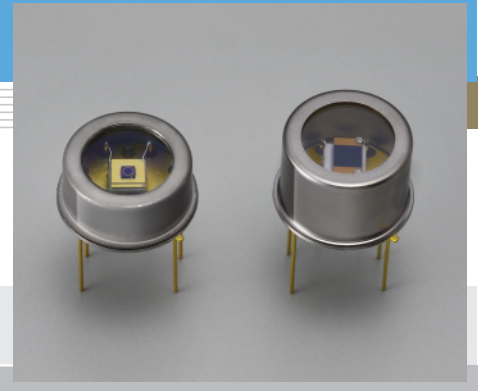


InGaAs PIN photodiode G8605 series

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		

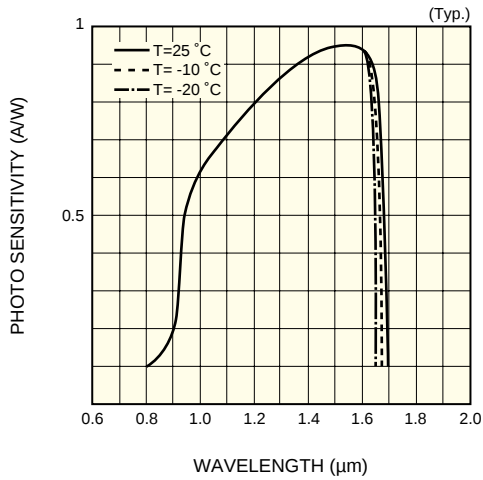
Electrical and optical characteristics (Typ. unless otherwise noted)

Type No.	Measurement condition	Spectral response range λ	Peak sensitivity wavelength λ_p	Photo sensitivity S		Dark current I _D V _R =1 V		Cut-off frequency f _c V _R =1 V R _L =50 Ω	Terminal capacitance C _t V _R =1 V f=1 MHz	Shunt resistance R _{sh} V _R =10 mV	D* $\lambda=\lambda_p$	NEP $\lambda=\lambda_p$
	Element temperature											
	(°C)	(μm)	(μm)	1.3 μm (A/W)	$\lambda=\lambda_p$ (A/W)	Typ. (nA)	Max. (nA)	(MHz)	(pF)	(MΩ)	(cm·Hz ^{1/2} /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)

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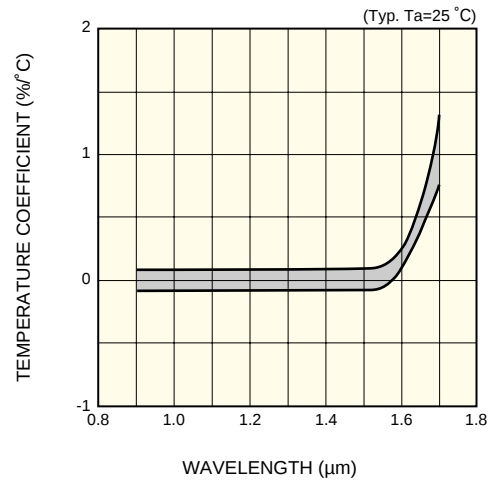
Spectral response



KIRDB0184EA

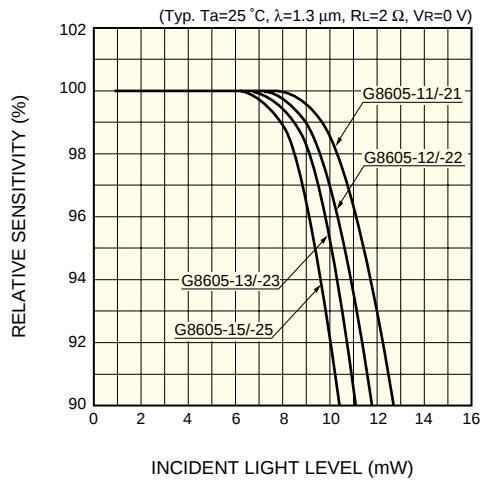
Spectral response shifts towards the short wavelength side when cooled.
 One-stage TE-cooled type: $\lambda_c=1.67\text{ }\mu\text{m}$
 Two-stage TE-cooled type: $\lambda_c=1.65\text{ }\mu\text{m}$

Photo sensitivity temperature characteristic



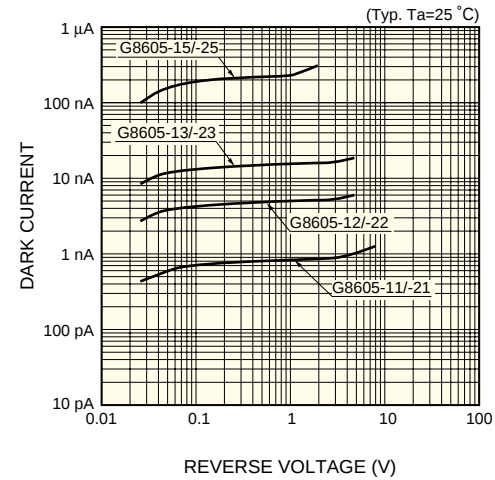
KIRDB0042EA

Photo sensitivity linearity



KIRDB0241EA

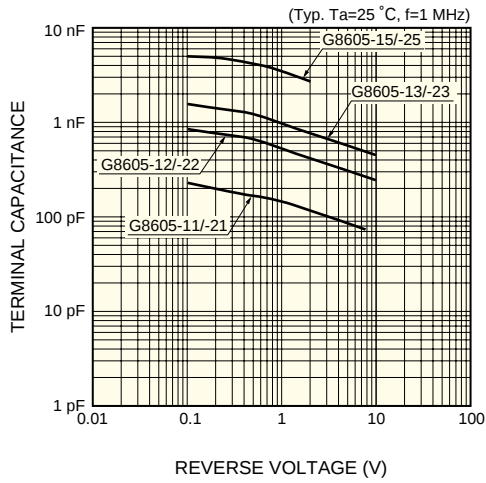
Dark current vs. reverse voltage



KIRDB0242EA

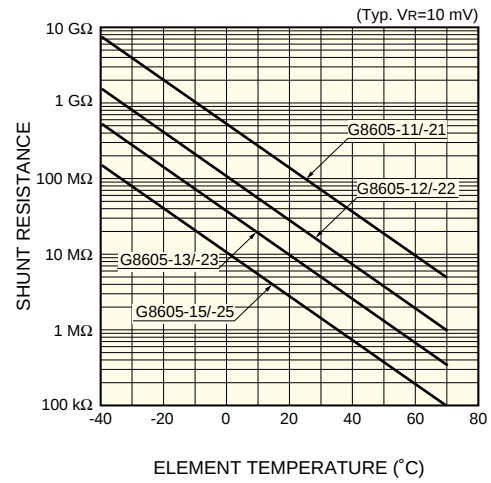
Applying a reverse voltage increases dark current, but improves frequency characteristics and output linearity.

Terminal capacitance vs. reverse voltage

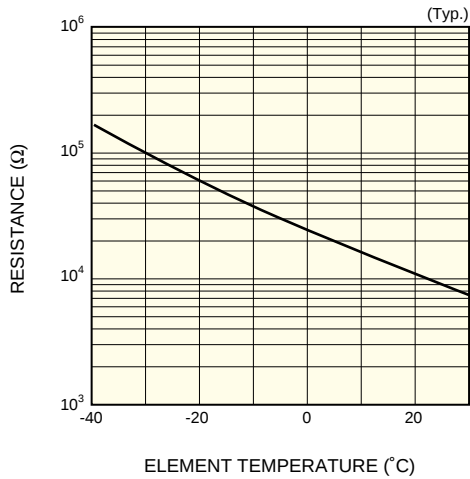


In applications requiring high-speed response, the lead length should be as short as possible to minimize the terminal capacitance.

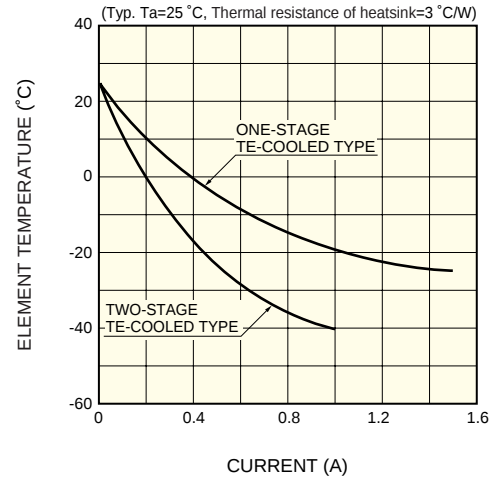
Shunt resistance vs. element temperature



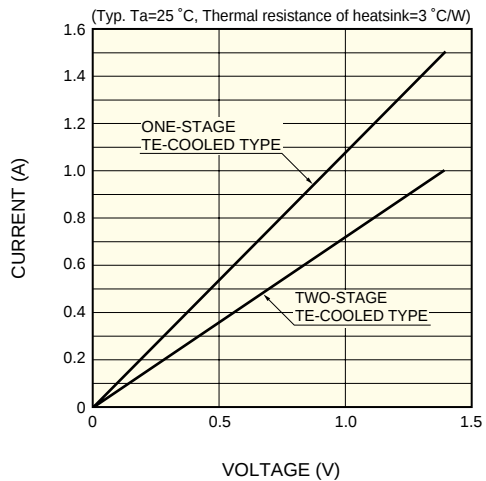
Thermistor temperature characteristic



Cooling characteristics of TE-cooler

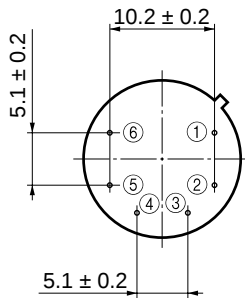
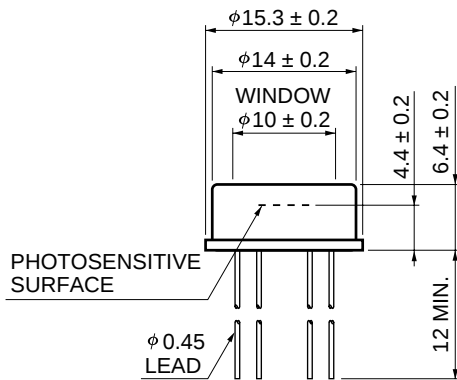


Current vs. voltage characteristics of TE-cooler



■ Dimensional outlines (unit: mm)

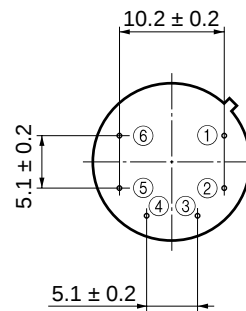
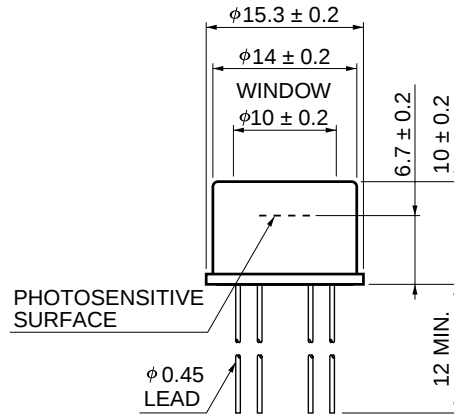
① G8605-11/-12/-13/-15



- 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

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