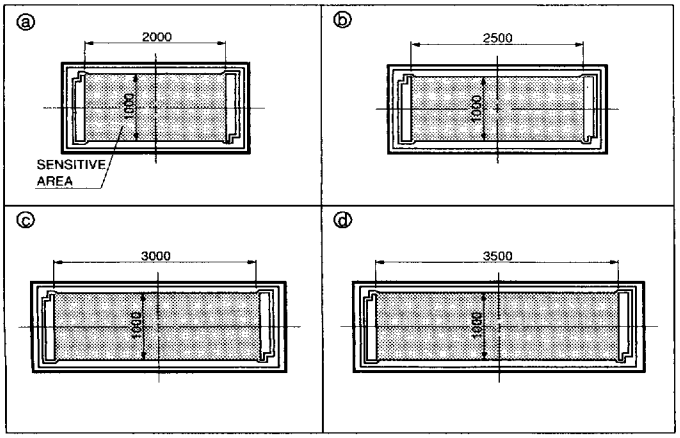

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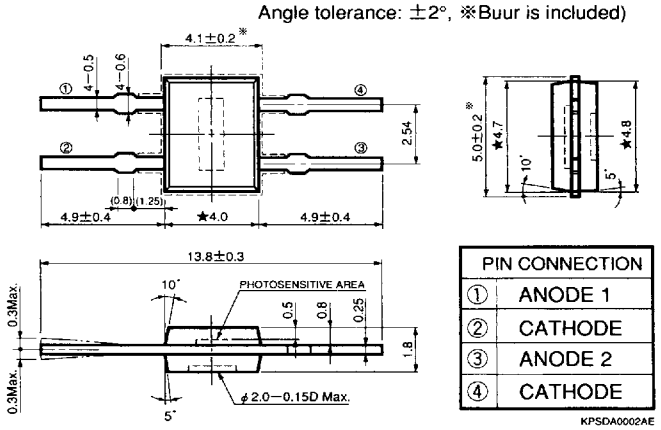
Figure 2: Dimensional Outline (Unit: mm)

(Tolerance without indication: ±0.1mm, Angle tolerance: ±2°, ※Buur is included)



PIN CONNECTION	
①	ANODE 1
②	CATHODE
③	ANODE 2
④	CATHODE

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EPOXY-MOLDED PACKAGE PSD

Type No.	Outline (Fig.6)	Active Area (mm)	Dimensions of Chip (Refer to p.1)	Spectral Response: Wavelength Range (nm)	Spectral Response: Peak Wavelength λp (nm)	Radiant Sensitivity at λp Typ. (A/W)	Refractive Index of Package at 900nm	Center Position Accuracy ① Max. (μm)	Position Detection Error ② Typ. (μm)	Position Detection Error ② Max. (μm)	Interelectrode Resistance VR=1V, VB=1V Min. (kΩ)	Interelectrode Resistance VR=1V, VB=1V Typ. (kΩ)	Interelectrode Resistance VR=1V, VB=1V Max. (kΩ)
Standard Types													
S3271	Ⓐ	1×2	ⓐ	760~1100	920	0.55	1.53	±200	±10	±20	100	140	180
S3272		1×2.5	ⓑ						±10	±25			
S3273		1×3	ⓒ						±10	±30			
S3274		1×3.5	ⓓ						±15	±35			
High Interelectrode Resistance Types													
S3271-01	Ⓐ	1×2	ⓐ	760~1100	920	0.55	1.53	±200	±10	±20	320	400	480
S3272-01		1×2.5	ⓑ						±10	±25			
S3273-01		1×3	ⓒ						±10	±30			
S3274-01		1×3.5	ⓓ						±15	±35			

① The deviation between the center of the package and the center of the photosensitive surface.
② A range of 75% of that from the center of the photosensitive surface to the edge.
③ Period of time required for the PSD output to make the transition from 10 to 90% of the stationary output level in response to the step function light input.
④ The upper limit of linearity of light current in response to the quantity of incident light. The light current value at the point where the linearity is deviated by 10%.

Figure 3: Spectral Response

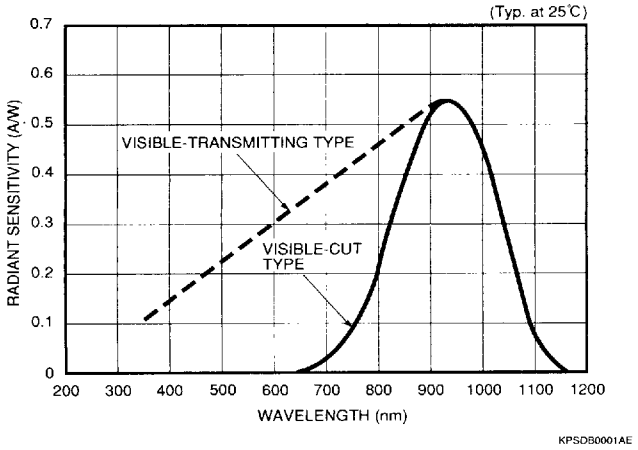


Figure 4: Temperature Characteristics of Spectral Response

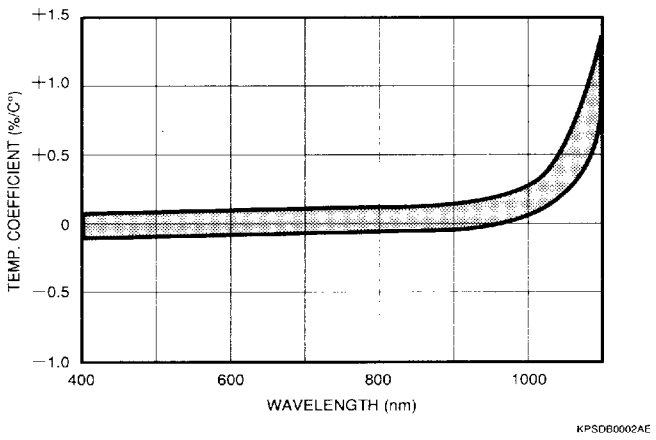


Figure 5: Saturation Current vs. Interelectrode Resistance

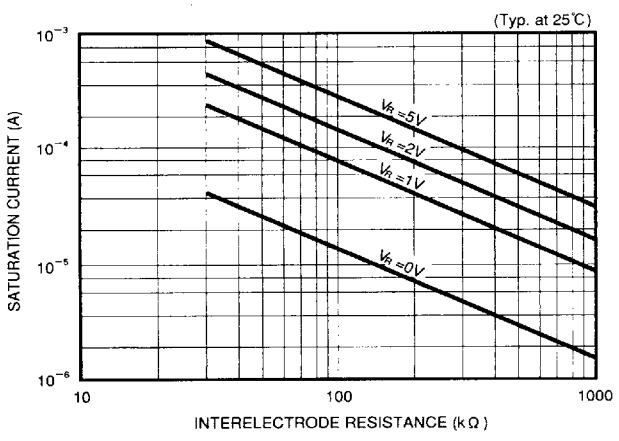
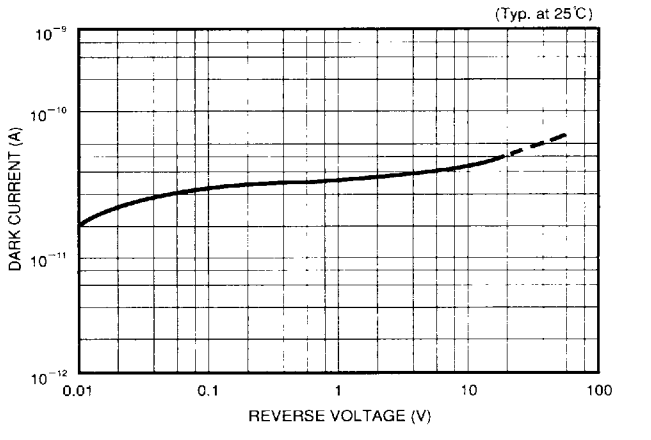


Figure 6: Dark Current vs. Reverse Voltage



(at 25℃)

Dark Current V_R=1V		Temperature Dependence of Dark Current	Terminal Capacitance V_R=1V, f=10kHz		Rise Time ③ V_R=1V, R_L=1kΩ		④ Saturation Current V_R=1V	Maximum Rating			Type No.
Typ. (nA)	Max. (nA)	(time/℃)	Typ. (pF)	Max. (pF)	Typ. (μs)	Max. (μs)	Min. (μA)	Reverse Voltage (V)	Operating Temperature (℃)	Storage Temperature (℃)	
0.05	1.0	1.15	15	30	10	30	30	20	−25～+85	−40～+100	S3271
											S3272
											S3273
											S3274
0.05	1.0	1.15	15	30	15	30	15	20	−25～+85	−40～+100	S3271-01
											S3272-01
											S3273-01
											S3274-01

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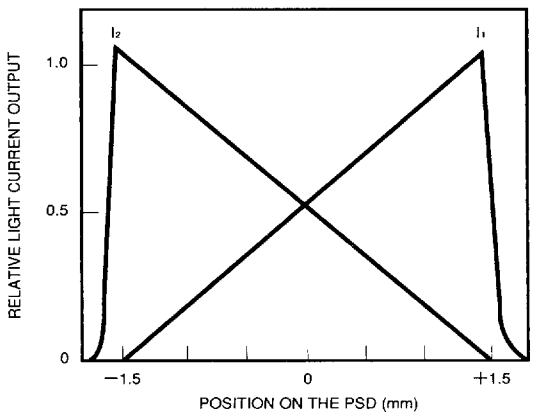
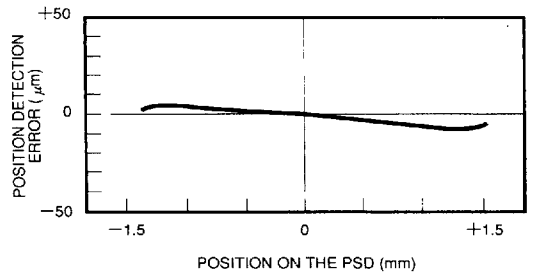
Figure 7: Example of Position Detectability (Type 1×3mm)





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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 in each incident position can be defined according to the following formula.

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

For incident position, the electrical center is regarded as 0, I_1 side as (+) and I_2 side as (−).

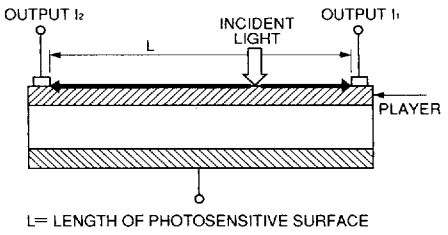

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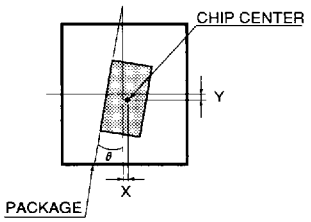
Figure 8: Chip Position Accuracy

Based on the dimensions indicated by ★ in Fig.2.
X≦0.2mm, y≦0.2mm, θ ≦2°



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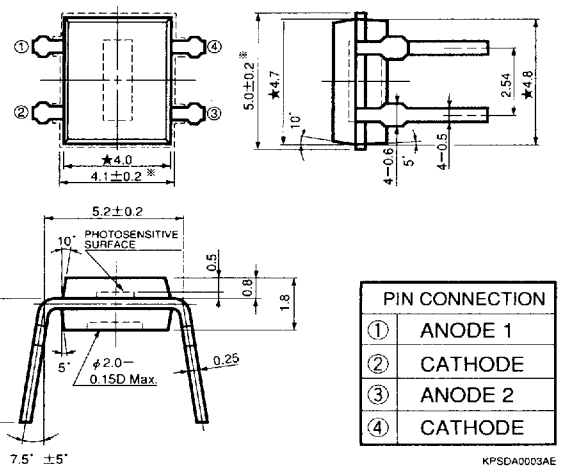
EPOXY-MOLDED PACKAGE PSD

SPECIAL-ORDER PRODUCTS

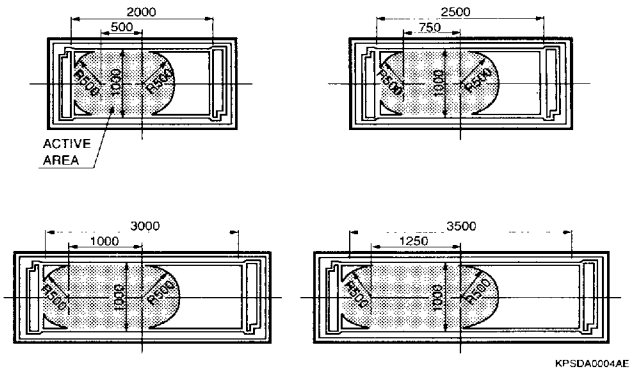
Formed lead type



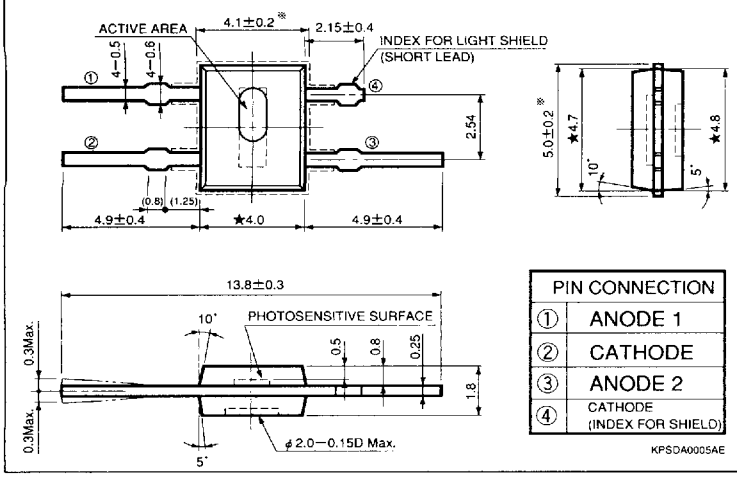
PIN CONNECTION	
①	ANODE 1
②	CATHODE
③	ANODE 2
④	CATHODE

KPSDA0003AE

Dimension of Chip with Partial Light Shield (Unit: μm)



Straight lead type



PIN CONNECTION	
①	ANODE 1
②	CATHODE
③	ANODE 2
④	CATHODE (INDEX FOR SHIELD)

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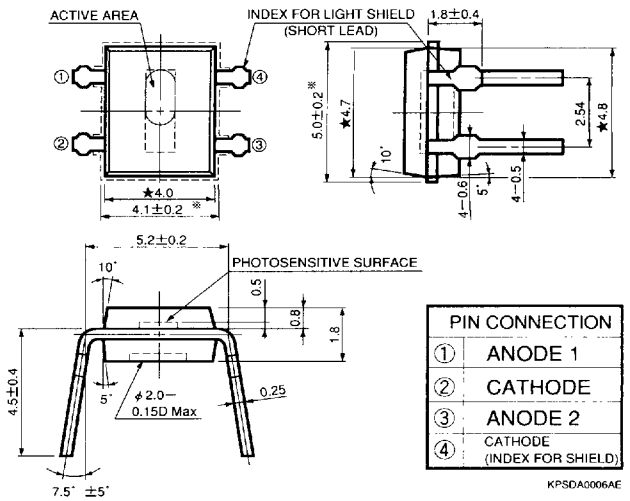
Formed lead type



PIN CONNECTION	
①	ANODE 1
②	CATHODE
③	ANODE 2
④	CATHODE (INDEX FOR SHIELD)

KPSDA0006AE

RELATED PRODUCTS

● Range-finder IC

Hamamatsu also provides BI-MOS monolithic range-finder ICs designed to be operated by a single power supply. Two types, H2152 (3 step) and H2476-01 (16 step), are available.

● High Power Infrared LED

Hamamatsu also provides high power infrared LED suitable for active auto-focus applications.

Handling Precautions

1. Storage Precautions

To avoid oxidation and dirt on leads, do not unpack until assembly or please store them in a desiccator. (The dry nitrogen type is best.)

2. Mounting Precautions

When bending or cutting the leads, fix the base section securely so that the epoxy package is not subjected to stress. The epoxy package can easily be scrached, and therefore do not contact hard or sharp things on the package surface.

3. Soldering Precautions

Soldering should be done at less than 230℃, within 5 seconds, and away from the base of the lead by at least 1mm. If these precautions are not followed, please use radiant heat at the base section of the lead so that heat is not transmitted to the epoxy package.

4. Washing

Use flon or alcohol solvents for washing. Acetone or other similar substances may dissolve the package surface if used.

HAMAMATSU

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