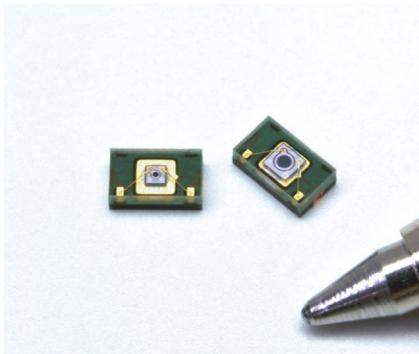


Si APD

S14645 series



High speed, compact Si APD for the 900 nm band featuring low-bias operation

This Si APD is suitable for detecting light in the 900 nm band, which is increasingly used in optical rangefinders. With the same shape as the previous product (S12926 series), this Si APD features less variation in breakdown voltage, reduced dark current, and expanded storage and operating temperatures.

Features

- **Small package: 3.1 × 1.8 × 1.0^t mm**
- **Peak sensitivity wavelength: 840 nm (M=100)**
- **Low bias operation: Breakdown voltage=195 V max.**
- **High-speed response: Cutoff frequency=600 MHz typ. (λ=900 nm, M=100)**
- **Reduction of breakdown voltage variation: 175 ± 20 V**

Applications

- **Optical rangefinders**

Structure

Parameter	Symbol	S14645-02	S14645-05	Unit
Photosensitive area size*1	A	φ0.2	φ0.5	mm
Effective photosensitive area	-	0.03	0.19	mm ²
Package	-	Plastic (silicone resin)		-

*1: Photosensitive area in which a typical gain can be obtained

Absolute maximum ratings

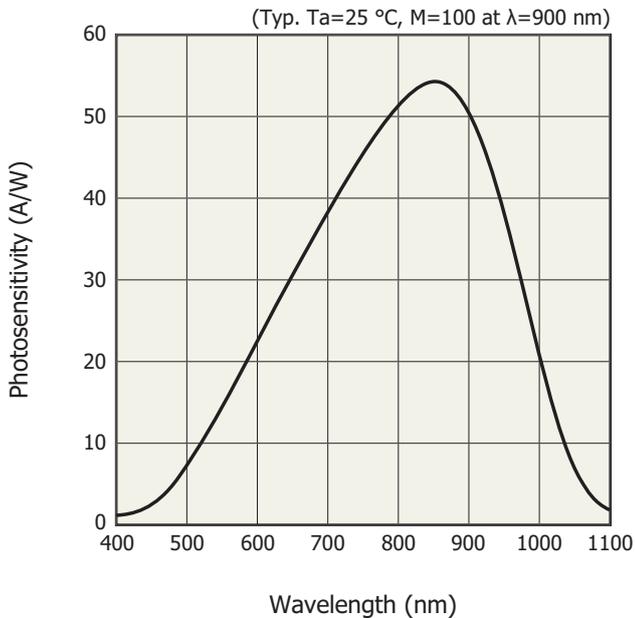
Parameter	Symbol	Specification	Unit
Operating temperature	T _{opr}	-30 to +100	°C
Storage temperature	T _{stg}	-40 to +100	°C
Reverse current (DC)	I _{R max}	0.2	mA
Forward current	I _{F max}	10	mA
Soldering conditions	-	Peak temperature: 260 °C (see P.4), JEDEC level 2a	-

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.

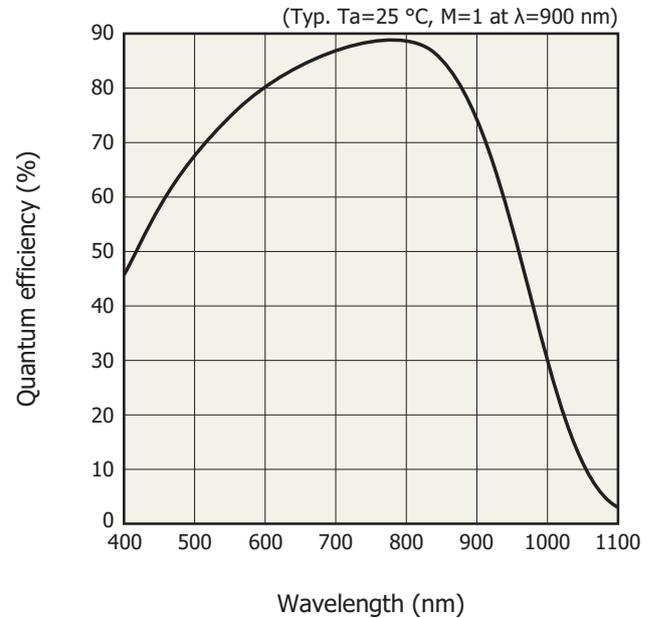
Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	S14645-02			S14645-05			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		400 to 1100						nm
Peak sensitivity wavelength	λ_p		-	840	-	-	840	-	nm
Photosensitivity	S	$\lambda=900$ nm, M=1	-	0.5	-	-	0.5	-	A/W
Quantum efficiency	QE	$\lambda=900$ nm, M=1	-	70	-	-	70	-	%
Breakdown voltage	V _{BR}	I _D =100 μ A	155	175	195	155	175	195	V
Temperature coefficient of V _{BR}	$\Delta T/V_{BR}$		-	1.1	-	-	1.1	-	V/°C
Dark current	I _D	M=100	-	40	400	-	80	800	pA
Temperature coefficient of I _D	$\Delta T/I_D$	M=100	-	1.1	-	-	1.1	-	times/°C
Cutoff frequency	f _c	M=100, R _L =50 Ω $\lambda=900$ nm, -3 dB	-	600	-	-	600	-	MHz
Terminal capacitance	C _t	M=100, f=1 MHz	-	0.5	-	-	1.0	-	pF
Excess noise figure	x	M=100, $\lambda=900$ nm	-	0.3	-	-	0.3	-	-
Gain	M	$\lambda=900$ nm	-	100	-	-	100	-	-

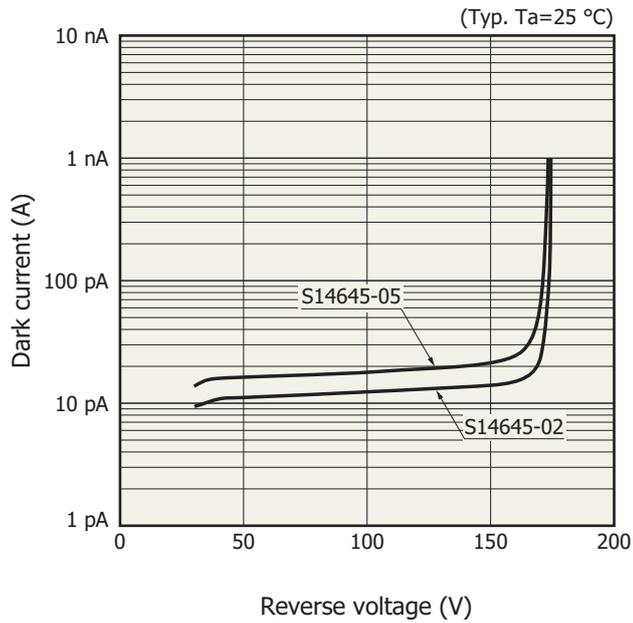
Spectral response



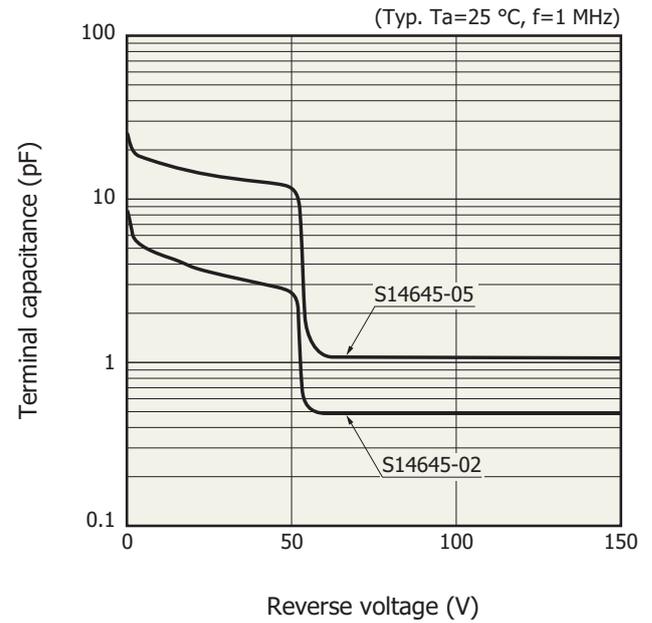
Quantum efficiency vs. wavelength



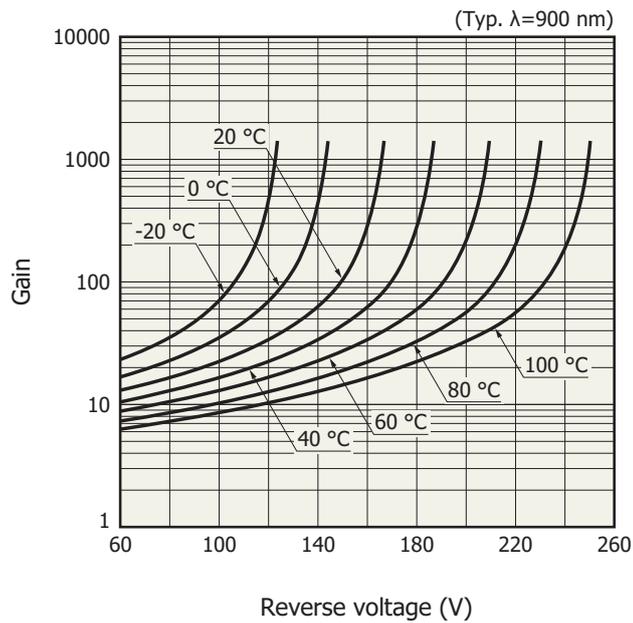
Dark current vs. reverse voltage



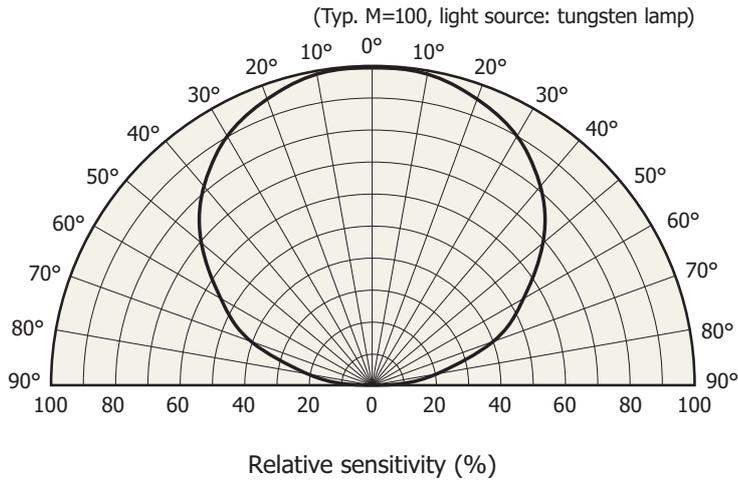
Terminal capacitance vs. reverse voltage



Gain vs. reverse voltage

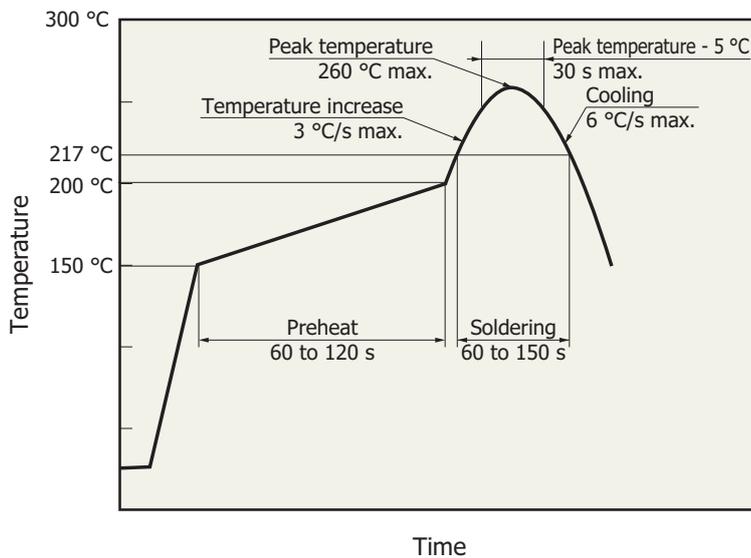


Directivity



KAPD0450EA

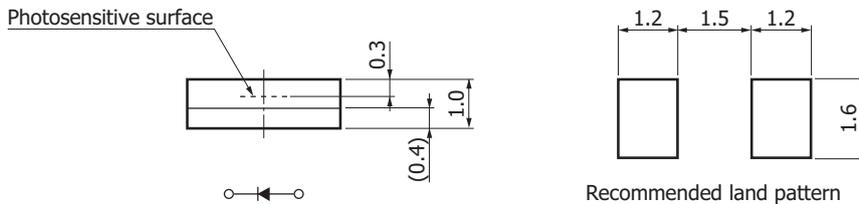
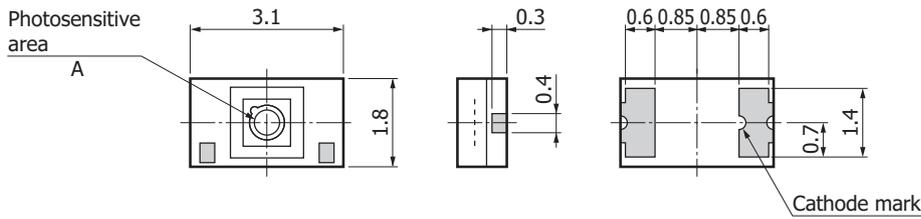
Recommended solder reflow conditions



KMPD0438EA

- 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 4 weeks.
- The effect that the product receives during reflow soldering varies depending on the circuit board and the 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.

Dimensional outline (unit: mm)



Position accuracy of photosensitive area:
X, Y $\leq \pm 0.2$

Type no.	A
S14645-02	$\phi 0.2$
S14645-05	$\phi 0.5$

Tolerance unless otherwise noted: ± 0.2

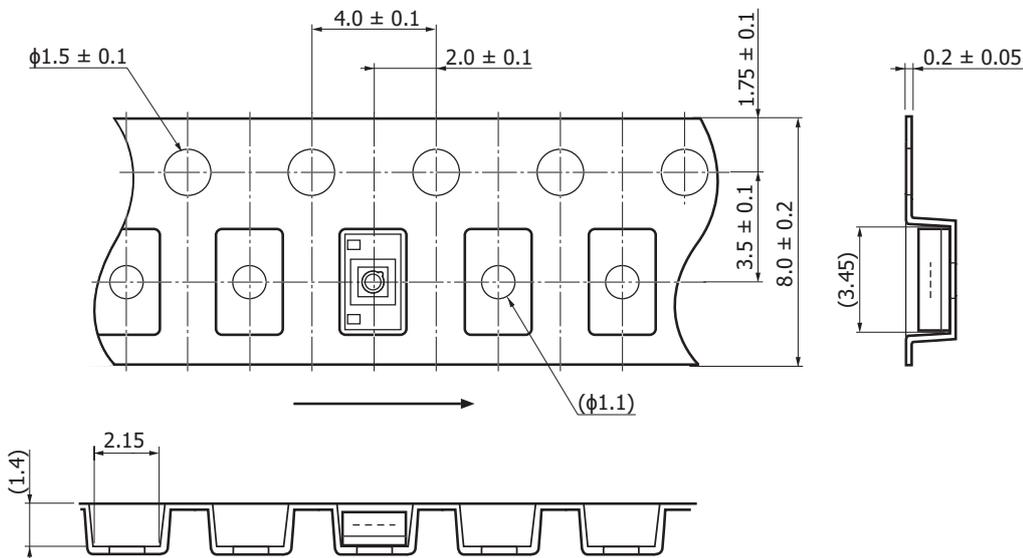
KAPDA0202EA

Standard packing specifications

- Reel (conforms to JEITA ET-7200)

Dimensions	Hub diameter	Tape width	Material	Electrostatic characteristics
180 mm	60 mm	8 mm	PS	Conductive

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



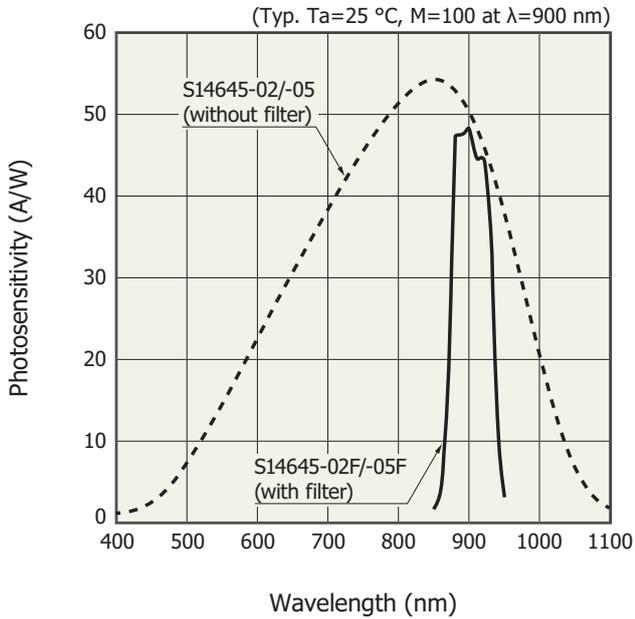
KPINC0023EA

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

Related products

Products with on-chip filter that transmits near infrared light (850 to 950 nm) are also available.

Spectral response



KAPDB0436EB

Related information

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

Precautions

- Disclaimer
- Surface mount type products

Information described in this material is current as of January 2019.

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.

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