

S11499 series

**Large area, enhanced near IR sensitivity,  
using a MEMS technology**

HAMAMATSU has developed various types of Si detectors that offer enhanced near-infrared sensitivity due to a MEMS structure formed on the back side of the photodiode. The S11499 series is a family of Si PIN photodiodes with drastically improved sensitivity in the near infrared region at wavelengths longer than 900 nm. Compared to our conventional product, the S11499 series has much higher sensitivity to YAG laser light (1.06 μm). It also offers improved temperature characteristics of sensitivity at wavelengths longer than 950 nm.

**Features**

- ➔ High sensitivity: 0.6 A/W ( $\lambda=1060$  nm)
- ➔ Large active area:  $\phi 5.0$  mm (S11499-01)
- ➔ High reliability package: TO-5/TO-8 metal package

**Applications**

- ➔ YAG laser monitor

**Structure**

Parameter	S11499	S11499-01	Unit
Package	TO-5	TO-8	-
Window material	Borosilicate glass		-
Photosensitive area	$\phi 3.0$	$\phi 5.0$	mm
Effective photosensitive area	7.0	19.6	mm <sup>2</sup>

**Absolute maximum ratings**

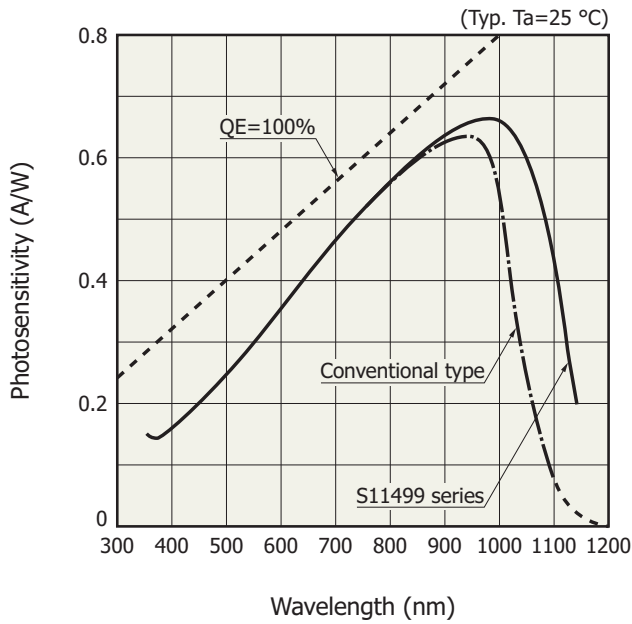
Parameter	Symbol	Condition	S11499	S11499-01	Unit
Reverse voltage	$V_R$ max.	$T_a=25$ °C	30		V
Operating temperature	$T_{opr}$		-40 to +100		°C
Storage temperature	$T_{stg}$		-55 to +125		°C

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.

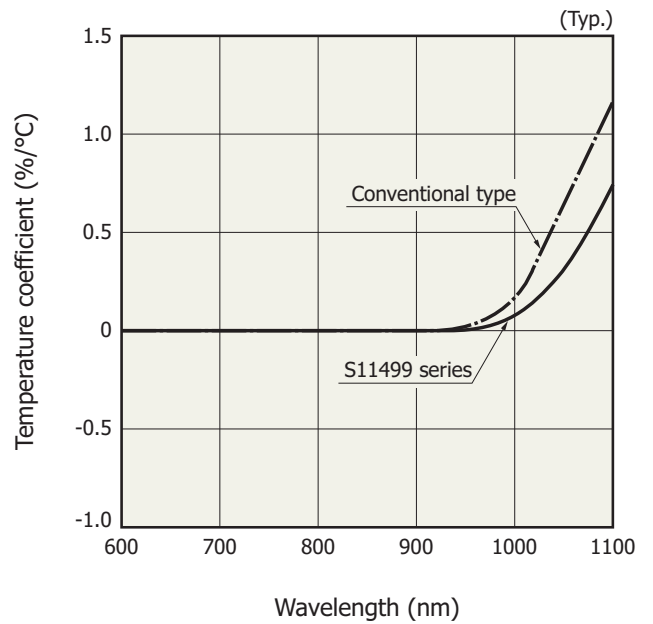
**Electrical and optical characteristics ( $T_a=25$  °C)**

Parameter	Symbol	Condition	S11499			S11499-01			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	$\lambda$		-	360 to 1140	-	-	360 to 1140	-	nm
Peak sensitivity wavelength	$\lambda_p$		-	1000	-	-	1000	-	nm
Photosensitivity	S	$\lambda=1060$ nm	0.54	0.6	-	0.54	0.6	-	A/W
Short circuit current	$I_{sc}$	100 lx	6.0	7.8	-	15	21	-	μA
Dark current	$I_D$	$V_R=20$ V	-	0.05	5	-	0.1	10	nA
Cutoff frequency	$f_c$	$V_R=20$ V, -3 dB, $R_L=50$ Ω	-	30	-	-	15	-	MHz
Terminal capacitance	$C_t$	$V_R=20$ V, $f=1$ MHz	-	13	-	-	33	-	pF

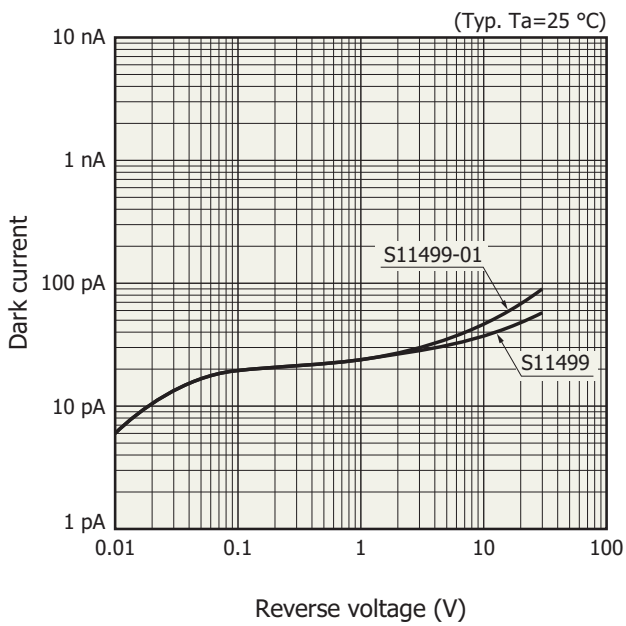
**Spectral response**



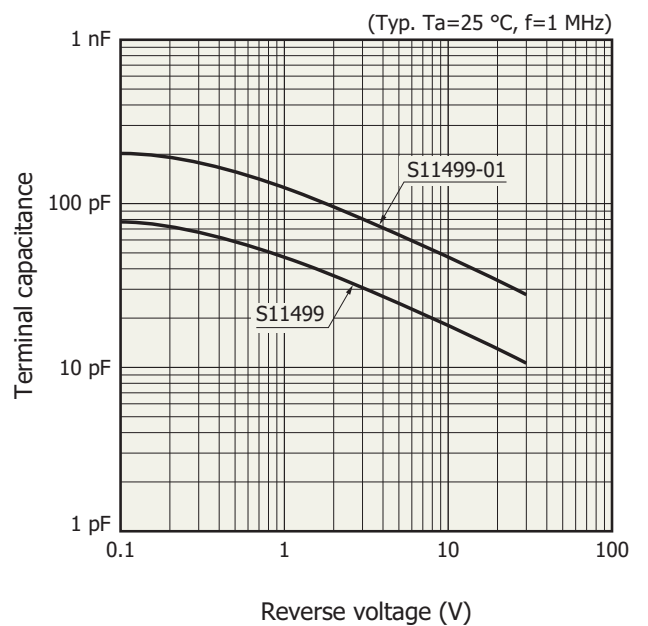
**Photosensitivity temperature characteristics**



**Dark current vs. reverse voltage**

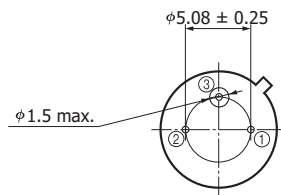
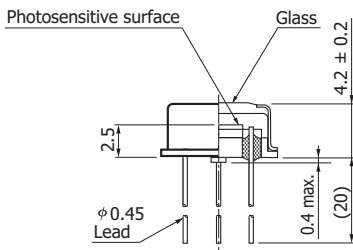
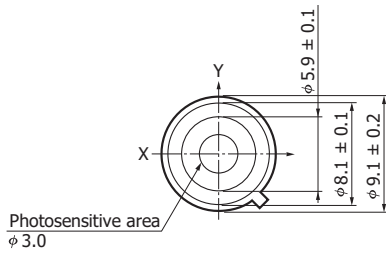


**Terminal capacitance vs. reverse voltage**

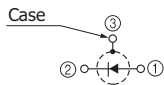


### Dimensional outlines (unit: mm)

S11499



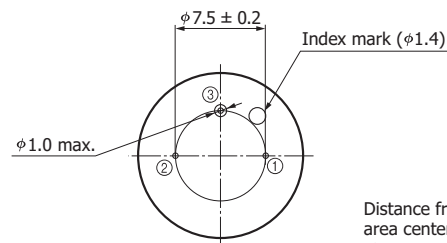
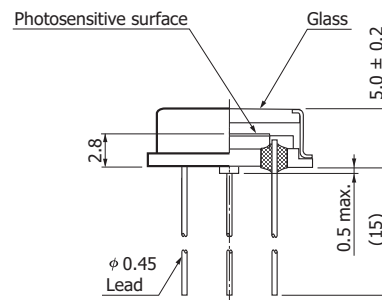
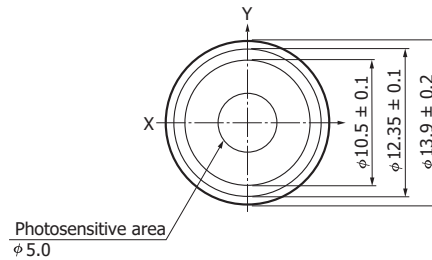
Distance from photosensitive area center to cap center  
 $-0.3 \leq X \leq +0.3$   
 $-0.3 \leq Y \leq +0.3$



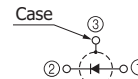
The glass window may extend a maximum of 0.15 mm above the upper surface of the cap.

KPINA0116EA

S11499-01



Distance from photosensitive area center to cap center  
 $-0.4 \leq X \leq +0.4$   
 $-0.4 \leq Y \leq +0.4$



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

KPINA0117EA

Information described in this material is current as of October 2015.

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, Higashi-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, N.J. 08807, U.S.A., Telephone: (1) 908-231-0960, Fax: (1) 908-231-1218

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 8152-375-0, Fax: (49) 8152-265-8

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

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777

North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01

Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39) 02-93581733, Fax: (39) 02-93581741

China: Hamamatsu Photonics (China) Co., Ltd.: B1201, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86) 10-6586-6006, Fax: (86) 10-6586-2866