



S12742 series, S16014-220

Photodiode with a filter for monochromatic light (220, 254, 275 nm) detection

The S12742 series is a photodiode that has a built-in band-pass filter and is sensitive only to monochromatic light. The series consists of three types with different center sensitivity wavelengths: 220 nm, 254 nm, and 275 nm. S16014-220 is a miniaturized photodiode with a built-in bandpass filter and a center sensitivity wavelength of 220 nm. These products have an extremely narrow response wavelength half width (FWHM), allowing accurate photometry with little stray light. They can be customized to support other peak sensitivity wavelengths such as 340 nm and 560 nm.

Features

- With monochromatic light filter
- Narrow spectral response half width (FWHM)
- Small package: TO-18 (S16014-220)

Applications

- Water quality and atmosphere analysis
- UV monitors (mercury lamp, etc.)

Structure

Parameter	S12742-220/-254/-275	S16014-220 NEW	Unit
Photosensitive area	3.61 × 3.61	1.1 × 1.1	mm
Package	TO-5	TO-18	-

Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Reverse voltage	V_R max		5	V
Operating temperature	T_{opr}	No dew condensation*	-20 to +60	°C
Storage temperature	T_{stg}	No dew condensation*	-55 to +80	°C

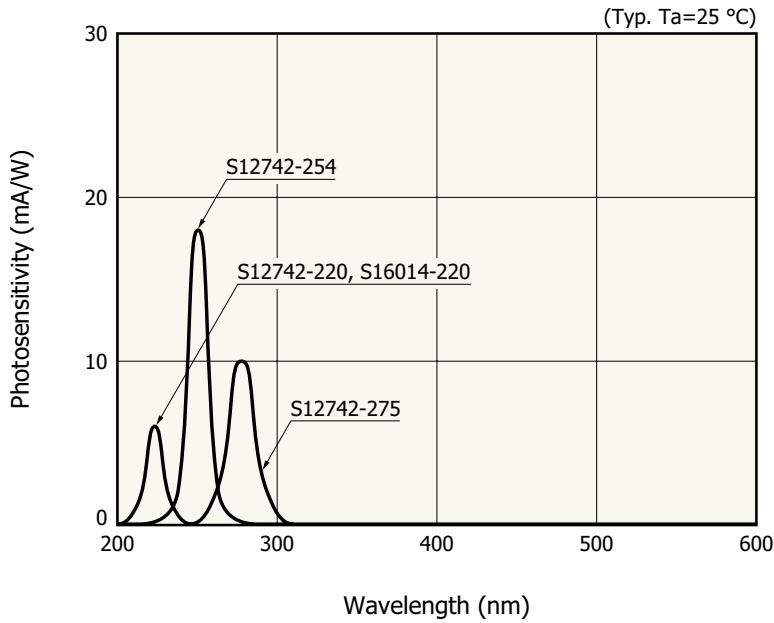
* When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

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.

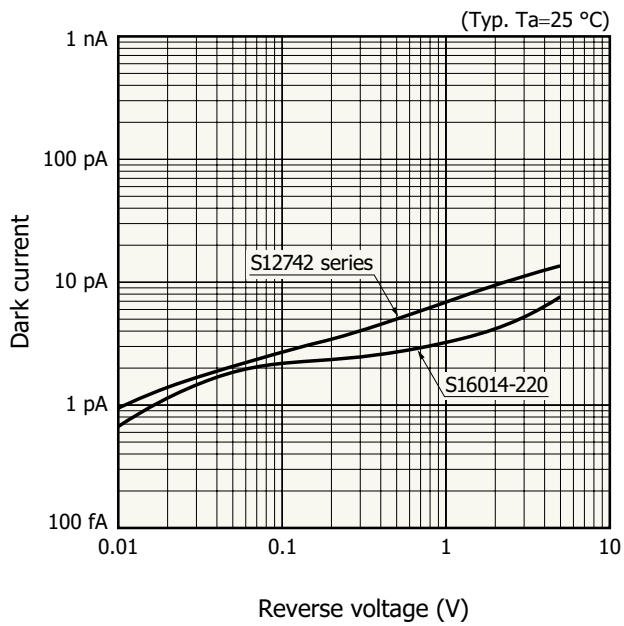
Electrical and optical characteristics (Ta=25 °C)

Type no.	Center wavelength CWL			Spectral response half width FWHM			Photosensitivity S $\lambda=CWL$		Dark current I_D $V_R=10$ mV Max. (pA)	Dark current temperature coefficient T_{CID} (times/°C)	Rise time t_r $V_R=0$ V $R_L=1$ kΩ (μs)	Terminal capacitance C_t $V_R=0$ V $f=10$ kHz (pF)	Shunt resistance R_{sh} $V_R=10$ mV		Noise equivalent power NEP $V_R=0$ V $\lambda=\lambda_p$ (W/Hz ^{1/2})
	Min. (nm)	Typ. (nm)	Max. (nm)	Min. (nm)	Typ. (nm)	Max. (nm)	Min. (mA/W)	Typ. (mA/W)					Min. (GΩ)	Typ. (GΩ)	
S12742-220	216	220	224	7.5	11	14.5	3.8	6	25	1.12	1	500	0.4	5	3.3×10^{-13}
S12742-254	252	254	256	8	10	12	12	18							9.1×10^{-14}
S12742-275	271	275	279	6.5	10	13.5	6	10							2.0×10^{-13}
S16014-220 NEW	216	220	224	7.5	11	14.5	3.5	6	10		0.1	25	1	10	2.3×10^{-13}

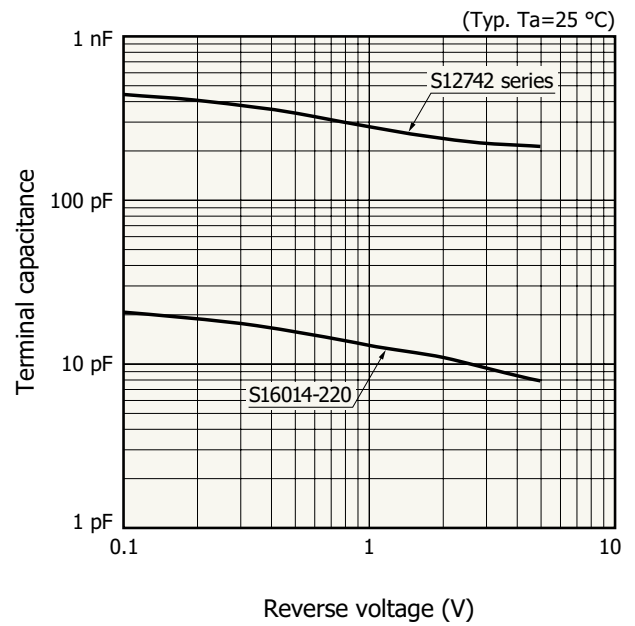
Spectral response



Dark current vs. reverse voltage

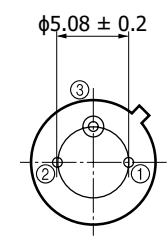
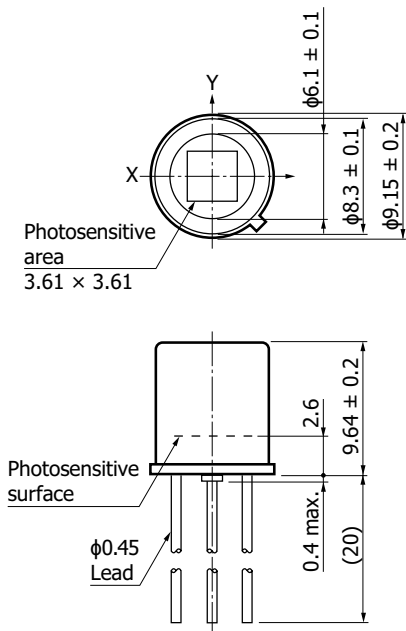


Terminal capacitance vs. reverse voltage



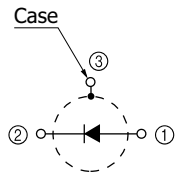
Dimensional outlines (unit: mm)

S12742 series



Tolerance unless otherwise noted: ± 0.2

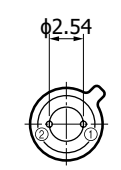
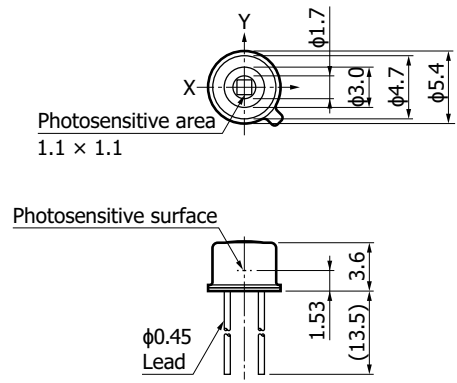
Distance from photosensitive area center to cap center
 $-0.3 \leq X \leq +0.3$
 $-0.3 \leq Y \leq +0.3$



The glass window may extend a maximum of 0.2 mm above the upper surface of the cap.

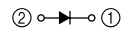
KSPDA0205EA

S16014-220



Tolerance unless otherwise noted: ± 0.2

Distance from photosensitive area center to cap center
 $-0.3 \leq X \leq +0.3$
 $-0.3 \leq Y \leq +0.3$



The glass window may extend a maximum of 0.1 mm above the upper surface of the cap.

KSPDA0233EA

Precautions against UV light exposure

- When UV light irradiation is applied, the product characteristics may degrade. Such examples include degradation of the product's UV sensitivity and increase in dark current. This phenomenon varies depending on the irradiation level, irradiation intensity, operating time, and operating environment and also varies depending on the product model. Before employing the product, we recommend that you check the tolerance under the ultraviolet light environment that the product will be used in.
- Exposure to UV light may cause the characteristics to degrade due to gas released from the resin bonding the product's component materials. As such, we recommend that you avoid applying UV light directly on the resin and apply it on only the inside of the photo-sensitive area by using an aperture or the like.

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

Precautions

- Disclaimer
- Metal, ceramic, plastic package products

Technical note

- Si photodiodes

Information described in this material is current as of February 2024.

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, Chuo-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

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.: 13F-1, No.101, Section 2, Gongdao 5th Road, East Dist., Hsinchu City, 300046, Taiwan(R.O.C) Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: info@hamamatsu.com.tw