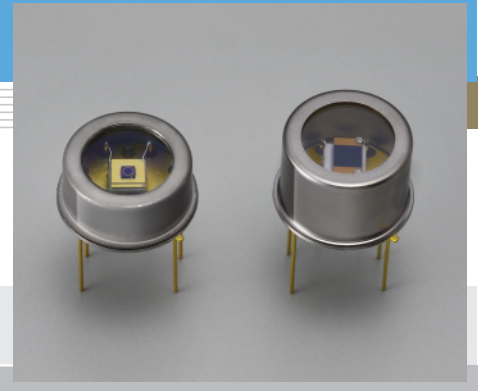


InGaAs PIN photodiode G8605 series

Thermoelectrically cooled NIR (near infrared) detector with low noise and high-speed response



InGaAs PIN photodiodes have small terminal capacitance for high-speed response and also feature high shunt resistance and very low noise. G8605 series of InGaAs PIN photodiodes are thermoelectrically cooled types that decrease the dark current to achieve high D^* . One-stage (-10°C) and two-stage (-20°C) thermoelectrically cooled types are provided.

Features

- High-speed response
- Low noise
- Various active area sizes available from $\phi 1$ to $\phi 5$ mm

Applications

- Optical power meter
- Water content analyzer
- Laser diode life test

Accessories (Optional)

- Preamp for InGaAs PIN photodiode (High-speed type) C4159-02
- Preamp for InGaAs PIN photodiode (High sensitivity type) C4159-03
- Heatsink for one-stage TE-cooled type A3179
- Heatsink for two-stage TE-cooled type A3179-01
- Temperature controller for TE-cooled type C1103-04

Specifications / Absolute maximum ratings

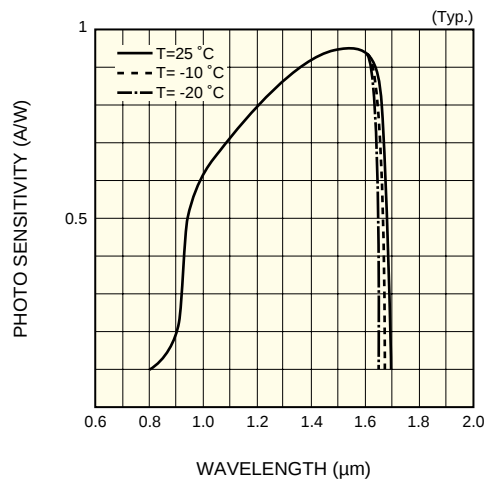
Type No.	Dimensional outline/ Window material *	Package	Cooling	Active area (mm)	Absolute maximum ratings				
					Thermistor power dissipation (mW)	TE-cooler allowable current (A)	Reverse voltage V _R Max. (V)	Operating temperature T _{opr} (°C)	Storage temperature T _{stg} (°C)
G8605-11	①/K	TO-8	One-stage TE-cooled	φ1	0.2	1.5	5	-40 to +70	-55 to +85
G8605-12				φ2			5		
G8605-13				φ3			5		
G8605-15				φ5			2		
G8605-21	②/K		Two-stage TE-cooled	φ1		1.0	5		
G8605-22				φ2			5		
G8605-23				φ3			5		
G8605-25				φ5			2		

Electrical and optical characteristics (Typ. unless otherwise noted)

Type No.	Measurement condition	Spectral response range λ	Peak sensitivity wavelength λ_p	Photo sensitivity S		Dark current I_D $V_R=1\text{ V}$		Cut-off frequency f_c $V_R=1\text{ V}$ $R_L=50\ \Omega$	Terminal capacitance C_t $V_R=1\text{ V}$ $f=1\text{ MHz}$	Shunt resistance R_{sh} $V_R=10\text{ mV}$	D^* $\lambda=\lambda_p$	NEP $\lambda=\lambda_p$
	Element temperature											
	($^{\circ}\text{C}$)	(μm)	(μm)	1.3 μm (A/W)	$\lambda=\lambda_p$ (A/W)	Typ. (nA)	Max. (nA)	(MHz)	(pF)	(M Ω)	($\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$)	(W/Hz $^{1/2}$)
G8605-11	-10	0.9 to 1.67	1.55	0.9	0.95	0.07	0.35	18	150	1500	2×10^{13}	5×10^{-15}
G8605-12						0.3	1.5	4	550	300		1×10^{-14}
G8605-13						1	5	2	1000	100		2×10^{-14}
G8605-15						2.5	12.5	0.6	3500	30		3×10^{-14}
G8605-21	-20	0.9 to 1.65				0.03	0.15	18	150	3000	3×10^{13}	3×10^{-15}
G8605-22						0.15	0.75	4	550	600		7×10^{-15}
G8605-23						0.5	2.5	2	1000	200		1×10^{-14}
G8605-25						1.2	6	0.6	3500	60		2×10^{-14}

* Window material K: borosilicate glass with anti-reflective coating (optimized for 1.55 μm peak)

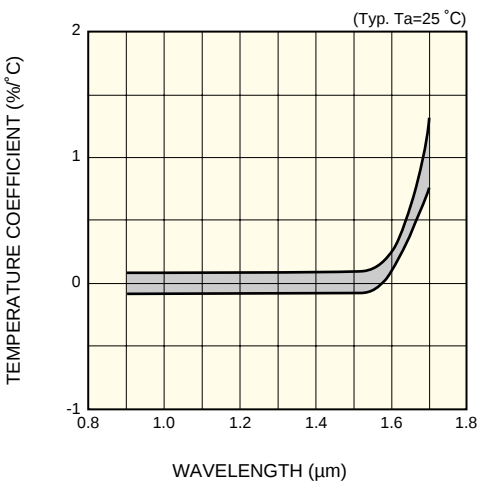
■ Spectral response



KIRDB0184EA

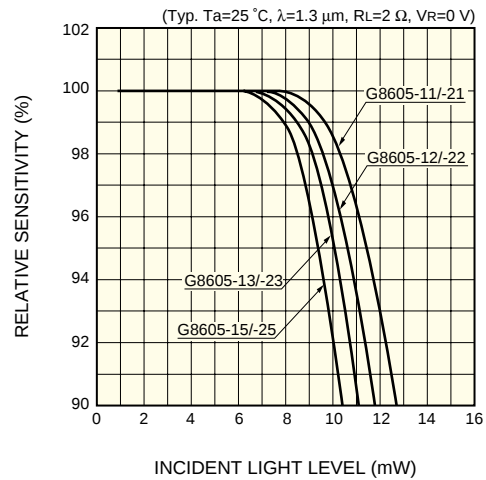
Spectral response shifts towards the short wavelength side when cooled.
One-stage TE-cooled type: $\lambda_c=1.67 \mu\text{m}$
Two-stage TE-cooled type: $\lambda_c=1.65 \mu\text{m}$

■ Photo sensitivity temperature characteristic



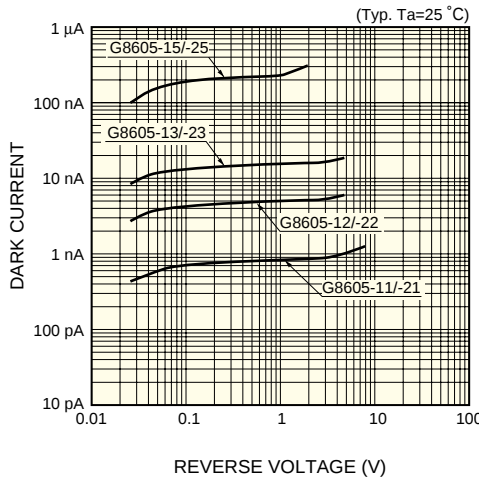
KIRDB0042EA

■ Photo sensitivity linearity



KIRDB0241EA

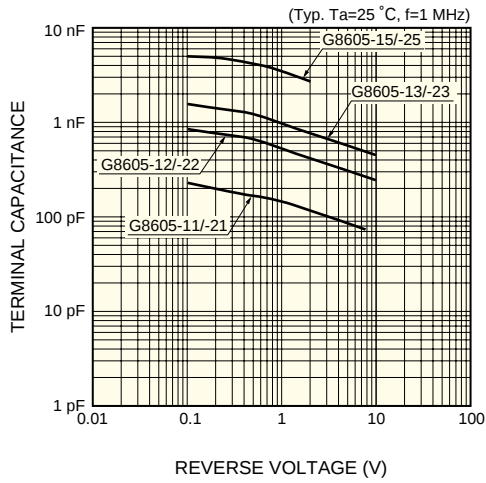
■ Dark current vs. reverse voltage



KIRDB0242EA

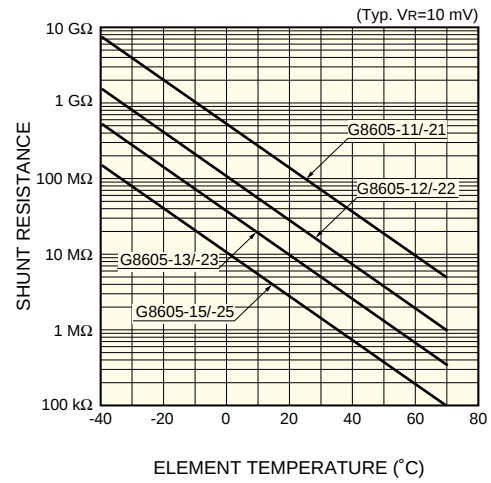
Applying a reverse voltage increases dark current, but improves frequency characteristics and output linearity.

Terminal capacitance vs. reverse voltage

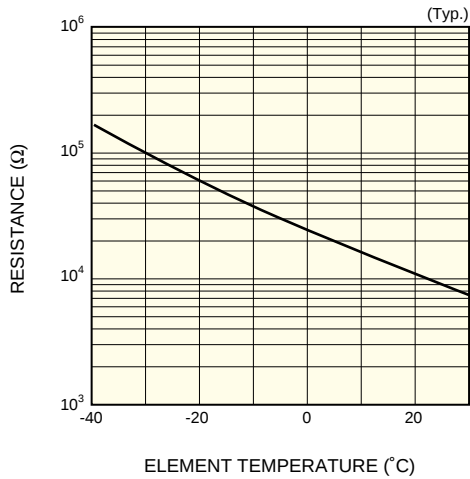


In applications requiring high-speed response, the lead length should be as short as possible to minimize the terminal capacitance.

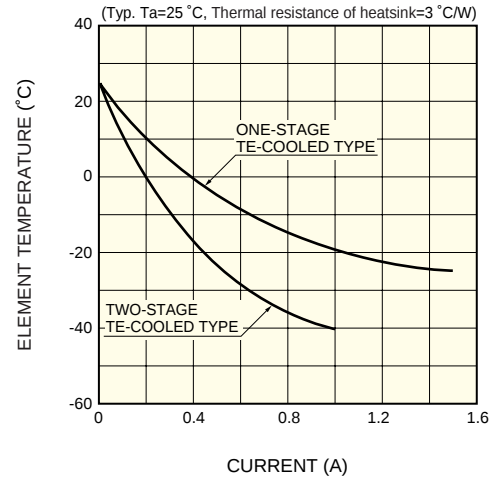
Shunt resistance vs. element temperature



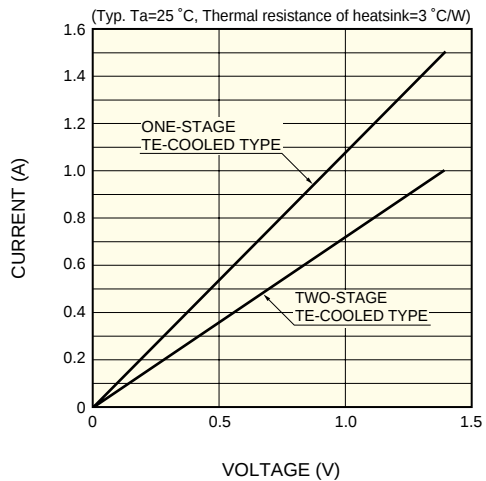
Thermistor temperature characteristic



Cooling characteristics of TE-cooler

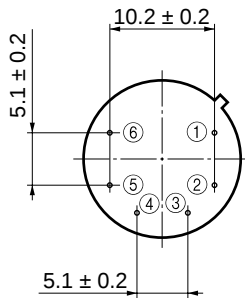
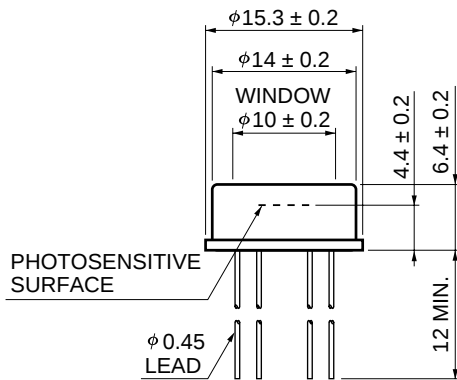


Current vs. voltage characteristics of TE-cooler



■ Dimensional outlines (unit: mm)

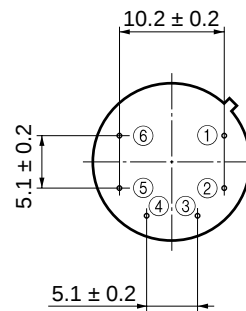
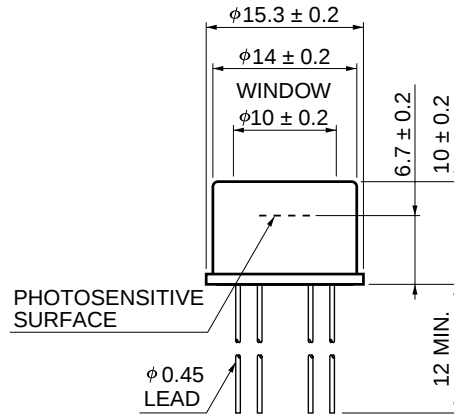
① G8605-11/-12/-13/-15



- ① DETECTOR (ANODE)
- ② DETECTOR (CATHODE)
- ③ TE-COOLER (-)
- ④ TE-COOLER (+)
- ⑤ ⑥ THERMISTOR

KIRDA0152EA

② G8605-21/-22/-23/-25



- ① DETECTOR (ANODE)
- ② DETECTOR (CATHODE)
- ③ TE-COOLER (-)
- ④ TE-COOLER (+)
- ⑤ ⑥ THERMISTOR

KIRDA0153EA

HAMAMATSU

HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Hamamatsu City, 435-8558 Japan, Telephone: (81) 053-434-3311, Fax: (81) 053-434-5184, <http://www.hamamatsu.com>

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, P.O.Box 6910, Bridgewater, N.J. 08807-0910, 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) 08152-3750, Fax: (49) 08152-2658

France: Hamamatsu Photonics France S.A.R.L.: 8, 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: Smidesvägen 12, SE-171 41 Solna, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01

Italy: Hamamatsu Photonics Italia S.R.L.: Strada della Moia, 1/E, 20020 Arese, (Milano), Italy, Telephone: (39) 02-935-81-733, Fax: (39) 02-935-81-741

Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions. Specifications are subject to change without notice. No patent rights are granted to any of the circuits described herein. ©2001 Hamamatsu Photonics K.K.