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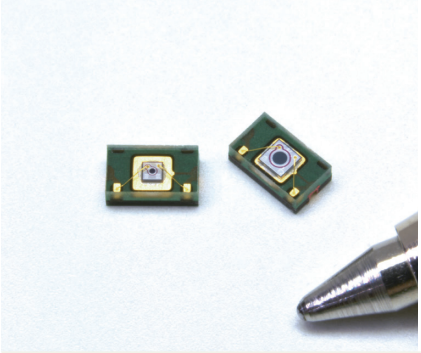
Si APD

S14644 series



High speed, compact Si APD for LiDAR (800 nm band) featuring low-bias operation

The S14644 series is a compact, surface mount type Si APD that achieves high sensitivity in the 800 nm band. This is suitable for laser monitoring of optical rangefinders widely used from consumer electronics to industrial use.

Features

- **Small package: 3.1 × 1.8 × 1.0^{t} mm**
- **Peak sensitivity wavelength: 800 nm (M=100)**
- **Low-bias operation: Breakdown voltage=180 V max.**
- **High-speed response: Cutoff frequency=1 GHz typ. (λ=800 nm, M=100)**
- **Reduction of breakdown voltage variation 160 ± 20 V**

Applications

- **Optical rangefinders**

Structure

Parameter	S14644-02	S14644-05	Unit
Photosensitive area*1	ϕ0.2	ϕ0.5	mm
Effective photosensitive area	0.03	0.19	mm^2
Package	Glass epoxy (silicone resin)		-

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

Absolute maximum ratings

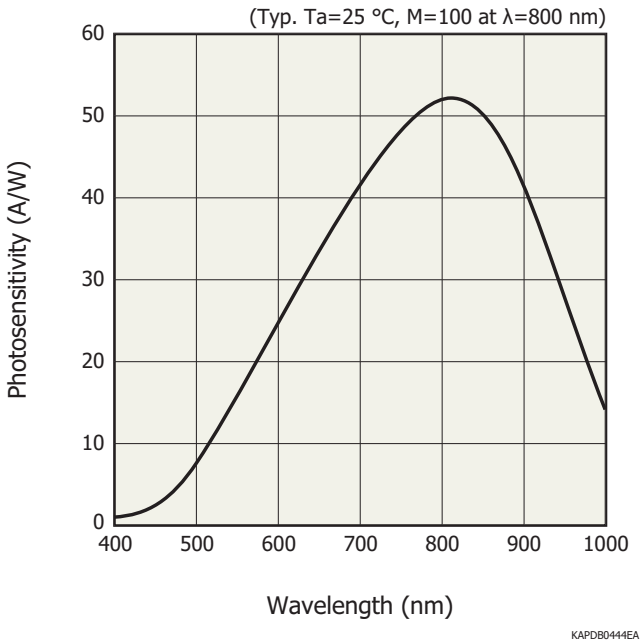
Parameter	Symbol	Specification	Unit
Reverse current (DC)	I_R max	0.2	mA
Forward current	I_F max	10	mA
Operating temperature*2	Topr	-30 to +100	°C
Storage temperature*2	Tstg	-40 to +100	°C
Soldering temperature	Tsol	260 (3 times)*3	°C

*2: No dew condensation
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.
*3: Reflow soldering, JEDEC J-STD-020 MSL 2a, see P.5
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.

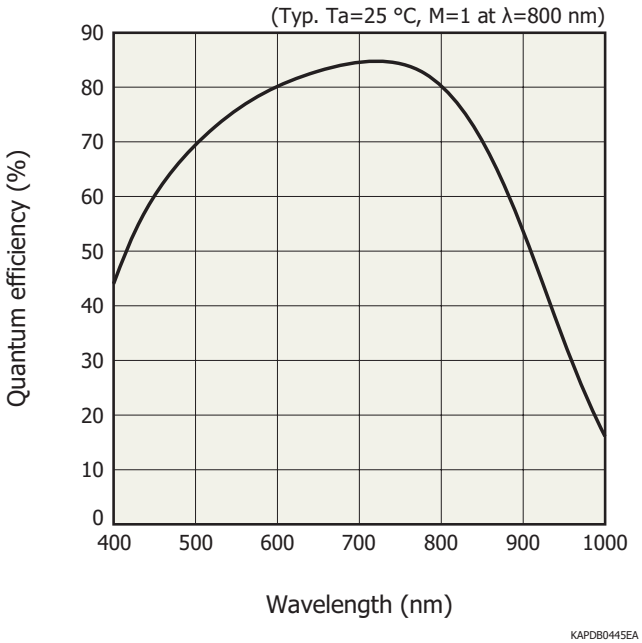
Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	S14644-02			S14644-05			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		400 to 1000						nm
Peak sensitivity wavelength	λp		-	800	-	-	800	-	nm
Photosensitivity	S	λ=800 nm, M=1	-	0.52	-	-	0.52	-	A/W
Quantum efficiency	QE	λ=800 nm, M=1	-	80	-	-	80	-	%
Breakdown voltage	V_{BR}	I_D=100 μA	140	160	180	140	160	180	V
Temperature coefficient of breakdown voltage	ΔTV_{BR}		-	0.63	-	-	0.63	-	V/°C
Dark current	I_D	M=100	-	30	300	-	50	500	pA
Temperature coefficient of dark current	ΔT_{ID}	M=100	-	1.1	-	-	1.1	-	times/°C
Cutoff frequency	fc	M=100, R_L=50 Ω λ=800 nm, -3 dB	-	1.2	-	-	1	-	GHz
Terminal capacitance	Ct	M=100, f=1 MHz	-	0.6	-	-	1.6	-	pF
Excess noise figure	x	M=100, λ=800 nm	-	0.3	-	-	0.3	-	-
Gain	M	λ=800 nm	-	100	-	-	100	-	-

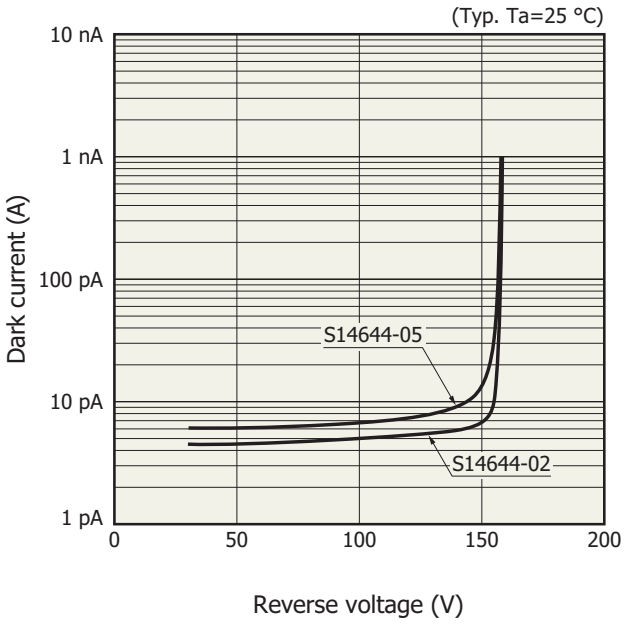
Spectral response



Quantum efficiency vs. wavelength



Dark current vs. reverse voltage



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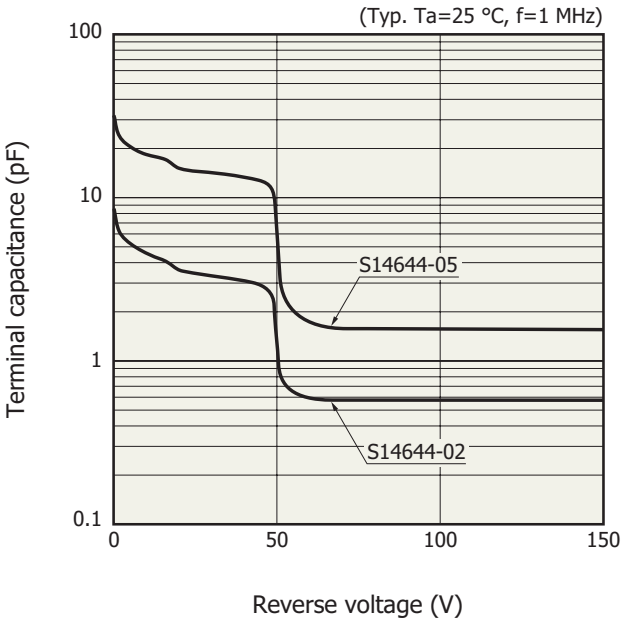
Terminal capacitance vs. reverse voltage



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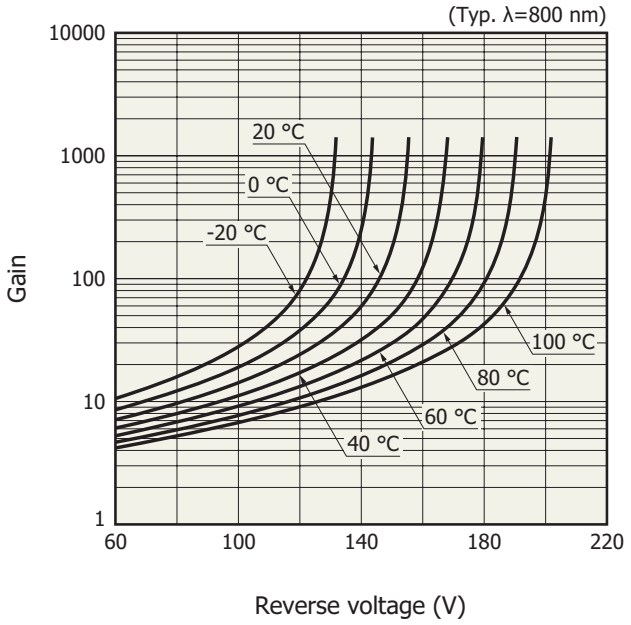
Gain vs. reverse voltage



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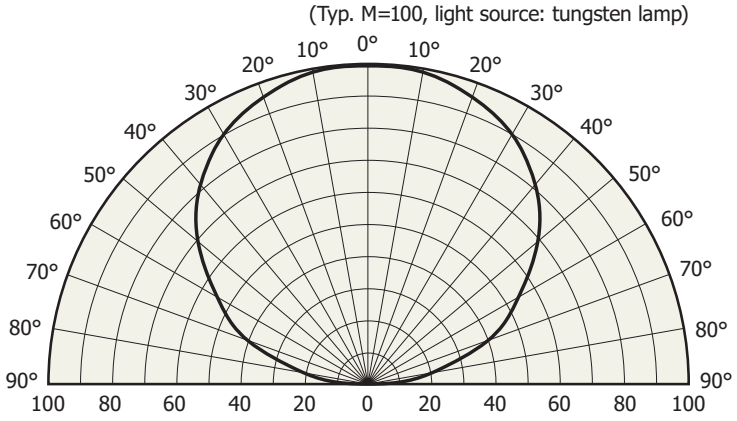
Directivity



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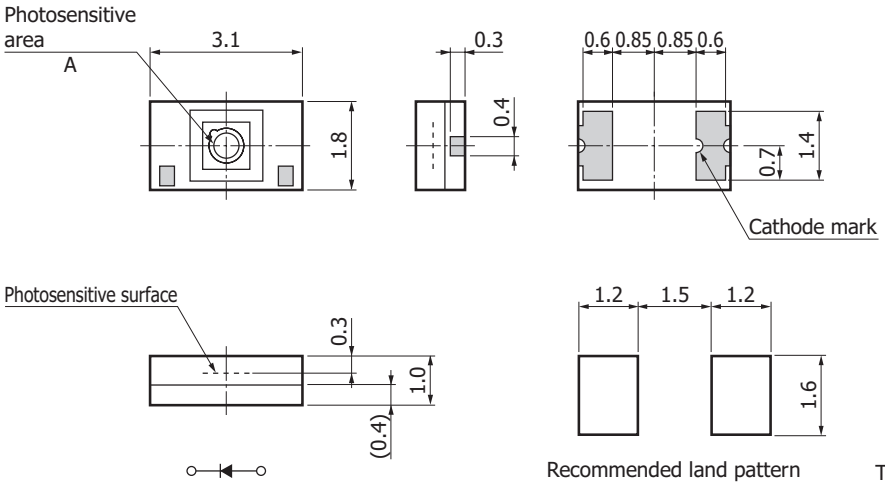
Dimensional outline (unit: mm)



Recommended land pattern

Tolerance unless otherwise noted: ±0.2

Photosensitive area position accuracy:
X, Y≤±0.2

Type no.	A
S14644-02	ϕ0.2
S14644-05	ϕ0.5

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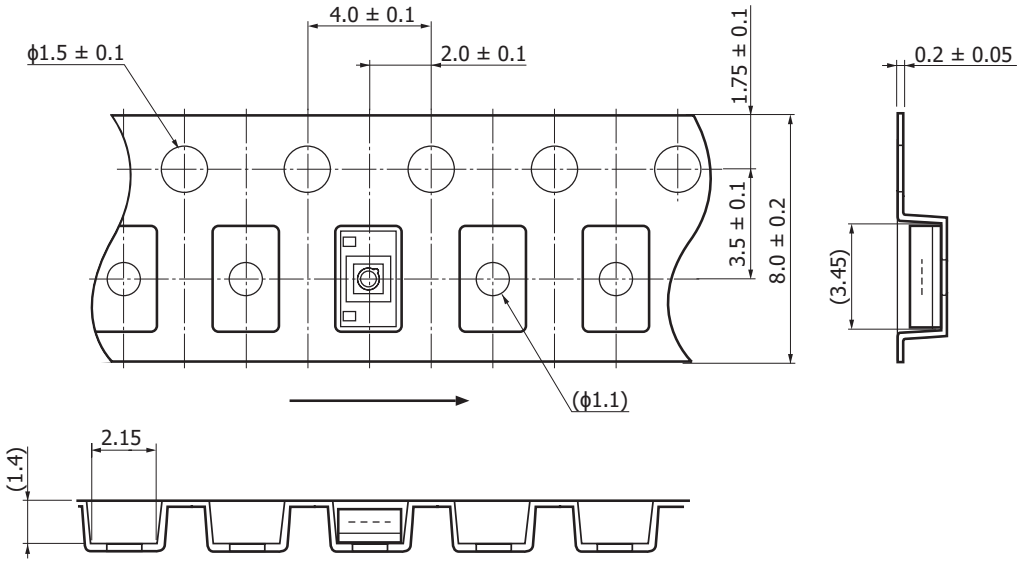
Standard packing specifications

■ Reel (conforms to JEITA ET-7200)

Outer diameter	Hub diameter	Tape width	Material	Electrostatic characteristics
ϕ180 mm	ϕ60 mm	8 mm	PS	Conductive

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



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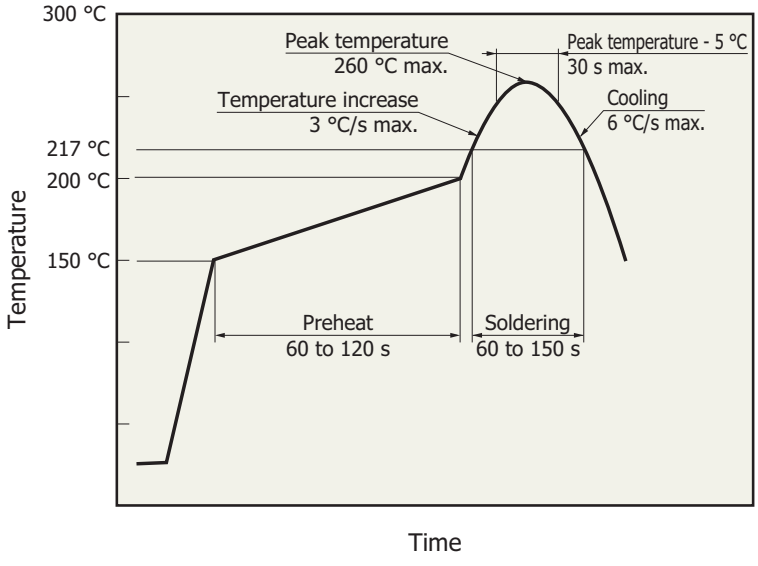
■ Packing quantity
1000 pcs/reel

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

Recommended reflow soldering conditions



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

Related information

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

■ Precautions
· Disclaimer
· Surface mount type products

■ Technical information
· Si photodiodes / Technical note

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