HAMAMATSU
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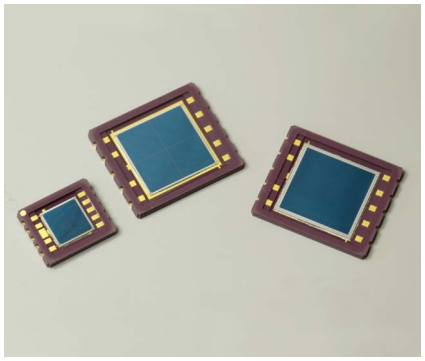
Si PIN photodiodes

S5980/S5981/S5870 series



Surface mountable, segmented type Si photodiode

Features

- **Surface mount type ceramic chip carrier package**
- **Compatible with lead-free solder reflow**
- **High sensitivity**
- **Packing**
  Tray: S5980, S5981, S5870
  Reel: S5980-10, S5981-10, S5870-10

Applications

- **Laser optical axis alignment**
- **Level meter**
- **Pointing device, etc.**

Structure

Parameter	Symbol	S5980/-10	S5981/-10	S5870/-10	Unit
Photosensitive area	A	5 × 5 / 4 segments	10 × 10 / 4 segments	10 × 10 / 2 segments	mm
Gap between elements	-	30			μm
Package	-	Ceramic			-
Window material	-	Resin coating			-

Absolute maximum ratings

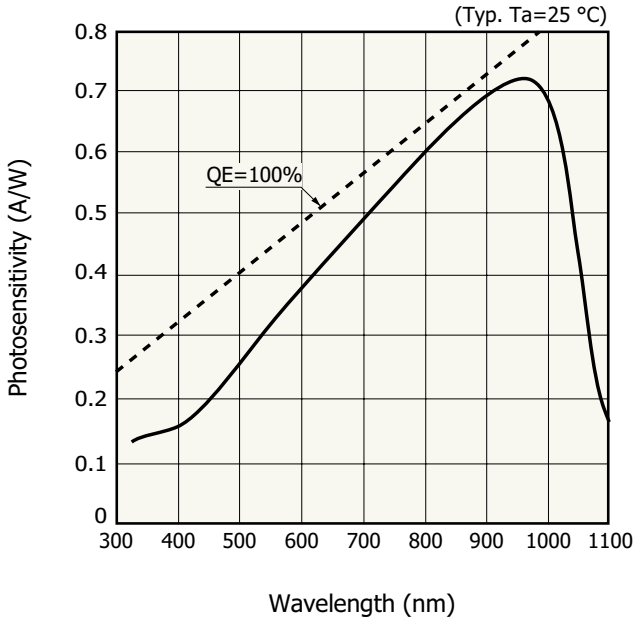
Parameter	Symbol	S5980/-10	S5981/-10	S5870/-10	Unit
Reverse voltage	V_R max	30			V
Operating temperature*1	Topr	-40 to +100			°C
Storage temperature*1	Tstg	-40 to +125			°C
Soldering temperature	Tsol	260 (3 times)*2			°C

*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.7
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, per element)

Parameter	Symbol	Condition	S5980/-10		S5981/-10		S5870/-10		Unit
			Typ.	Max.	Typ.	Max.	Typ.	Max.	
Spectral response range	λ		320 to 1100	-	320 to 1100	-	320 to 1100	-	nm
Peak sensitivity wavelength	λp		960	-	960	-	960	-	nm
Photosensitivity	S	λ=λp	0.72	-	0.72	-	0.72	-	A/W
Dark current	I_D	V_R=10 V	0.3	2	0.6	4	2	10	nA
Dark current temperature coefficient	T_{CID}		1.15	-	1.15	-	1.15	-	times/°C
Cutoff frequency	fc	V_R=10 V, R_L=50 Ω, -3 dB	25	-	20	-	10	-	MHz
Terminal capacitance	Ct	V_R=10 V, f=1 MHz	10	-	35	-	50	-	pF
Noise equivalent power	NEP	V_R=10 V, λ=λp	1.4×10^{-14}	-	1.9×10^{-14}	-	3.5×10^{-14}	-	$W/Hz^{1/2}$

Spectral response



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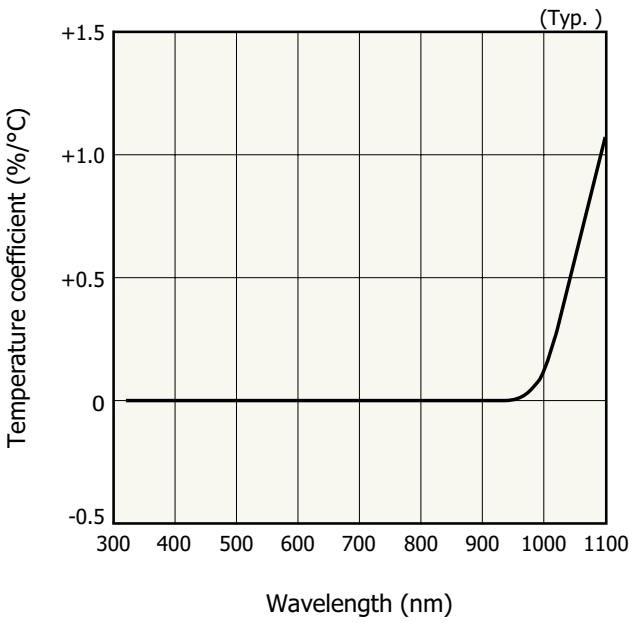
Sensitivity temperature characteristics



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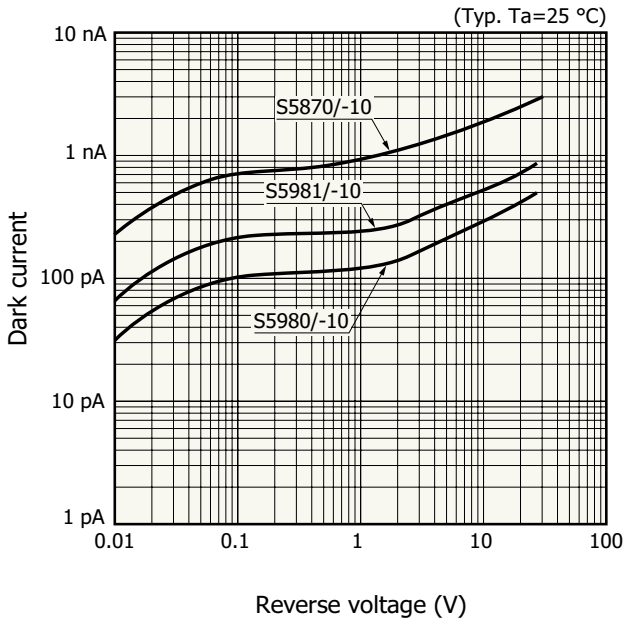
Dark current vs. reverse voltage



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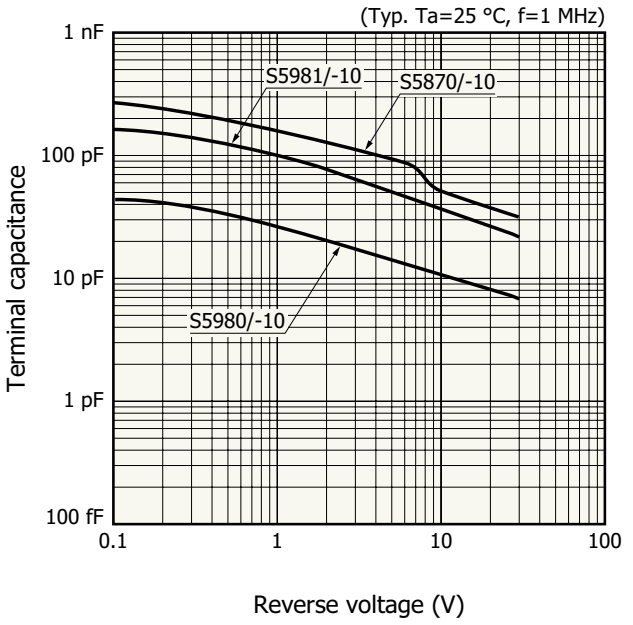
Terminal capacitance vs. reverse voltage



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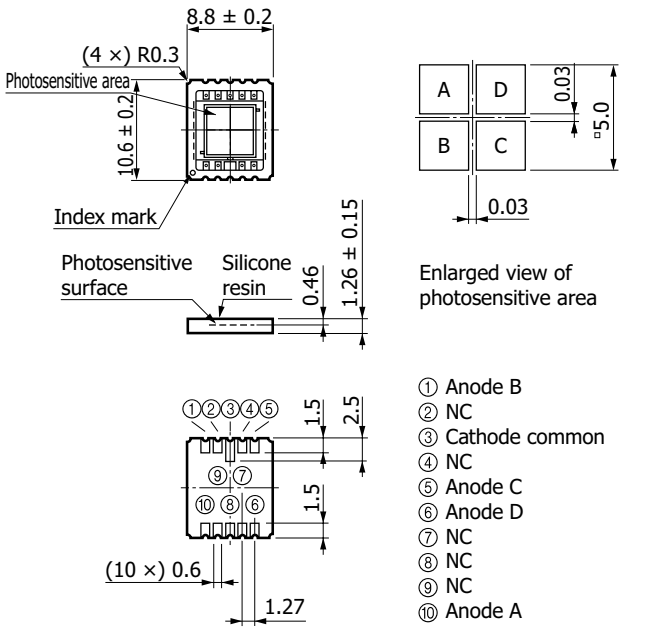
Dimensional outlines (unit: mm)

S5980/-10



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

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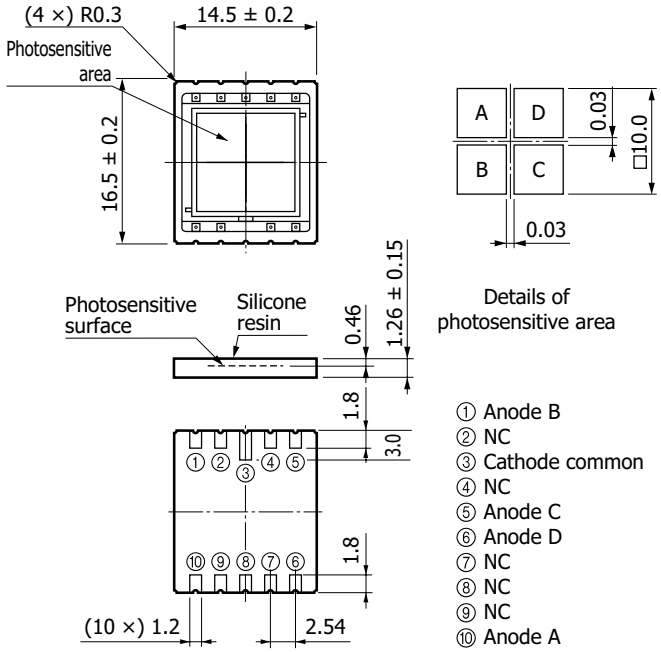
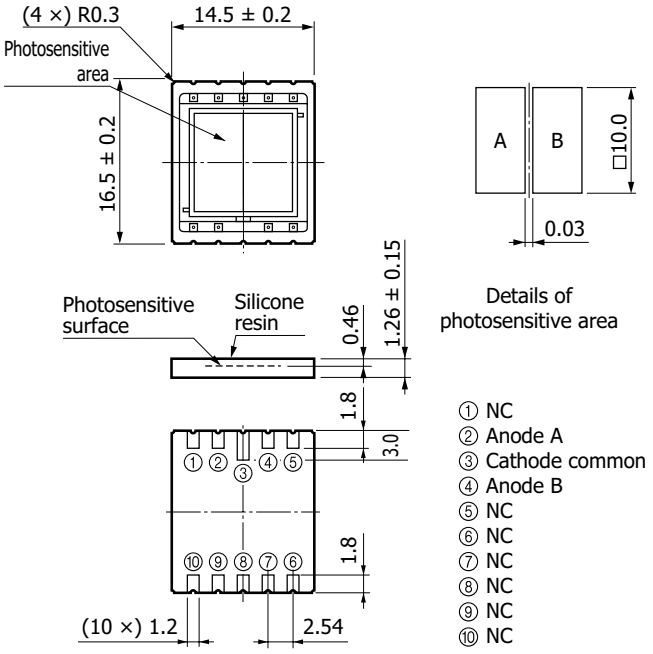
S5981/-10



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

KMPDA0037EB

S5870/-10



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

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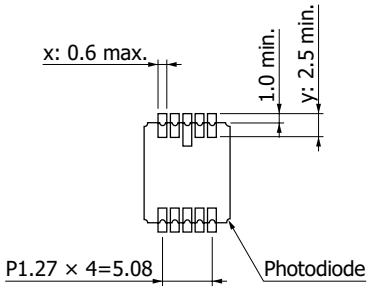
Recommended land patterns (unit: mm)

S5980/-10



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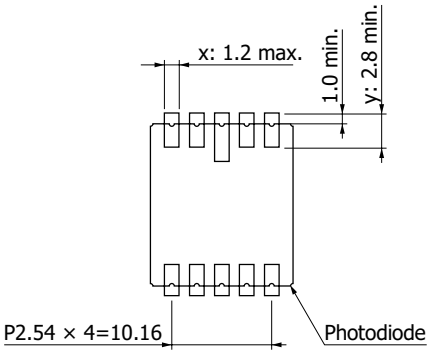
S5981/-10, S5870/-10



KPINC0032EE

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

S5980, S5981, S5870

- Packing quantity
  S5980: 100 pcs max./tray
  S5981, S5870: 50 pcs max./tray

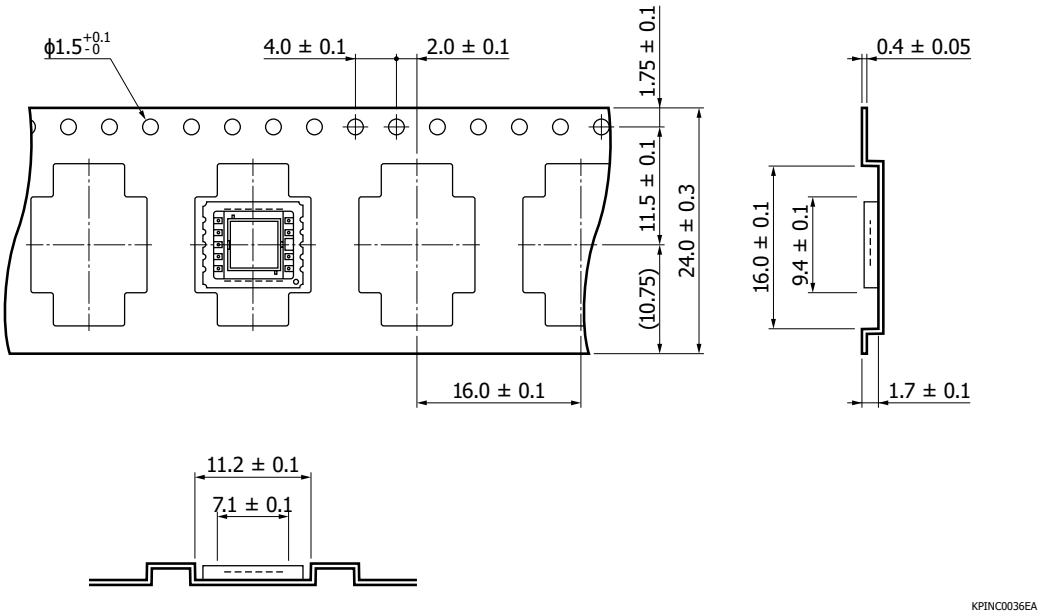
- Packing state
  Tray and desiccant in moisture-proof packaging (vacuum-sealed)

S5980-10

- 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

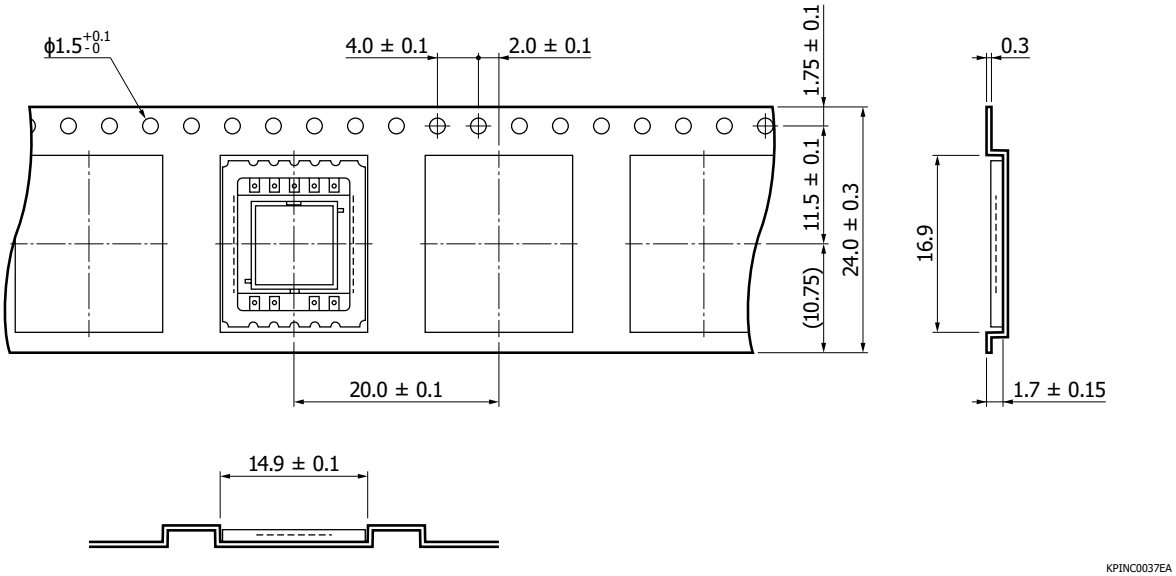
- Packing state
  Reel and desiccant in moisture-proof packaging (vacuum-sealed)

S5870-10, S5981-10

■ Reel (conforms to JEITA ET-7200)

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

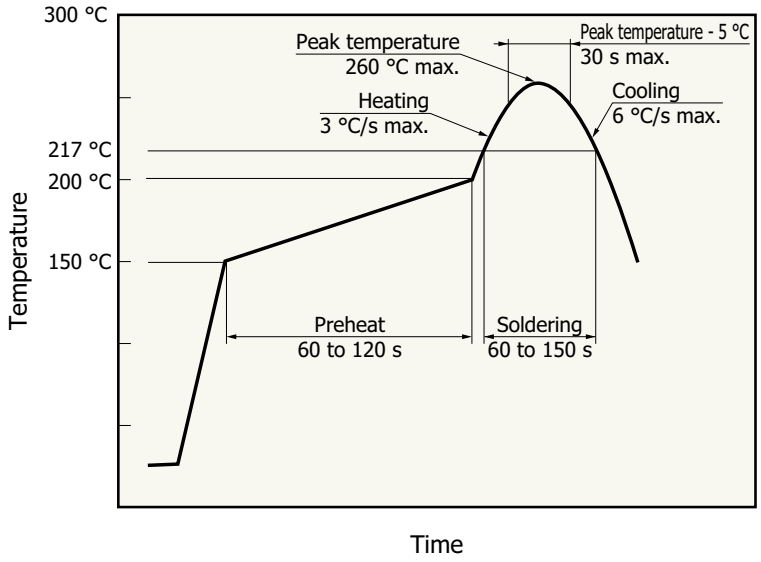
■ Embossed tape (unit: mm, material: PS, conductive)



■ Packing quantity
100 pcs/reel

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

Recommended reflow soldering conditions



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- After unpacking, store in an environment at a temperature of 30 °C or less and a humidity 60% or less, and perform reflow soldering within 168 hours.
- 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.

Baking

If more than 12 months have passed in the unopened state, or storage conditions are exceeded after opening the package, baking is required to remove moisture before reflow soldering. For the baking, refer to "Precautions / Surface mount type products" in the related information.

■ Recommended baking conditions

Temperature: 150 °C (3 to 5 hours) or 120 °C (12 to 15 hours)
Note: Before setting the baking conditions, perform experiments to confirm that no problems occur with the product.

Related information

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

■ Precautions
- Disclaimer
- Precautions / Surface mount type products

■ Catalogs
- Technical note / Si photodiodes

Information described in this material is current as of December 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.
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