

One-dimensional PSD

S15430 series



PSD compatible to lead-free reflow soldering

The S15430 series is a position sensitive detector (PSD) compatible to lead-free reflow soldering. The small and thin leadless package allows reducing the mount area on a printed circuit board.

Features

- Photosensitive area: 1 × 6 mm (resistance length: 6 mm)
- Visible light cut type (S15430-01CT, S15430-03CT)
- High interelectrode resistance: 300 kΩ (S15430-03CT)
- Surface mount type
Compact and thin leadless package
- Applicable lead-free reflow soldering

Applications

- Distance measuring equipment
- Camera auto-focus
- Proximity switches
- Displacement meters

Structure

Parameter	Specification	Unit
Photosensitive area	1 × 6	mm
Package	Glass epoxy	-
Sealing material	Silicone resin	-

Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Reverse voltage	V _R max	T _a =25 °C	10	V
Operating temperature	T _{opr}	No dew condensation*1	-25 to 85	°C
Storage temperature	T _{stg}	No dew condensation*1	-40 to 100	°C
Soldering temperature*2	T _{sol}		250 (twice)	°C

*1: 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, IPC/JEDEC J-STD-020 MSL 3, see P.6

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)

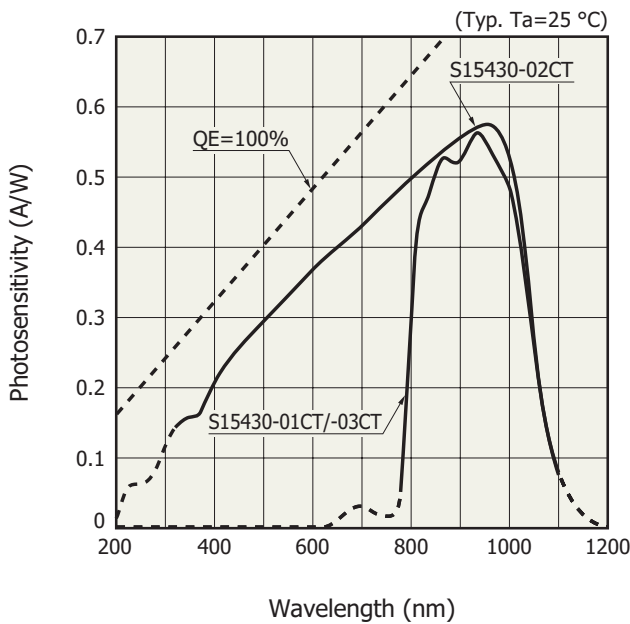
Parameter	Symbol	Condition	S15430-01CT			S15430-02CT			S15430-03CT			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		-	780 to 1100	-	-	320 to 1100	-	-	780 to 1100	-	nm
Peak sensitivity wavelength	λ_p		-	960	-	-	960	-	-	960	-	nm
Photosensitivity	S	$\lambda=890$ nm	-	0.5	-	-	0.55	-	-	0.5	-	A/W
Interelectrode resistance	Rie	Vb=0.1 V	30	50	80	30	50	80	240	300	360	k Ω
Position detection error*3	-	VR=1 V Light spot size= ϕ 300 μ m	-	\pm 20	\pm 60	-	\pm 20	\pm 60	-	\pm 20	\pm 60	μ m
Saturation current*4	Ist	VR=1 V, RL=1 k Ω	80	-	-	80	-	-	20	-	-	μ A
Dark current	ID	VR=1 V	-	0.1	2	-	0.1	2	-	0.1	2	nA
Dark current temperature coefficient	Δ TID		-	1.15	-	-	1.15	-	-	1.15	-	times/ $^{\circ}$ C
Rise time*5	tr	VR=1 V, $\lambda=650$ nm RL=1 k Ω , $\lambda=890$ nm	-	-	-	-	2	-	-	-	-	μ s
Terminal capacitance	Ct	VR=1 V, f=10 kHz	-	60	90	-	60	90	-	60	90	pF

*3: In the range 75% from the center of the photosensitive area to the edge

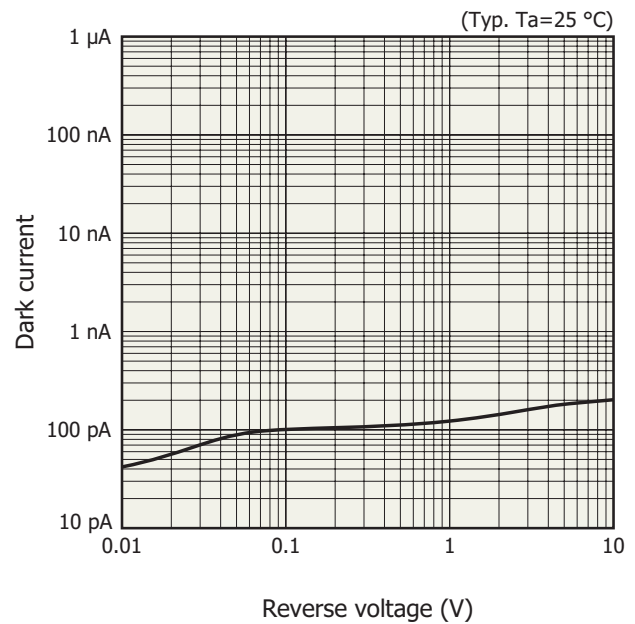
*4: Upper limit of linearity of the photocurrent relative to the total incident light level. Photocurrent at a point 10% deviation from linearity

*5: Time required for output change from 10 to 90% of the steady output value when stepped function light is input to the PSD

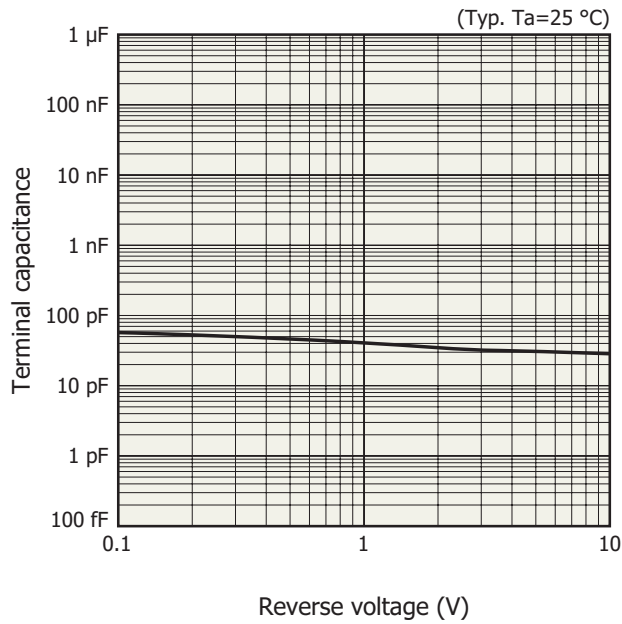
Spectral response



Dark current vs. reverse voltage

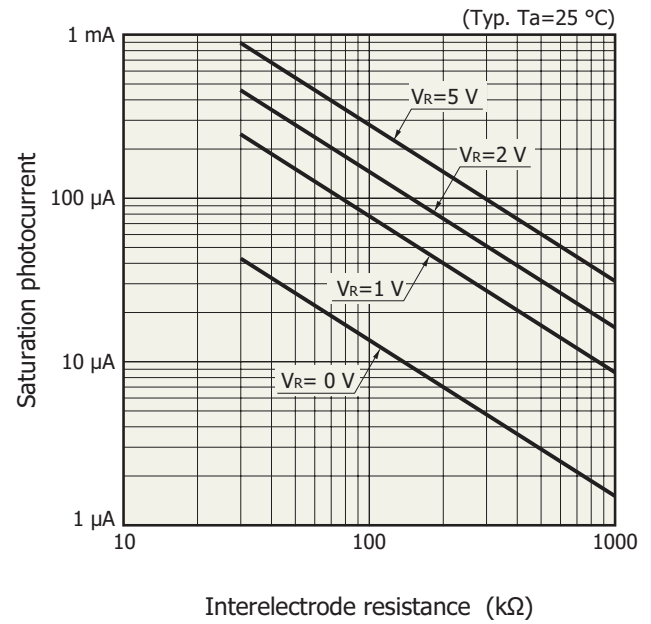


Terminal capacitance vs. reverse voltage



KPSDB0126EA

Saturation photocurrent vs. interelectrode resistance



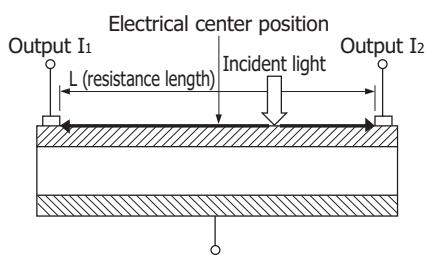
KPSDB0003EA

Definition of position detection error

Given the electrical center position to be the incident position that produces $I_1=I_2$, the position detection error at each incident position is defined by the following equation.

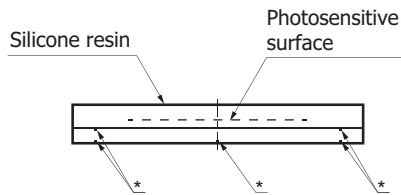
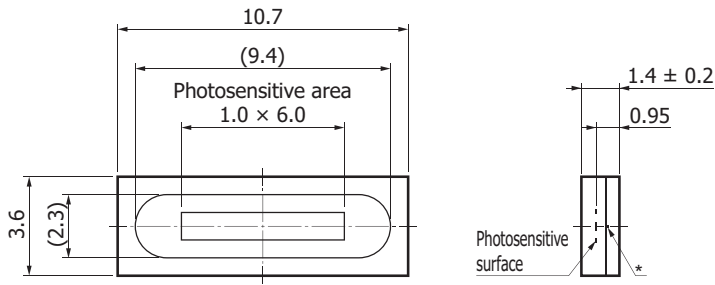
$$\text{Position detection error } (\mu\text{m}) = \text{Incident position} - \frac{I_2 - I_1}{I_1 + I_2} \times \frac{L}{2}$$

The value at the incident position assumes that the electrical center position is 0 with the I_1 side as negative and I_2 side as positive.

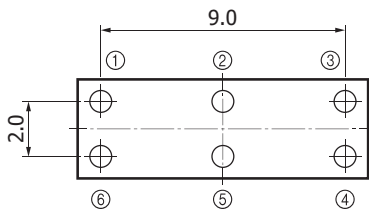


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Dimensional outline (unit: mm)



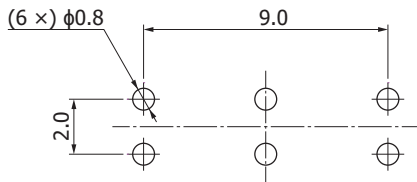
- ① Anode 1
- ② NC
- ③ Cathode (common)
- ④ Anode 2
- ⑤ NC
- ⑥ Cathode (common)



Tolerance unless otherwise noted: ± 0.1 mm, $\pm 2^\circ$
 Values in parentheses indicate reference values.
 Chip position accuracy with respect to the base edge
 $X, Y \leq \pm 0.2$, $\theta \leq \pm 2^\circ$
 * Do not allow metal/conductive objects to contact the part where the wiring is exposed. Doing so may cause short circuits.
 (the opposite side is the same)

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Recommended land pattern (unit: mm)



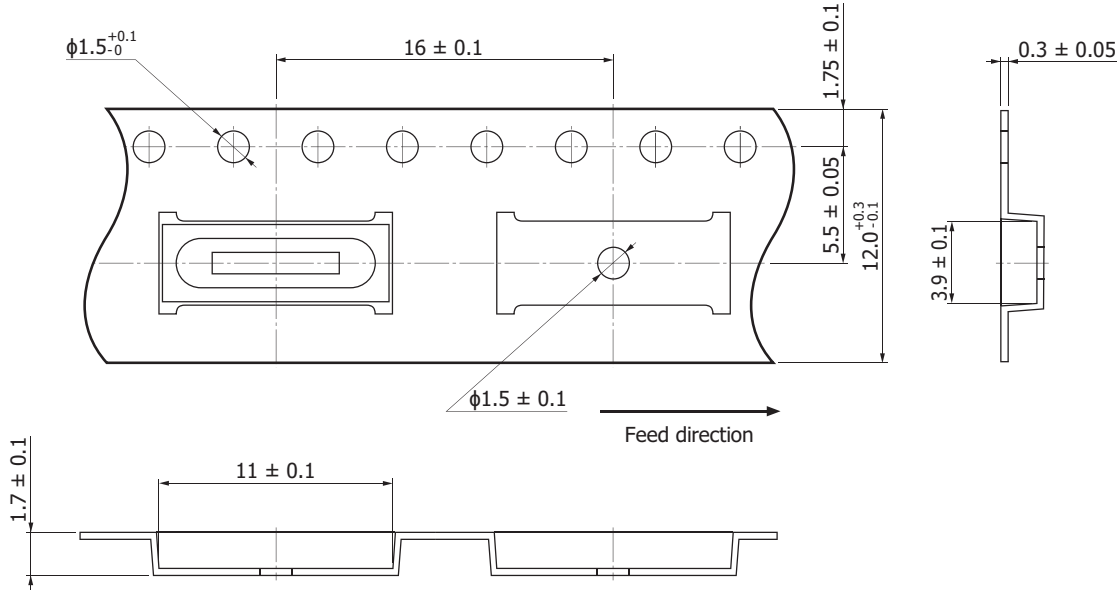
KPSDC0098EA

Reel packing specifications

■ Reel (conforms to JEITA ET-7200)

Outer diameter	Hub diameter	Tape width	Material	Electrostatic characteristics
φ254 mm	φ100 mm	12 mm	PS	Conductive

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



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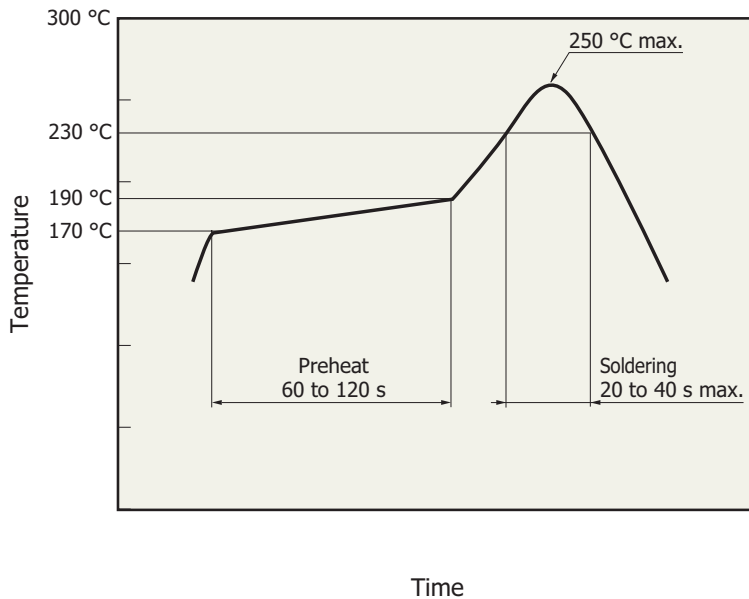
■ Packing quantity

1000 pcs/reel

■ Packing state

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

Recommended soldering conditions



KPSDC0032EA

- 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 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.

Related information

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

■ Precautions

- Disclaimer
- Surface mount type products

■ Technical information

- PSD

Information described in this material is current as of July 2020.

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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