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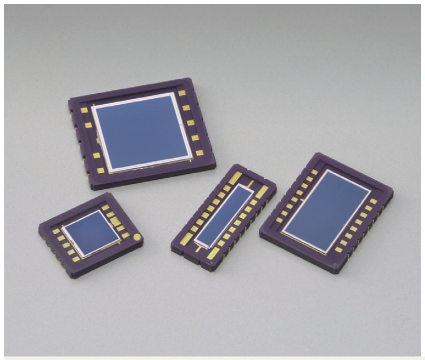
# Si PIN photodiodes



S5106/S5107/S7509/S7510 series

## Surface mountable, high-speed response Si PIN photodiodes

The S5106, S5107, S7509, and S7510 are Si PIN photodiodes sealed in surface mountable chip carrier packages. They can be mounted using solder reflow, which facilitates automation. Since the photosensitive area is large, they are suitable for FSO (free space optics) and other applications that require a wide field of view. In addition, they can be used in a wide variety of applications including POS, measurements, and analysis.

### Features

- **Surface mount type ceramic chip carrier package**
- **Compatible with lead-free solder reflow**
- **High sensitivity, high-speed response**
- **Packing**
  **Tray: S5106, S5107, S7509, S7510**
  **Reel: S5106-10, S5107-10, S7509-10, S7510-10**

### Applications

- **FSO**
- **Laser radars**
- **Power meters**
- **Barcode readers**

### Structure

| Type no. | Photosensitive area (mm) | Package | Window material |
|---|---|---|---|
| S5106/-10 | 5 × 5 | Ceramic | Silicone resin |
| S5107/-10 | 10 × 10 | | |
| S7509/-10 | 2 × 10 | | |
| S7510/-10 | 6 × 11 | | |

### Absolute maximum ratings

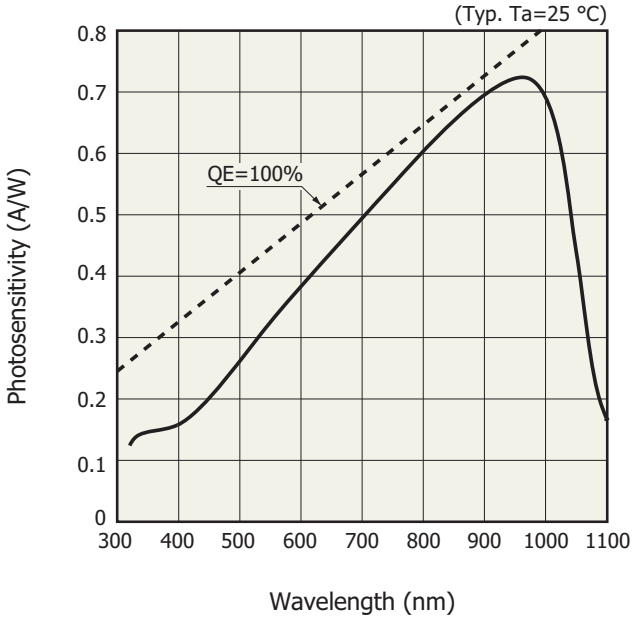
| Type no. | Reverse voltage $V_R$ (V) | Power dissipation P (mW) | Operating temperature Topr*1 (°C) | Storage temperature Tstg*1 (°C) | Soldering temperature Tsol*1 (°C) |
|---|---|---|---|---|---|
| S5106/-10 | 30 | 50 | -40 to +100 | -40 to +125 | 260 (3 times)*2 |
| S5107/-10 | | | | | |
| S7509/-10 | | | | | |
| S7510/-10 | | | | | |

*1: No dew condensation
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.
*2: Reflow soldering, JEDEC J-STD-020 MSL 3, see P.9
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 (Typ. Ta=25 °C, unless otherwise noted)

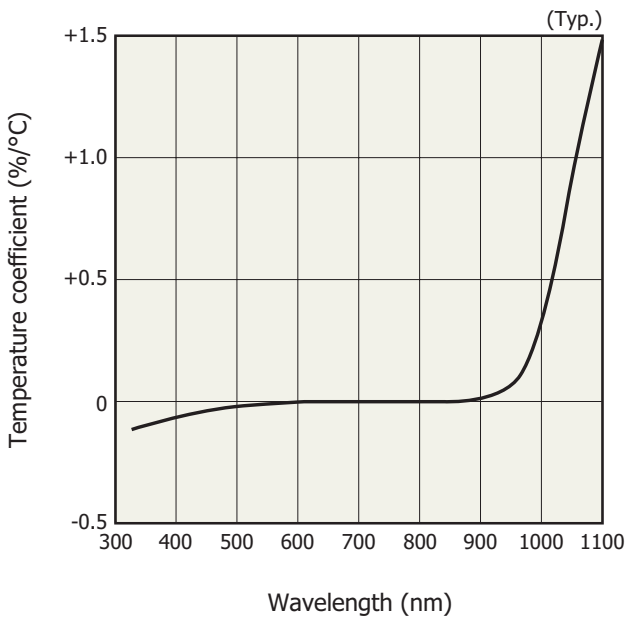
| Type no. | Spectral response range λ (nm) | Peak sensitivity wavelength λp (nm) | Photosensitivity S (A/W) λp | 660 nm | 780 nm | 830 nm | Short circuit current Isc 100 lx (μA) | Dark current ID VR=10 V Typ. (nA) | Max. (nA) | Dark current temperature coefficient TCID (times/°C) | Cutoff frequency fc RL=50 Ω VR=10 V (MHz) | Terminal capacitance Ct f=1 MHz VR=10 V (pF) | NEP VR=10 V λ=λp (W/Hz$^{1/2}$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S5106/-10 | 320 to 1100 | 960 | 0.72 | 0.45 | 0.57 | 0.62 | 27 | 0.4 | 5 | 1.15 | 20 | 40 | $1.6 \times 10^{-14}$ |
| S5107/-10 | | | | | | | 110 | 0.9 | 10 | | 10 | 150 | $2.4 \times 10^{-14}$ |
| S7509/-10 | | | | | | | 22 | 0.5 | 5 | | 20 | 40 | $1.7 \times 10^{-14}$ |
| S7510/-10 | | | | | | | 72 | 1.0 | 10 | | 15 | 80 | $2.5 \times 10^{-14}$ |

## Spectral response



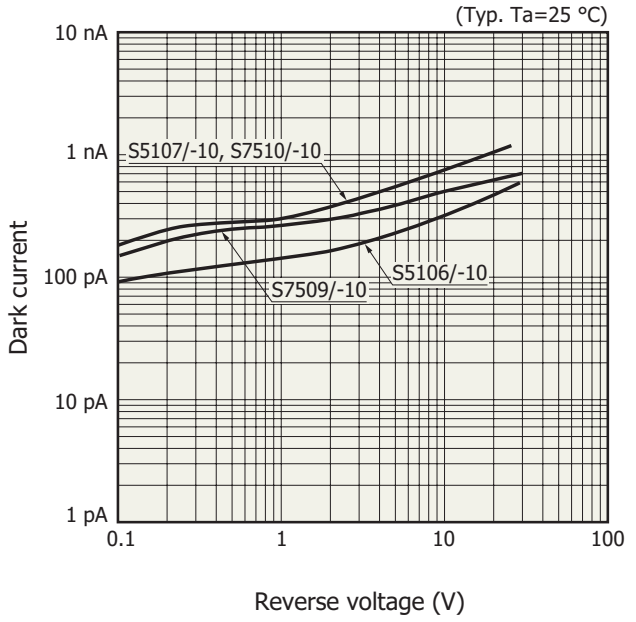

KPINB0165EB

## Sensitivity temperature characteristics




KPINB0452ECA

## Dark current vs. reverse voltage

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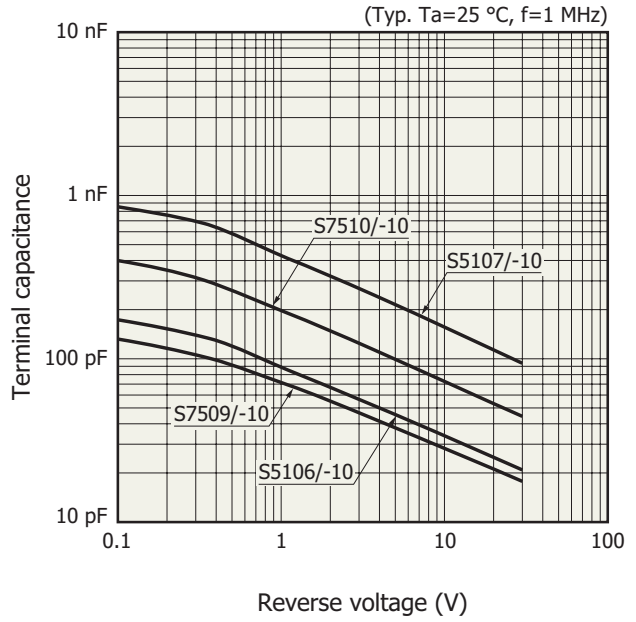
## Terminal capacitance vs. reverse voltage

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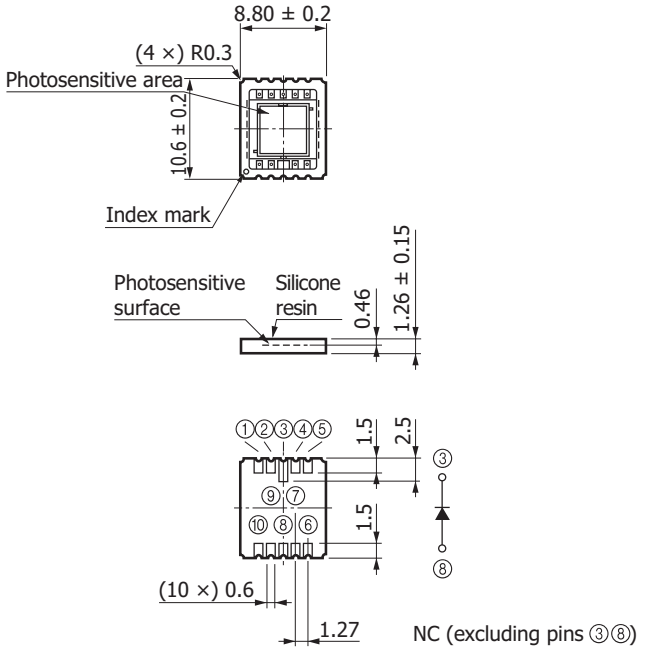
## Dimensional outlines (unit: mm)

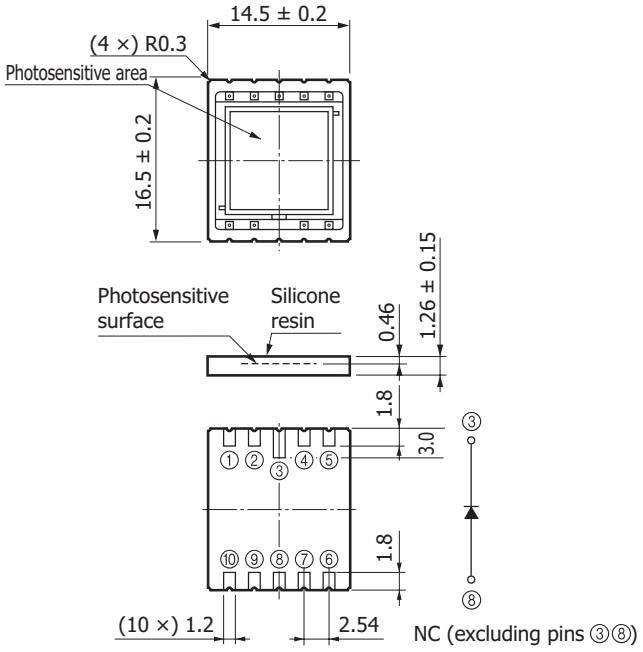
### S5106/-10




Burrs shall protrude no more than 0.3 mm on any side of package.

KPINA0002EF

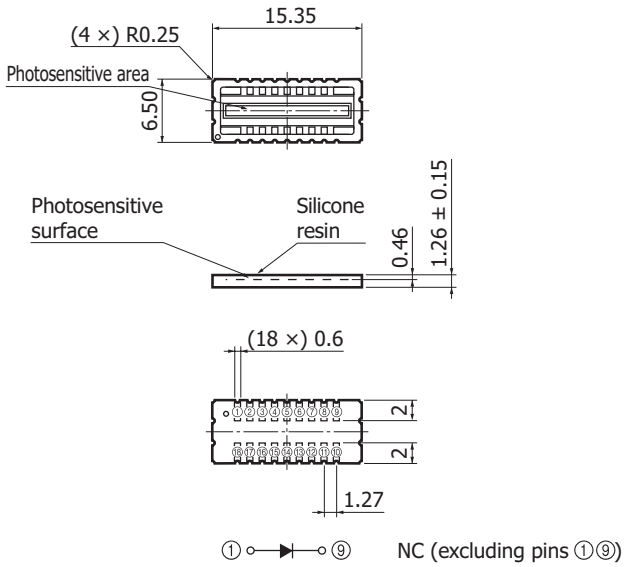
### S5107/-10




Burrs shall protrude no more than 0.3 mm on any side of package.

KPINA0013ED

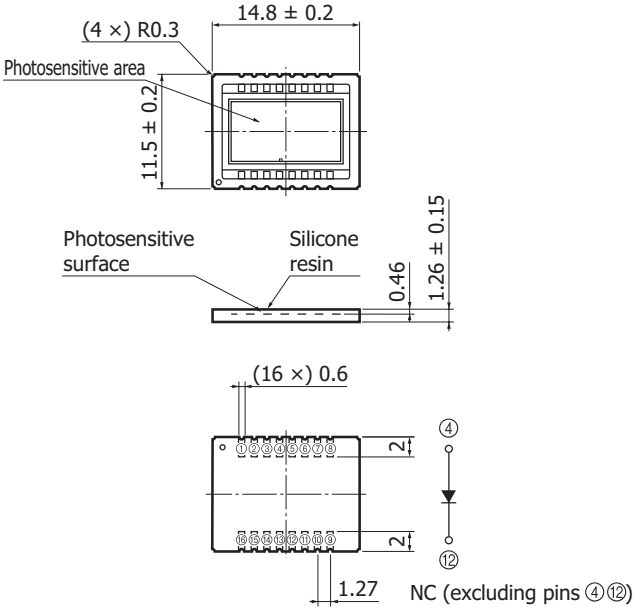
### S7509/-10




Burrs shall protrude no more than 0.3 mm on any side of package.

KPINA0055EB

### S7510/-10

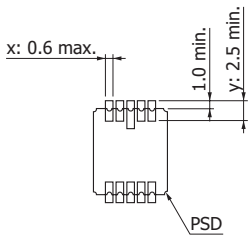



Burrs shall protrude no more than 0.3 mm on any side of package.

KPINA0056EB

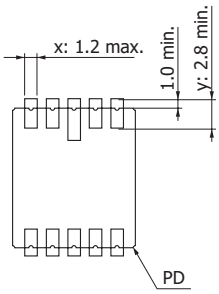
## Recommended land patterns (unit: mm)

S5106/-10



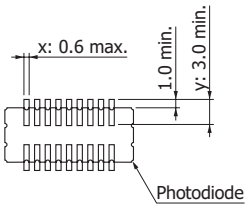

KPINC0031EB

S5107/-10



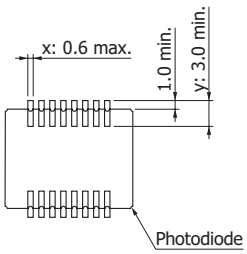

KPINC0032ED

S7509/-10




KPINC0028EC

S7510/-10




KPINC0033EB

1. Solder all terminals.
2. Do not make the land area larger than necessary.
3. It is preferable that the land sizes be about equal.
4. Make land width x about the same as the terminal width.
5. Make land height y at least 1 mm longer than the terminal height, protruding outside the package.

## Standard packing specifications

S5106, S5107, S7509, S7510

■ Packing quantity
S5106, S7509: 100 pcs max./tray
S5107, S7510: 50 pcs max./tray

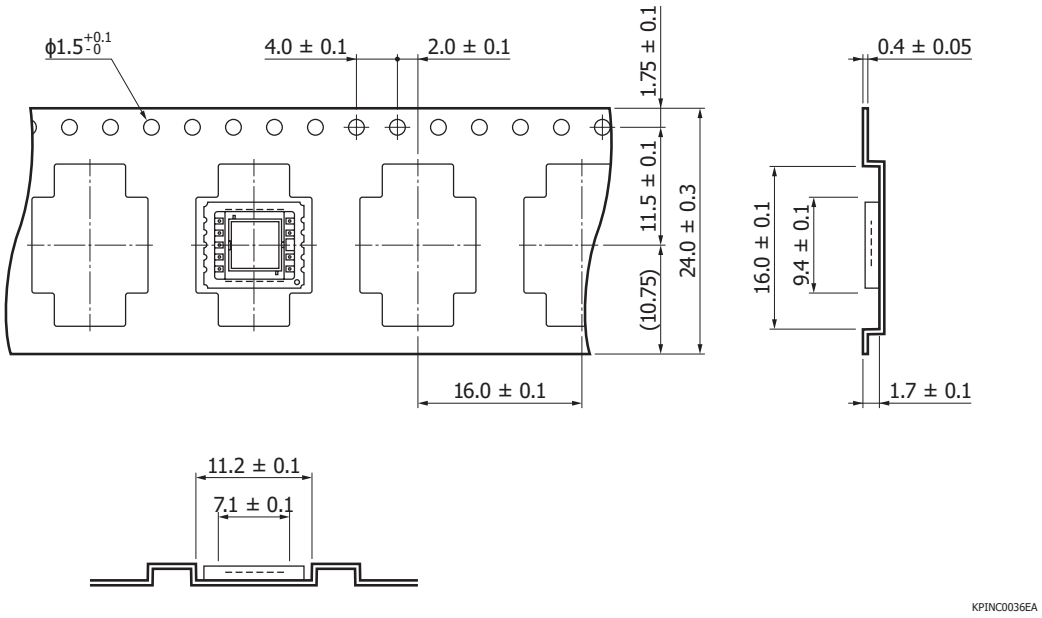
■ Packing state
Tray and desiccant in moisture-proof packaging (vacuum-sealed)

S5106-10

■ Reel (conforms to JEITA ET-7200)

| Outer diameter | Hub diameter | Tape width | Material | Electrostatic characteristics |
|---|---|---|---|---|
| ϕ330 mm | ϕ100 mm | 24 mm | PS | Conductive |

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




■ Packing quantity
1000 pcs/reel

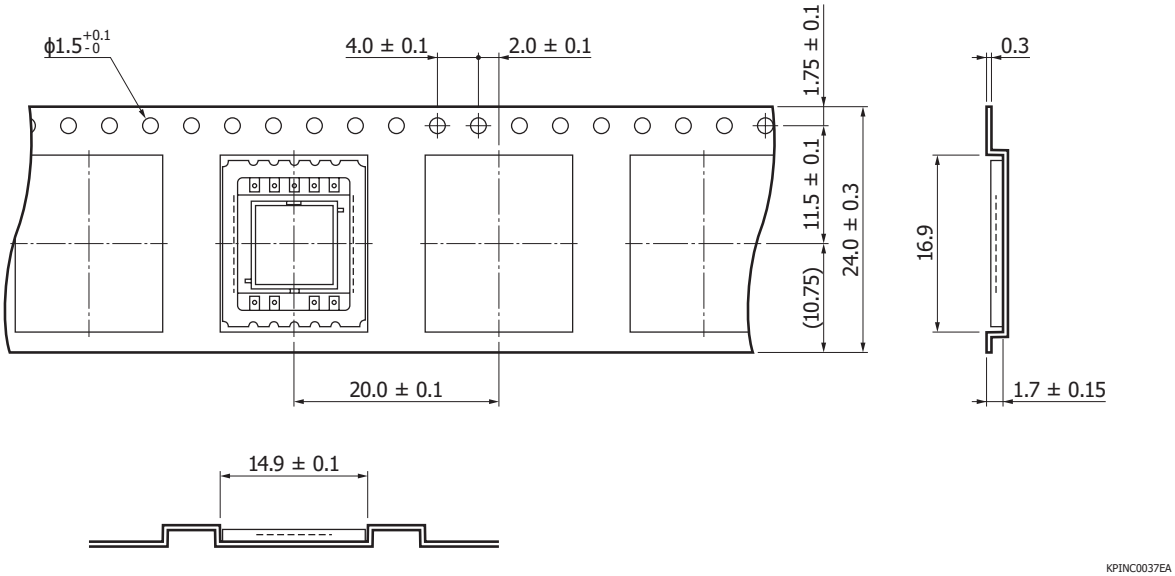
■ Packing state
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

S5107-10

■ Reel (conforms to JEITA ET-7200)

| Outer diameter | Hub diameter | Tape width | Material | Electrostatic characteristics |
|---|---|---|---|---|
| ϕ330 mm | ϕ80 mm | 24 mm | PS | Conductive |

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




■ Packing quantity
100 pcs/reel

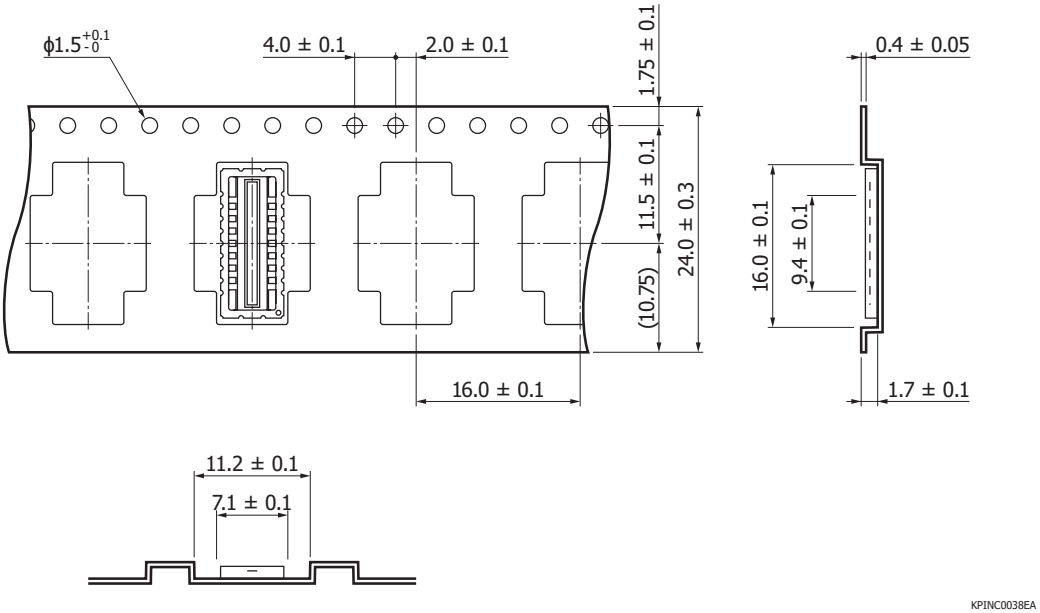
■ Packing state
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

S7509-10

■ Reel (conforms to JEITA ET-7200)

| Outer diameter | Hub diameter | Tape width | Material | Electrostatic characteristics |
|---|---|---|---|---|
| ϕ254 mm | ϕ100 mm | 24 mm | PS | Conductive |

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




■ Packing quantity
1000 pcs/reel

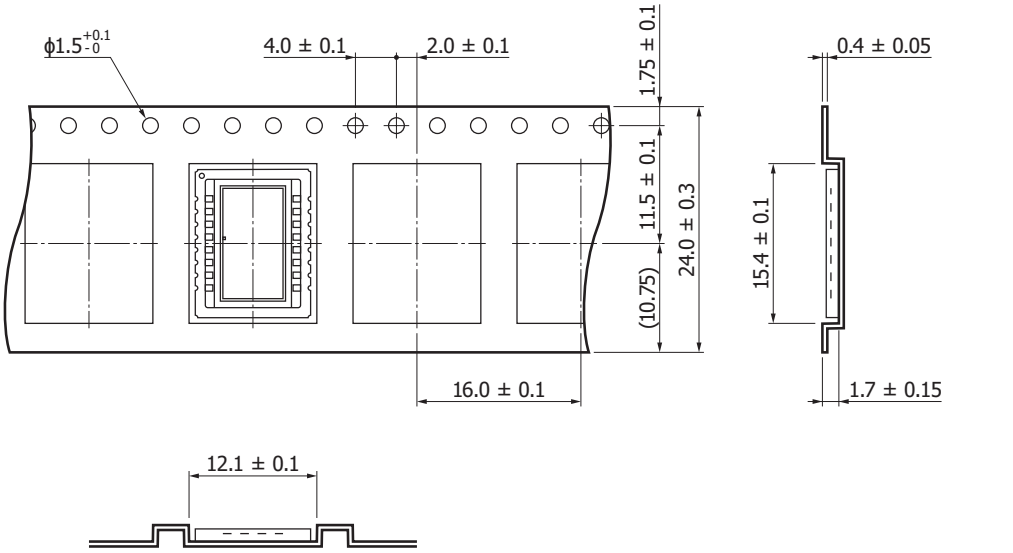
■ Packing state
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

S7510-10

■ Reel (conforms to JEITA ET-7200)

| Outer diameter | Hub diameter | Tape width | Material | Electrostatic characteristics |
|---|---|---|---|---|
| ϕ254 mm | ϕ100 mm | 24 mm | PS | Conductive |

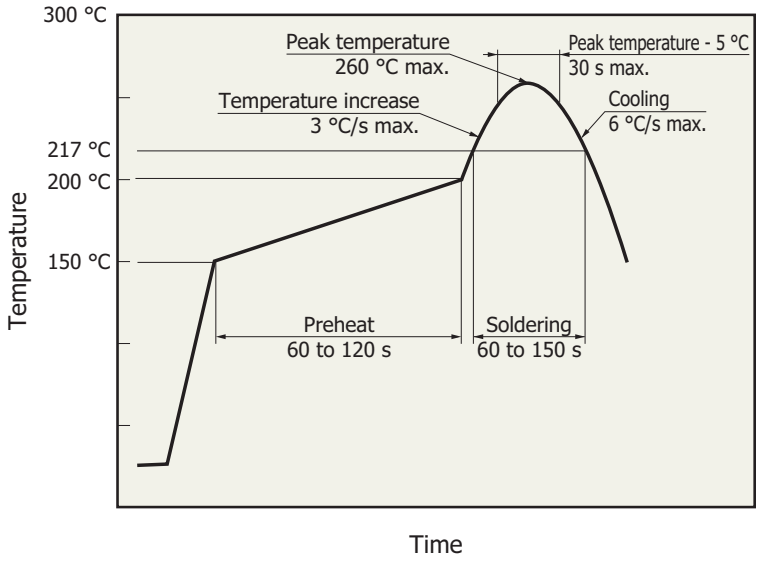
■ Embossed tape (unit: mm, material: PS, conductive)




■ Packing quantity
100 pcs/reel

■ Packing state
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

## Recommended reflow soldering conditions

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## Precautions

· This product's light input window uses soft silicone resin. Stain or scratch in the light input window degrades the sensitivity. Avoid contact with the light input window, as applying external force to the resin surface may cause the wire to deform and break.
· When soldering, use rosin-based flux to prevent terminal corrosion. Solder at 260 ° C or less within 5 seconds without moisture absorption.
· The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used. When you set reflow soldering conditions, check that problems do not occur in the product by testing out the conditions in advance.
· Silicone resin swells with organic solvents. So do not use anything other than alcohol.
· Avoid opening the bag until immediately before using the product so as to prevent oxidation or contamination of terminals or moisture absorption of resin filling.
In addition, if 3 months have passed in an unopened state or 168 hours have passed after opening, bake in nitrogen atmosphere for 3 to 5 hours at 150 °C, or for 12 to 15 hours at 120 °C before use.

## Related information

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

■ Precautions
· Disclaimer
· Surface mount type products

■ Technical information
· Si photodiode / Application circuit examples



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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, E-mail: usa@hamamatsu.com
Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-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, 20020 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.: 8F-3, No. 158, Section2, 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

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