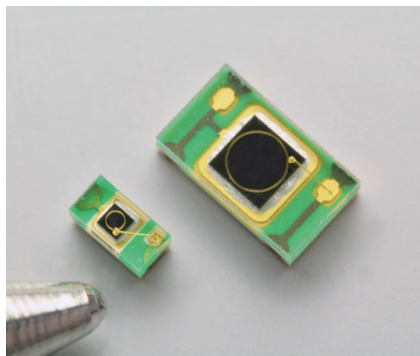


InGaAs PIN photodiodes

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: $\phi 0.3$ mm, $\phi 1.0$ 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	-	$\phi 0.3$	$\phi 1.0$	mm

Absolute maximum ratings

Parameter	Symbol	Condition	G13176-003P	G13176-010P	Unit
Reverse voltage	VR max.		10		V
Operating temperature	Topr	No dew condensation*1	-25 to +105		$^{\circ}\text{C}$
Storage temperature	Tstg	No dew condensation*1	-40 to +105		$^{\circ}\text{C}$

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.

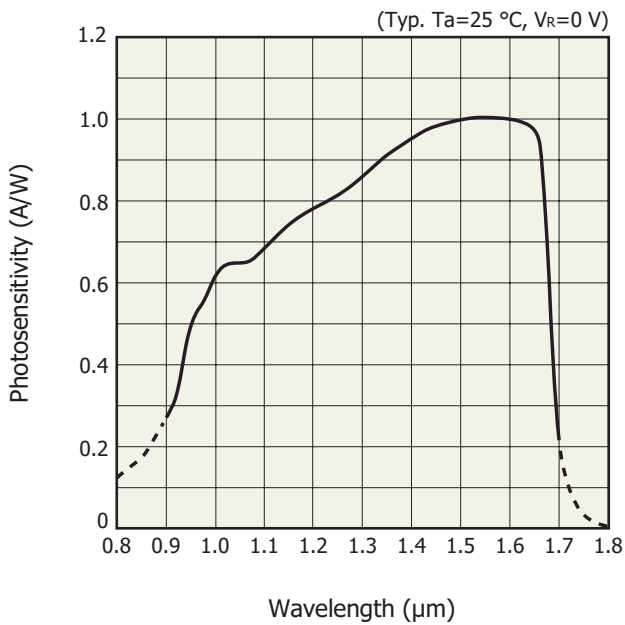
*1: When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

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

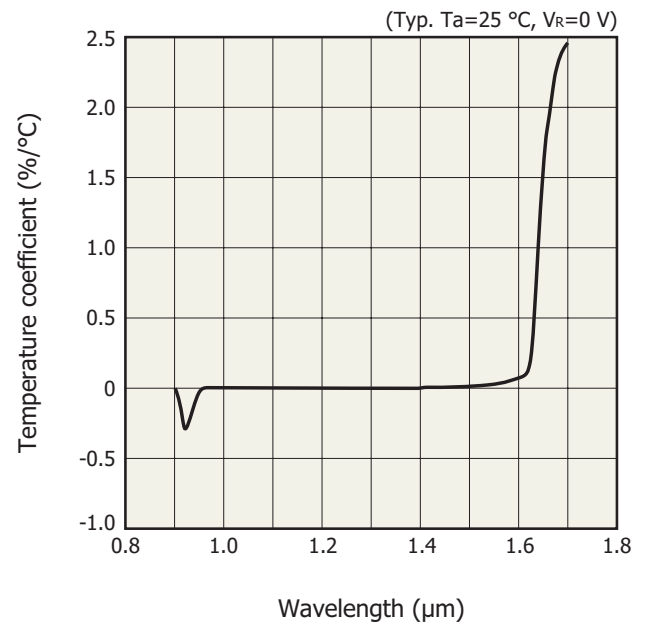
Electrical and optical characteristics (Ta=25 °C)

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	λ_p		-	1.55	-	-	1.55	-	μm
Photosensitivity	S	$\lambda=1.3 \mu\text{m}$	0.75	0.85	-	0.75	0.85	-	A/W
		$\lambda=\lambda_p$	0.85	1	-	0.85	1	-	
Dark current	I_D	$V_R=5 \text{ V}$	-	0.1	0.8	-	0.8	4	nA
Dark current temperature coefficient	ΔT_{ID}		-	1.09	-	-	1.09	-	times/ $^{\circ}\text{C}$
Cutoff frequency	f_c	$V_R=5 \text{ V}, R_L=50 \Omega$	300	600	-	25	60	-	MHz
Terminal capacitance	C_t	$V_R=5 \text{ V}, f=1 \text{ MHz}$	-	5	8	-	55	120	pF
Shunt resistance	R_{sh}	$V_R=10 \text{ mV}$	100	700	-	25	125	-	$\text{M}\Omega$
Detectivity	D^*	$\lambda=\lambda_p$	1.5×10^{12}	5×10^{12}	-	1.5×10^{12}	5×10^{12}	-	$\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$
Noise equivalent power	NEP	$\lambda=\lambda_p$	-	5×10^{-15}	2×10^{-14}	-	1.4×10^{-14}	4×10^{-14}	$\text{W}/\text{Hz}^{1/2}$

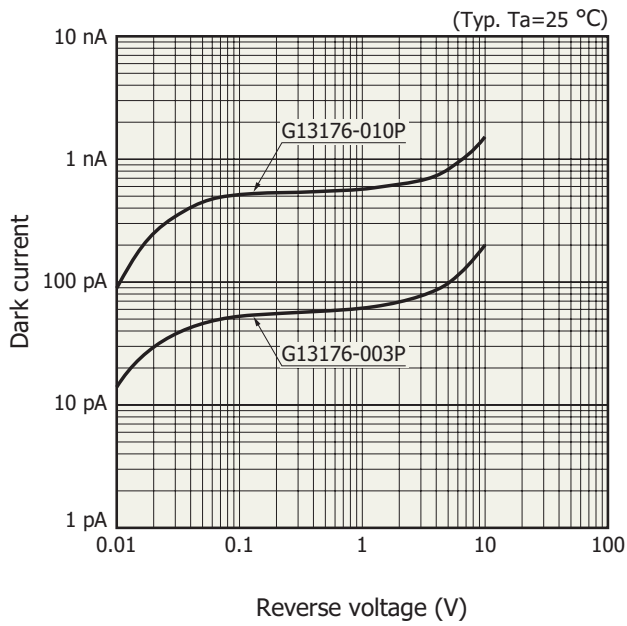
Spectral response



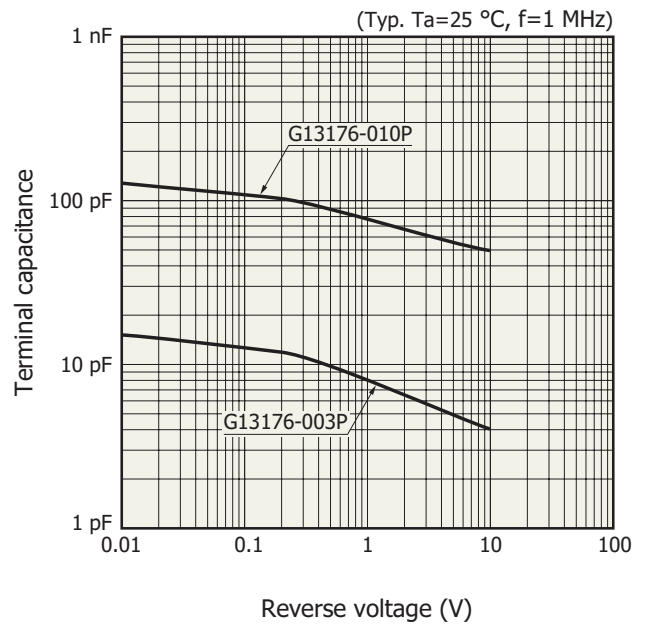
Photosensitivity temperature characteristics



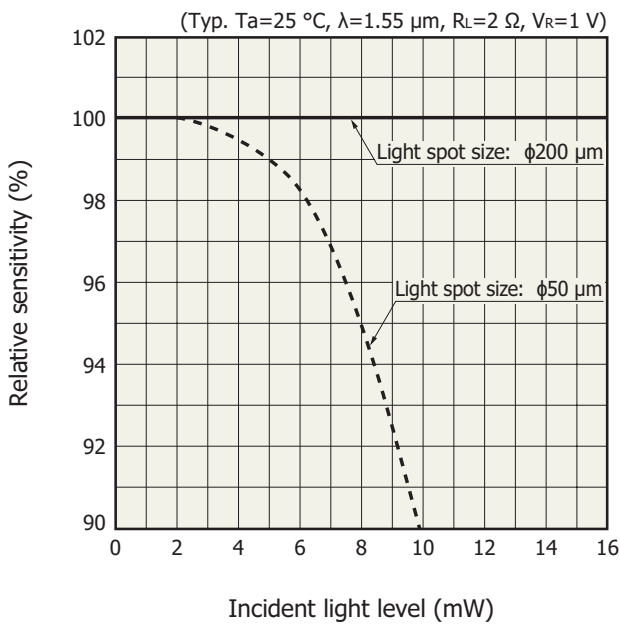
Dark current vs. reverse voltage



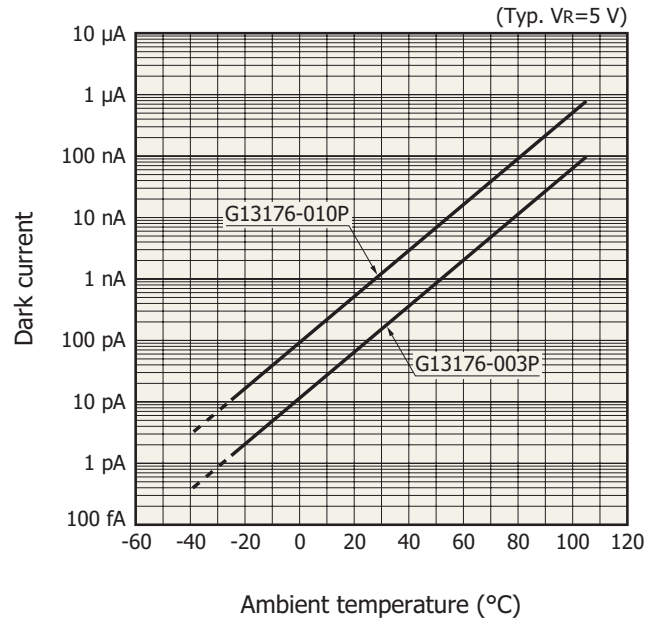
Terminal capacitance vs. reverse voltage



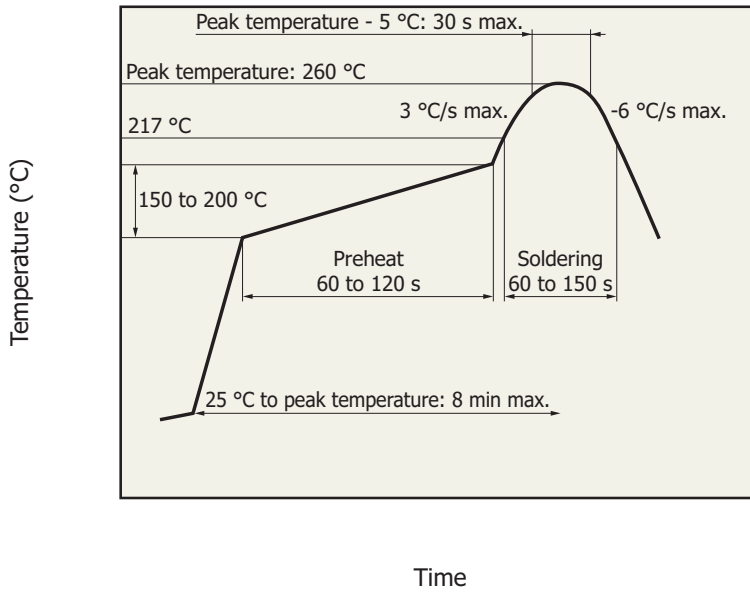
Linearity



Dark current vs. ambient temperature



Recommended solder reflow conditions

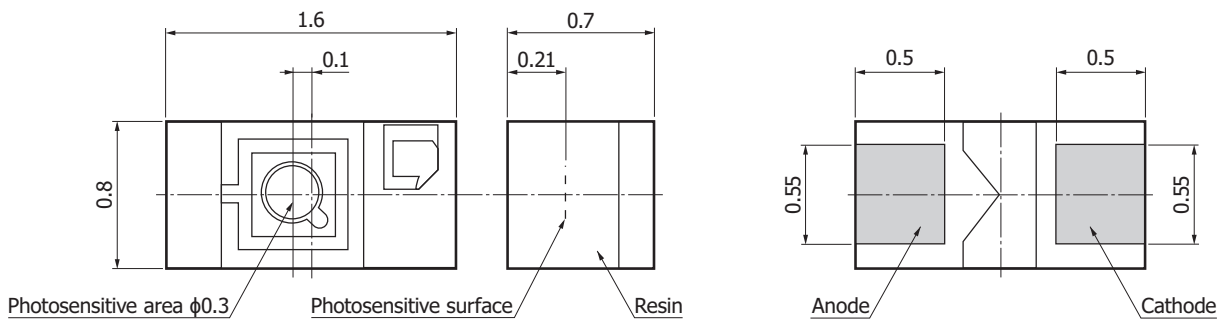


- After unpacking, store the device in an environment at a temperature range of 5 to 30 °C and a humidity of 60% or less, and perform reflow soldering within 1 year.
- Thermal stress applied to the device during reflow soldering differs depending on the PC board and reflow oven being used.
- When setting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

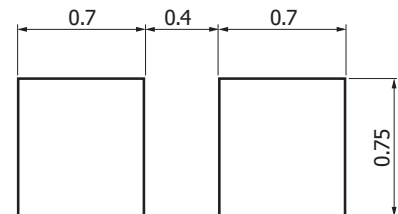
KIRDB0622EA

Dimensional outlines (unit: mm)

G13176-003P



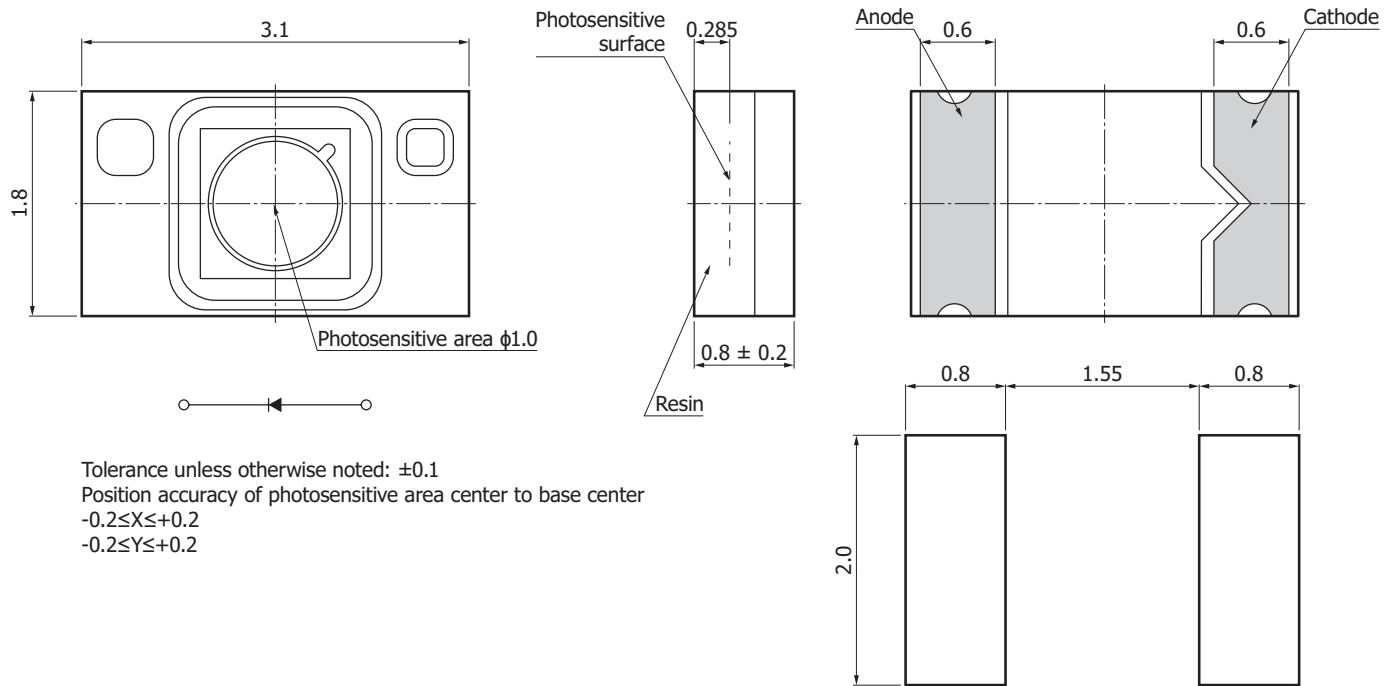
Tolerance unless otherwise noted: ± 0.1
 Position accuracy of photosensitive area center to base center
 $-0.25 \leq X \leq +0.05$
 $-0.15 \leq Y \leq +0.15$



Recommended land pattern

KIRDA0251EA

G13176-010P



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

Information described in this material is current as of September 2017.

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HAMAMATSU

www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81) 53-434-3311, Fax: (81) 53-434-5184

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807, U.S.A., Telephone: (1) 908-231-0960, Fax: (1) 908-231-1218

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 8152-375-0, Fax: (49) 8152-265-8

France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: 33-(1) 69 53 71 00, Fax: 33-(1) 69 53 71 10

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777

North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01

Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39) 02-93581733, Fax: (39) 02-93581741

China: Hamamatsu Photonics (China) Co., Ltd.: B1201, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, Beijing 100020, China, Telephone: (86) 10-6586-6006, Fax: (86) 10-6586-2866