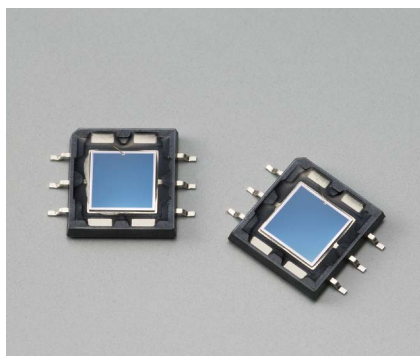


# Si PIN photodiodes



S7478 series

## High reliability Large photosensitive area (5 × 5 mm)

The S7478 series are PIN photodiodes having a large photosensitive area and surface mount flat package with leads. There are two same products in different packing types; the S7478 is reel packing and the S7478-02DS is stick packing.

### Features

- Surface mount plastic package: 9 × 9.6 × 1.5<sup>t</sup> mm
- Large photosensitive area: 5 × 5 mm
- Operating temperature range: -25 to +85 °C  
Storage temperature range: -40 to +100 °C
- High sensitivity: 0.72 A/W ( $\lambda=960$  nm)

### Applications

- Automobile sensor  
(Vehicle and traffic information system, laser radar, front window frost sensor, rain sensor)
- FSO (free space optics)

### Structure

Parameter	S7478	S7478-02DS	Unit
Photosensitive area	5 × 5		mm
Package	Plastic		-
Window material	Silicone resin		-
Packing type	Reel	Stick	-

### Absolute maximum ratings

Parameter	Symbol	Condition	Specification	Unit
Reverse voltage	VR max.	Ta=25 °C	20	V
Operating temperature	Topr	No dew condensation*1	-25 to +85	°C
Storage temperature	Tstg	No dew condensation*1	-40 to +100	°C
Soldering temperature*2	Tsol		240 (two times)	°C

\*1: When there is a temperature difference between a product and the surrounding area in high humidity environments, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

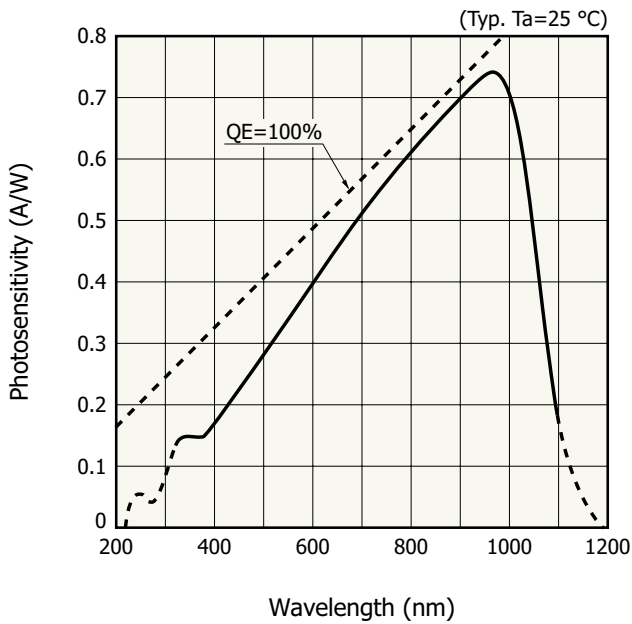
\*2: Reflow soldering, IPC/JEDEC J-STD-020 MSL 5a, see P.4

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)

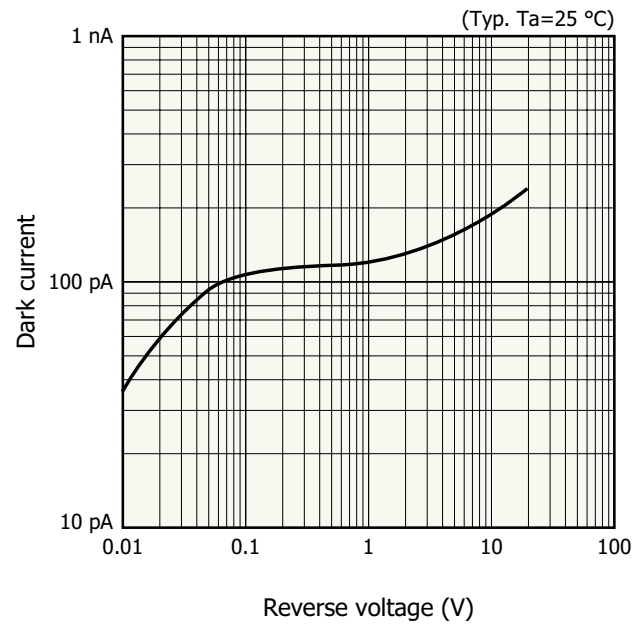
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	$\lambda$		-	320 to 1100	-	nm
Peak sensitivity wavelength	$\lambda_p$		-	960	-	nm
Photosensitivity	S	$\lambda=\lambda_p$	0.6	0.72	-	A/W
Short circuit current	Isc	100 lx, 2856 K	-	26	-	mA
Dark current	ID	VR=10 V	-	0.4	5	nA
Temperature coefficient of ID	TcID		-	1.14	-	times/°C
Cutoff frequency	fc	VR=10 V, RL=50 $\Omega$ -3 dB, $\lambda=780$ nm	10	20	-	MHz
Terminal capacitance	Ct	VR=10 V, f=1 MHz	-	40	60	pF

**Spectral response**



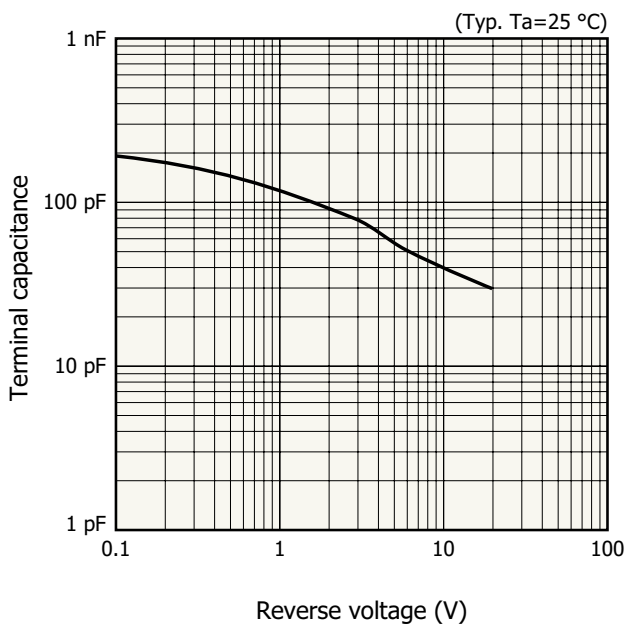
KPINB0190EB

**Dark current vs. reverse voltage**



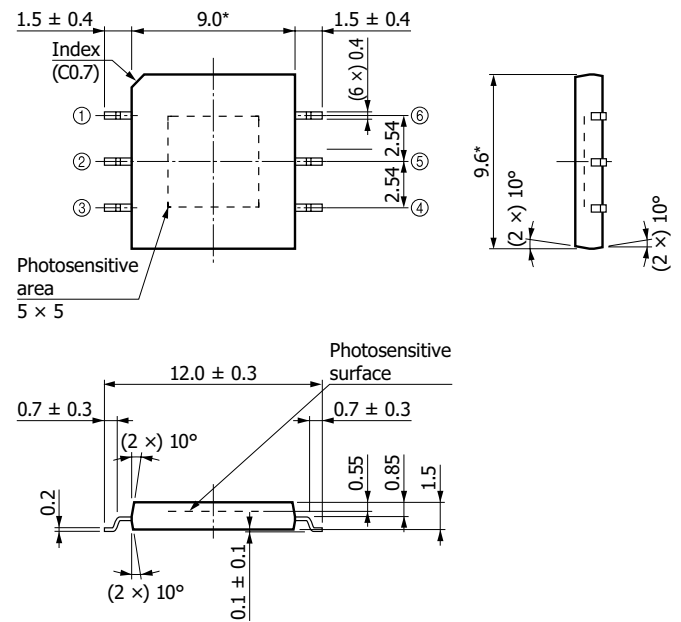
KPINB0191EA

**Terminal capacitance vs. reverse voltage**



KPINB0192EA

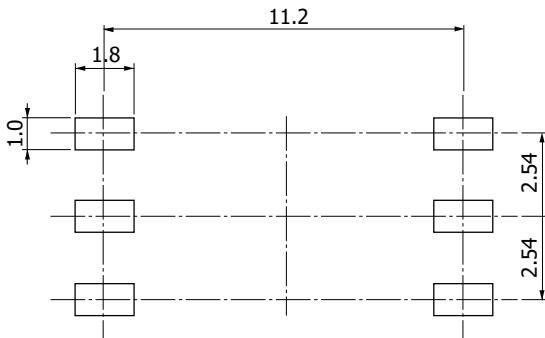
**Dimensional outline (unit: mm)**



- ① Anode
  - ② Cathode
  - ③ NC
  - ④ NC
  - ⑤ Cathode
  - ⑥ NC
- Tolerance unless otherwise noted: ±0.1  
 Chip position accuracy with respect to the package dimensions marked \*:  
 X, Y ≤ ±0.2, θ ≤ ±2°

KPINA0062EB

### Recommended land pattern (unit: mm)



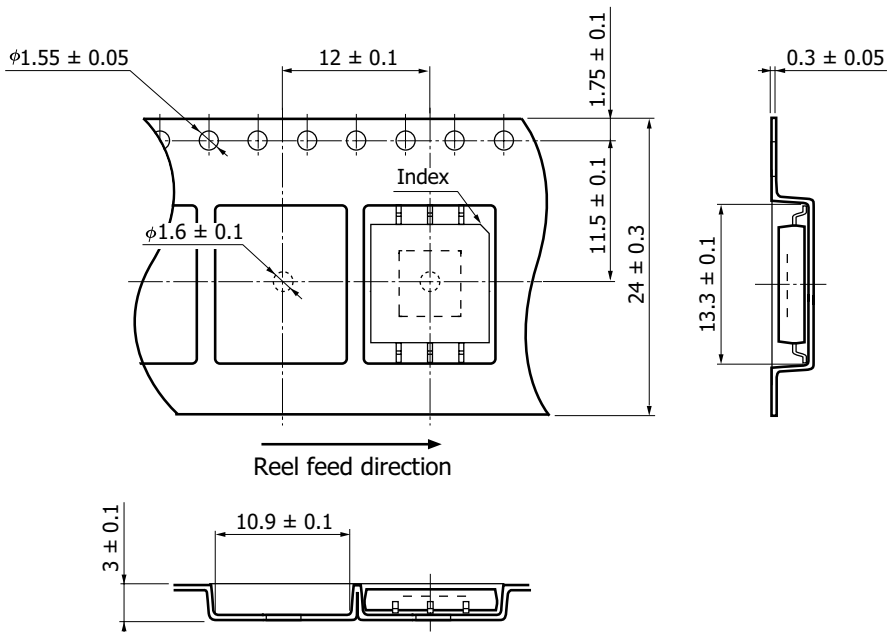
KPINC0018EA

### Reel packing specifications (S7478)

- Reel (conforms to JEITA ET-7200)

Dimensions	Hub diameter	Tape width	Material	Electrostatic characteristics
φ254 mm	φ100 mm	24 mm	PS	Conductive

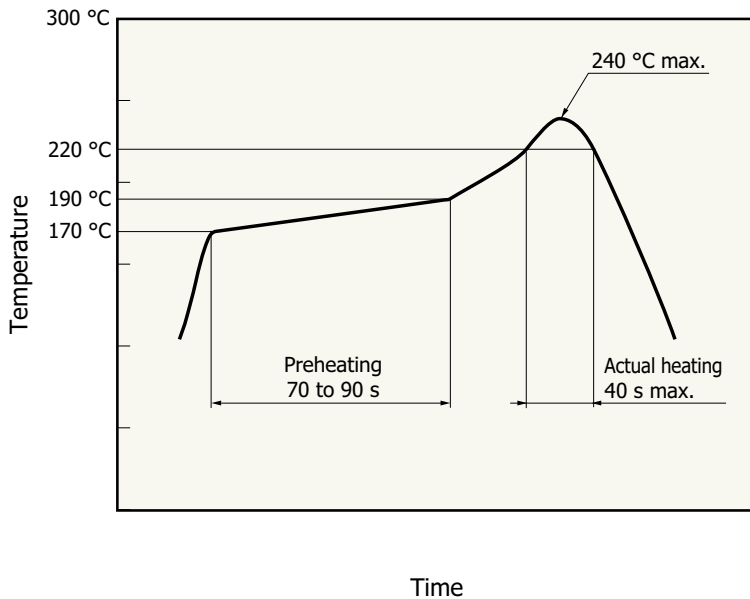
- Embossed tape (unit: mm, material: PS, conductive)



KPINC0025EA

- Packing quantity  
1000 pcs/reel
- Packing type  
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

### Recommended soldering condition



KPICB0164EC

- This product supports lead-free soldering. After unpacking, store it in an environment at a temperature of 30 °C or less and a humidity of 60% or less, and perform soldering within 24 hours.
- The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used. Before actual reflow soldering, check for any problems by testing out the reflow soldering methods in advance.

### Related information

#### ■ Precautions

- Disclaimer
- Metal, ceramic, Plastic Package products
- Surface mount type products

Information described in this material is current as of December 2022.

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, 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: info@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 Bellu, 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.: 8F-3, No.158, Section 2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: info@hamamatsu.com.tw