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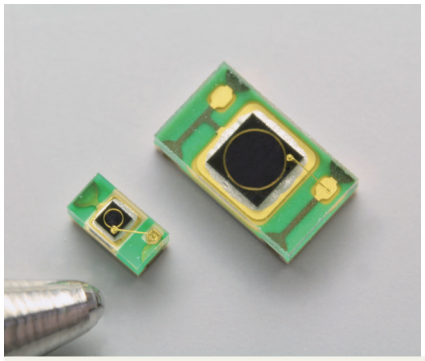
InGaAs PIN photodiodes

G13176 series



Surface mount type COB (chip on board) package

The G13176 series is a small-size near infrared detector available in a surface mount COB package. Its size is drastically reduced compared to the previous metal package type (G12180-003A/-010A). The spectral response covers a range from 0.9 to 1.7 µm (with peak sensitivity wavelength at 1.55 µm). This product features high sensitivity and low noise. In addition to optical communication, you can use this product for analysis, measurement, and the like. The small package makes this product suitable for integration into hand-held devices and mobile devices. The modified resin has improved the reflow resistivity as compared to the previous product (G11777-003P).

Features

- **Low noise**
- **High sensitivity**
- **High-speed response**
- **Photosensitive area: ϕ0.3 mm, ϕ1.0 mm**
- **Surface mount type**
- **Small size COB package**
- **Low cost**
- **Compatible lead-free reflow soldering**

Application

- **Measurement**
- **Analysis**
- **Light level monitor**

Structure

Parameter	Symbol	G13176-003P	G13176-010P	Unit
Window material	-	Silicone resin		-
Package	-	Glass epoxy		-
Photosensitive area	-	ϕ0.3	ϕ1.0	mm

Absolute maximum ratings

Parameter	Symbol	Condition	G13176-003P	G13176-010P	Unit
Reverse voltage	V_R max.		10		V
Operating temperature	Topr	No dew condensation*1	-25 to +105		°C
Storage temperature	Tstg	No dew condensation*1	-40 to +105		°C

Note: Handle the G13176 series with tweezers or gloves. Do not touch with bare hands. As the resin area of the G13176 series is soft, do not allow sharp or hard objects to come in contact with it, or apply external force to it.
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.

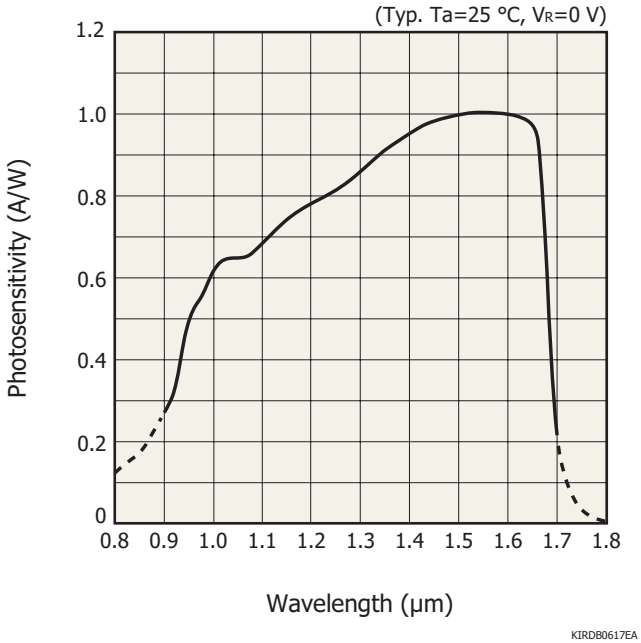
*1: When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

The G13176 series may be damaged by electrostatic discharge, etc. Be careful when using the G13176 series.

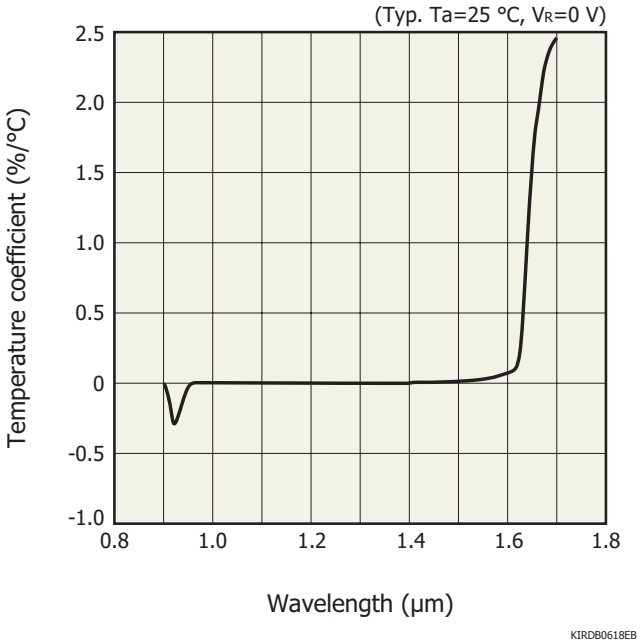
Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	G13176-003P			G13176-010P			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ	10% or more of the value at peak	-	0.9 to 1.7	-	-	0.9 to 1.7	-	μm
Peak sensitivity wavelength	λp		-	1.55	-	-	1.55	-	μm
Photosensitivity	S	λ=1.3 μm	0.75	0.85	-	0.75	0.85	-	A/W
		λ=λp	0.85	1	-	0.85	1	-	
Dark current	I_D	V_R=5 V	-	0.1	0.8	-	0.8	4	nA
Dark current temperature coefficient	ΔT_{ID}		-	1.09	-	-	1.09	-	times/°C
Cutoff frequency	fc	V_R=5 V, R_L=50 Ω	300	600	-	25	60	-	MHz
Terminal capacitance	Ct	V_R=5 V, f=1 MHz	-	5	8	-	55	120	pF
Shunt resistance	Rsh	V_R=10 mV	100	700	-	25	125	-	MΩ
Detectivity	D*	λ=λp	1.5×10^{12}	5×10^{12}	-	1.5×10^{12}	5×10^{12}	-	cm·Hz$^{1/2}$/W
Noise equivalent power	NEP	λ=λp	-	5×10^{-15}	2×10^{-14}	-	1.4×10^{-14}	4×10^{-14}	W/Hz$^{1/2}$

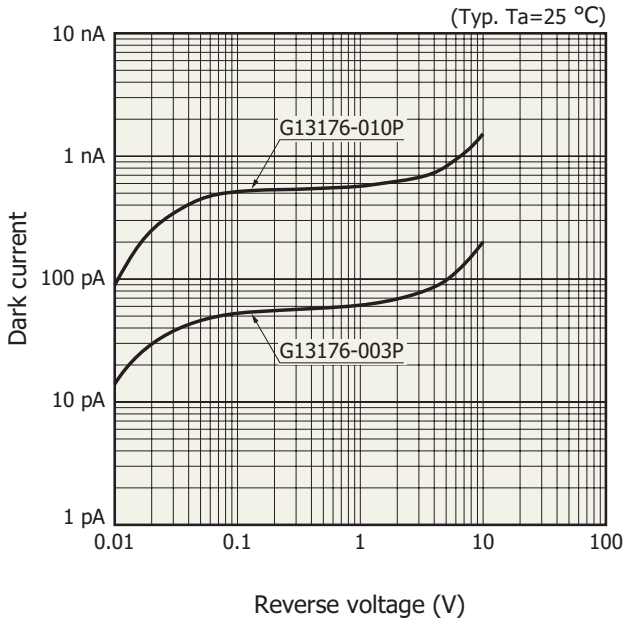
Spectral response



Photosensitivity temperature characteristics



Dark current vs. reverse voltage



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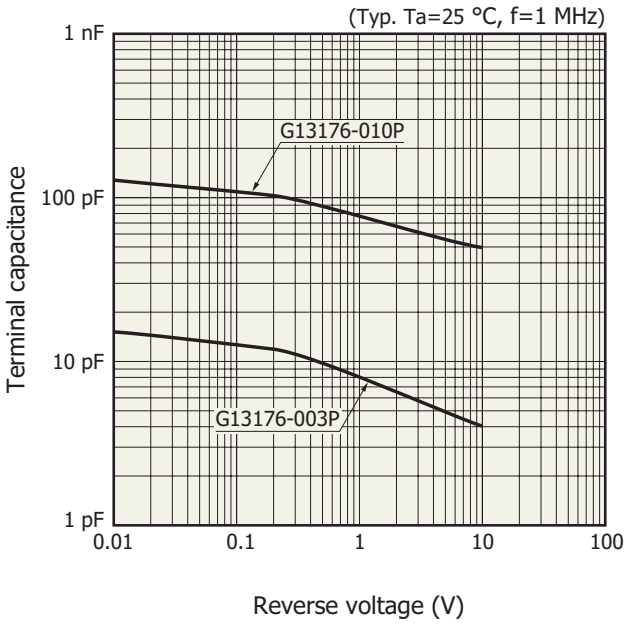
Terminal capacitance vs. reverse voltage



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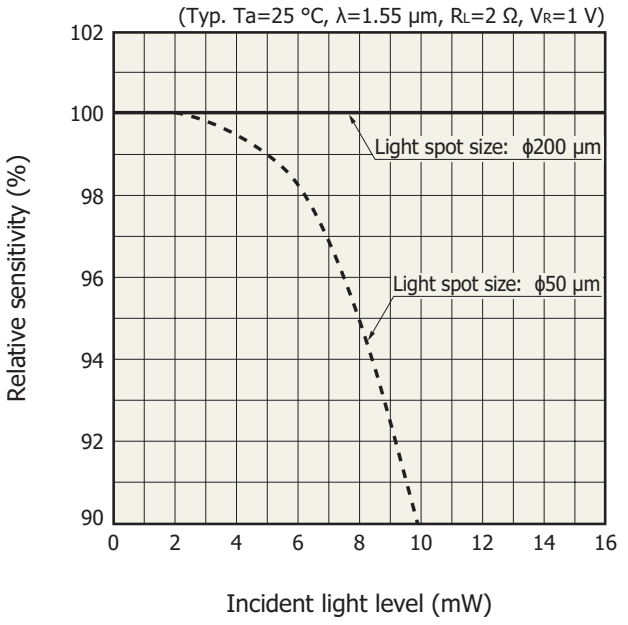
Linearity



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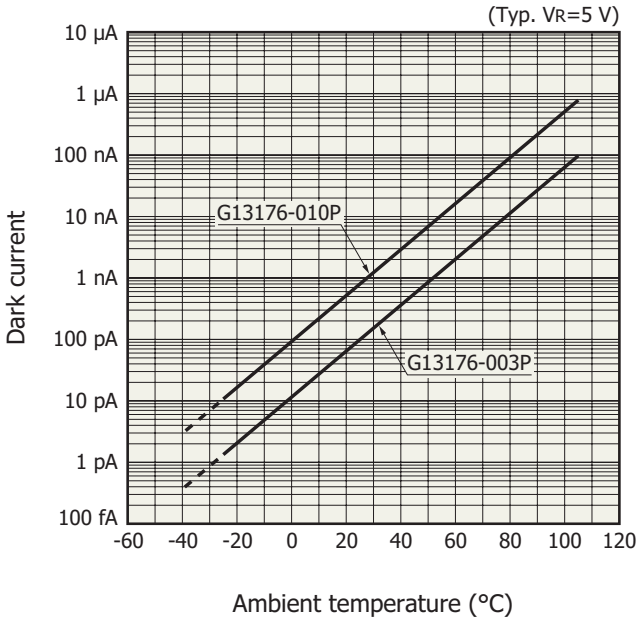
Dark current vs. ambient temperature



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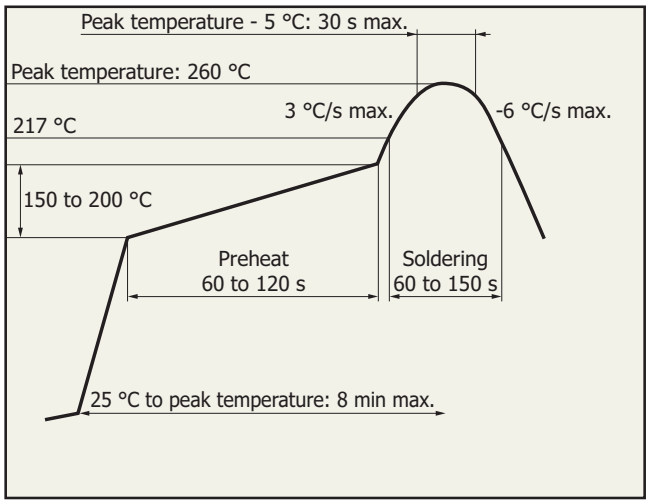
Recommended solder reflow conditions



- After unpacking, store the device in an environment at a temperature range of 5 to 30 °C and a humidity of 60% or less, and perform reflow soldering within 1 year.
- Therminal stress applied to the device during reflow soldering differs depending on the PC board and reflow oven being used.
- When setting the reflow conditions, make sure that the reflow soldering process does not degrade device reliability.

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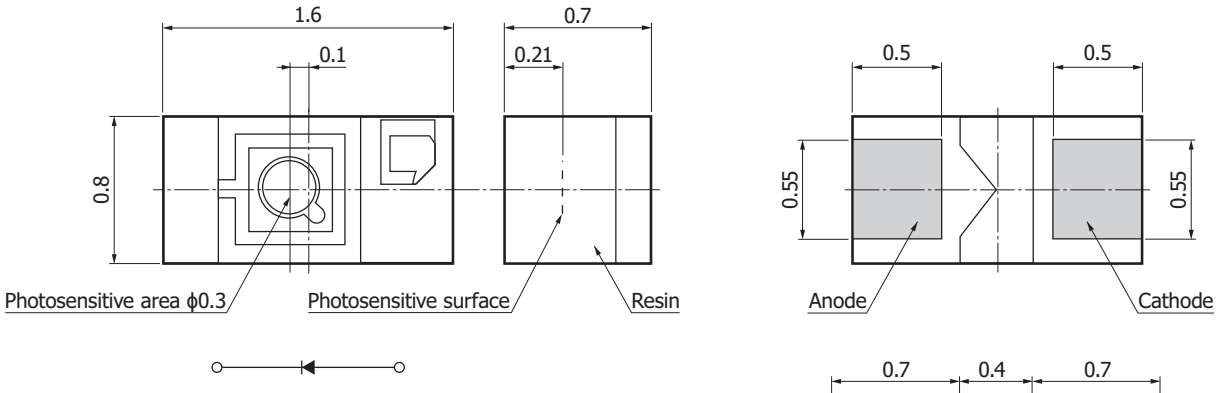
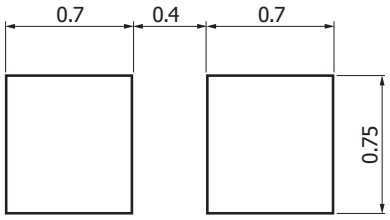
Dimensional outlines (unit: mm)

G13176-003P



Tolerance unless otherwise noted: ±0.1
Position accuracy of photosensitive area center to base center
-0.25≤X≤+0.05
-0.15≤Y≤+0.15



Recommended land pattern

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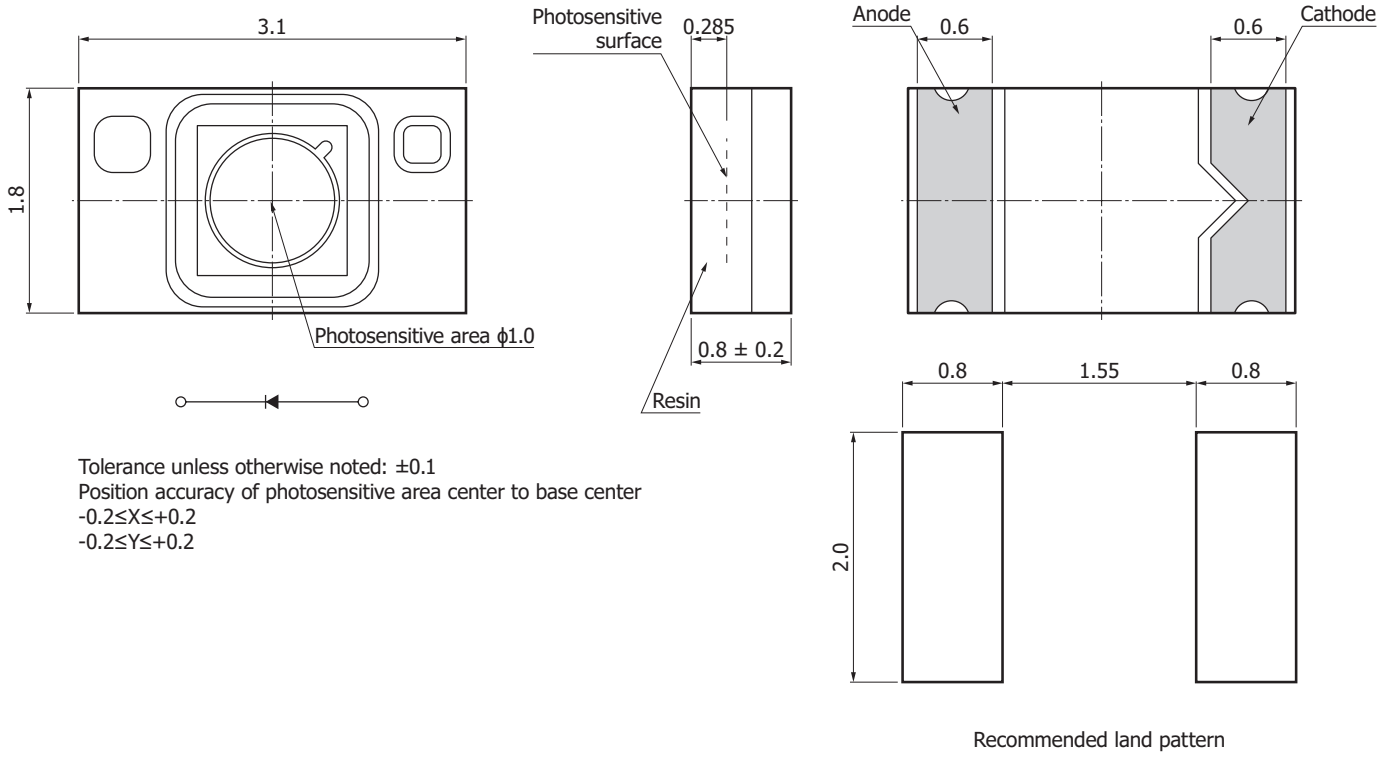
G13176-010P



Tolerance unless otherwise noted: ±0.1
Position accuracy of photosensitive area center to base center
-0.2≤X≤+0.2
-0.2≤Y≤+0.2

Recommended land pattern

KIRDA0252EA

Related information

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

■ Precautions
· Disclaimer
· Safety consideration
· Surface mount type products

■ Technical information
· Infrared detector

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