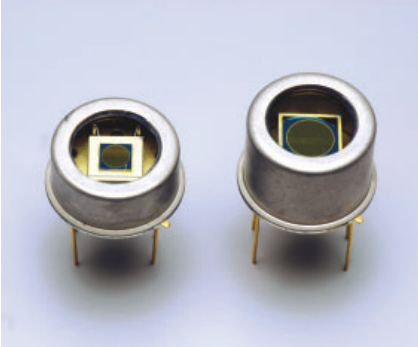
HAMAMATSU

InGaAs PIN photodiodes



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. The 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 ϕ1 to ϕ5 mm**

Applications

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

Accessories (Optional)

- **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

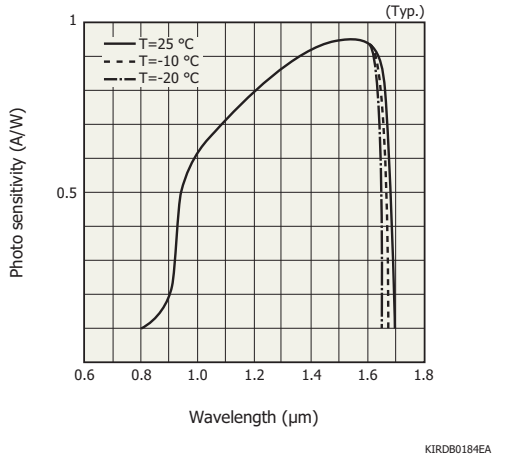
Type No.	Dimensional outline/ Window material *	Package	Cooling	Active area (mm)	Absolute maximum ratings				
					Thermistor power dissipation (mW)	TE-cooler allowable current (A)	Reverse voltage VR Max. (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)
G8605-11	①/K	TO-8	One-stage TE-cooled	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		

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

Electrical and optical characteristics (Typ. unless otherwise noted)

Type No.	Measurement condition: Element temperature (°C)	Spectral response range λ (μm)	Peak sensitivity wavelength λp (μm)	Photo sensitivity S: 1.3 μm (A/W)	Photo sensitivity S: λ=λp (A/W)	Dark current ID VR=1 V: Typ. (nA)	Dark current ID VR=1 V: Max. (nA)	Cut-off frequency fc VR=1 V RL=50 Ω (MHz)	Terminal capacitance Ct VR=1 V f=1 MHz (pF)	Shunt resistance Rsh VR=10 mV (MΩ)	D* λ=λp (cm·Hz$^{1/2}$/W)	NEP λ=λp (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}

Spectral response



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Spectral response shifts towards the short wavelength side when cooled.
One-stage TE-cooled type: λc=1.67 mm
Two-stage TE-cooled type: λc=1.65 mm

Photo sensitivity temperature characteristic

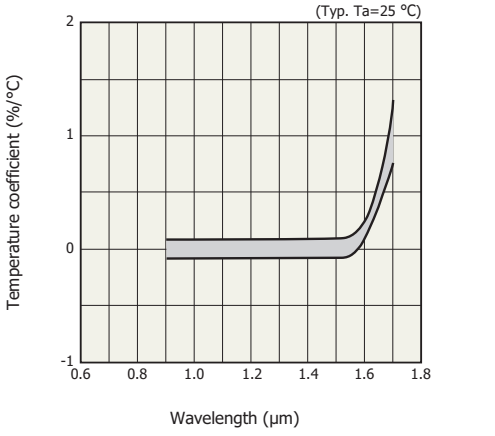

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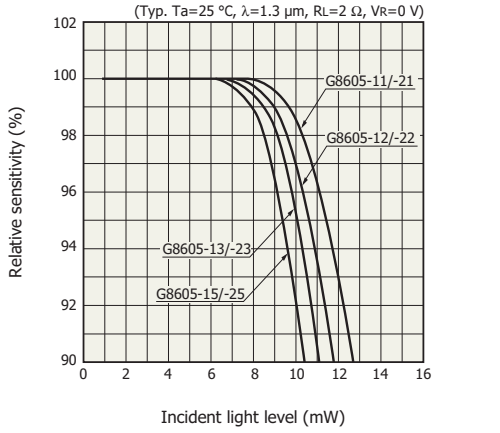
Photo sensitivity linearity



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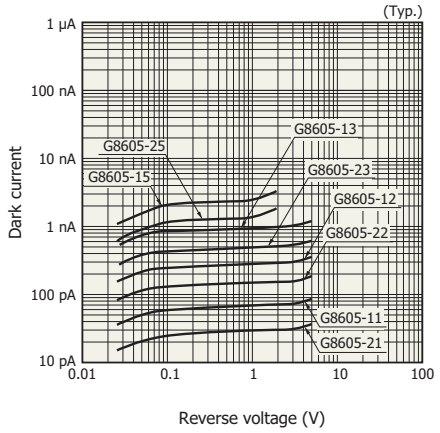
Dark current vs. reverse voltage



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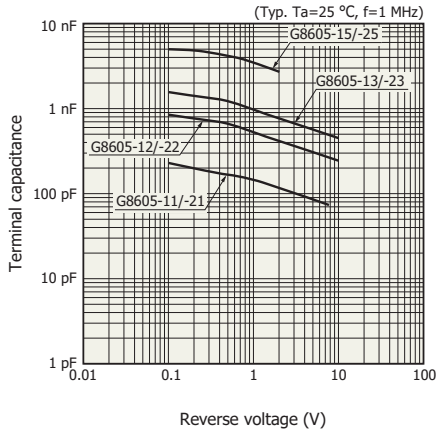
Applying a reverse voltage increases dark current, but improves frequency characteristics and output linearity.

Terminal capacitance vs. reverse voltage



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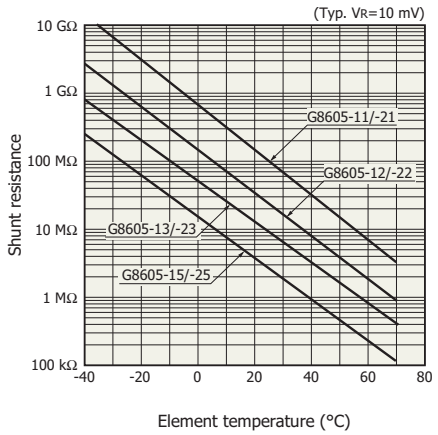
In applications requiring high-speed response, the lead length should be as short as possible to minimize the terminal capacitance.

Shunt resistance vs. element temperature



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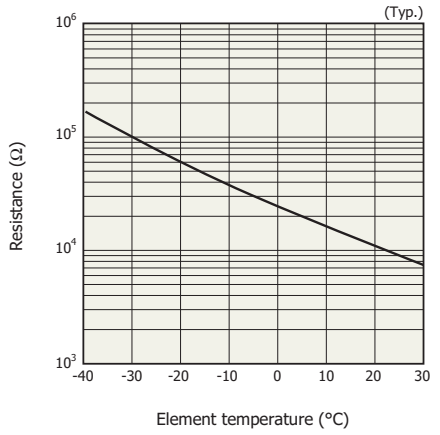
Thermistor temperature characteristic



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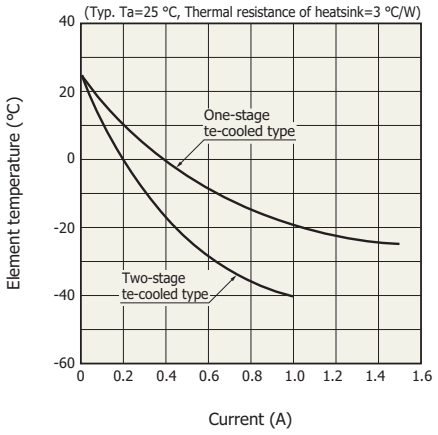
Cooling characteristics of TE-cooler



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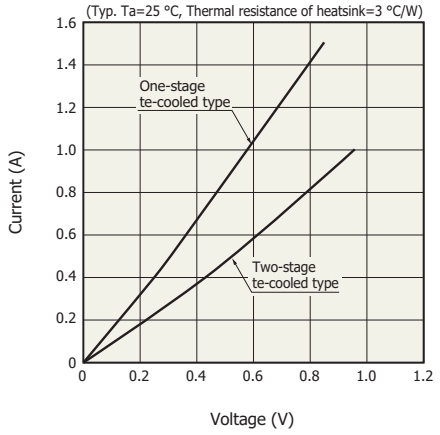
Current vs. voltage (TE-cooler)



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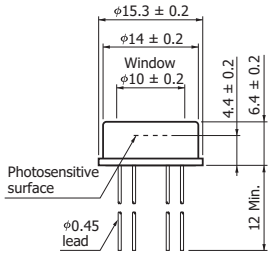
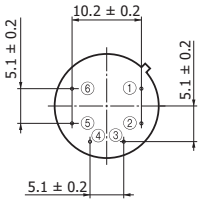
Dimensional outlines (unit: mm)

① G8605-11/-12/-13/-15





① Detector (anode)
② Detector (cathode)
③ TE-cooler (-)
④ TE-cooler (+)
⑤⑥ Thermistor

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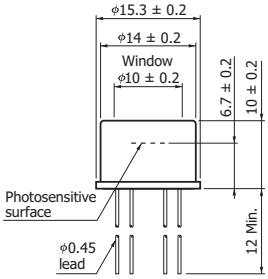
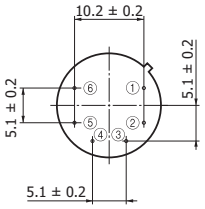
② G8605-21/-22/-23/-25





① Detector (anode)
② Detector (cathode)
③ TE-cooler (-)
④ TE-cooler (+)
⑤⑥ Thermistor

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