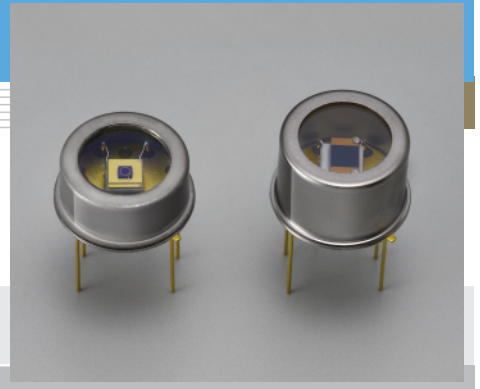


InGaAs PIN photodiode G8605 series

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

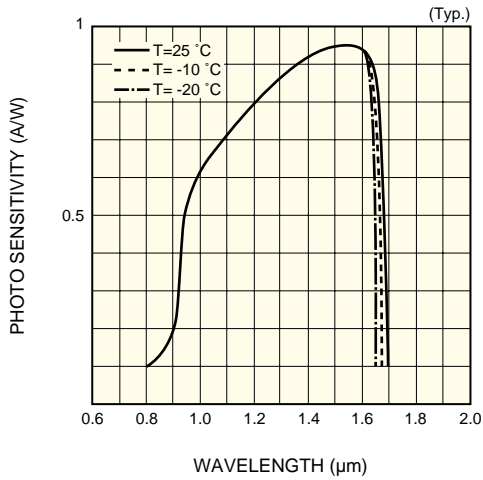
Type No.	Dimensional outline/ Window material *	Package	Cooling	Active area (mm)	Absolute maximum ratings					
					Thermistor power dissipation (mW)	TE-cooler allowable current (A)	Reverse voltage V_R Max. (V)	Operating temperature T_{opr} (°C)	Storage temperature T_{stg} (°C)	
G8605-11	①/K	TO-8	One-stage TE-cooled	$\phi 1$	0.2	1.5	5	-40 to +70	-55 to +85	
G8605-12				$\phi 2$			5			
G8605-13				$\phi 3$			5			
G8605-15				$\phi 5$			2			
G8605-21	②/K		Two-stage TE-cooled	$\phi 1$			1.0			5
G8605-22				$\phi 2$						5
G8605-23				$\phi 3$						5
G8605-25				$\phi 5$						2

Electrical and optical characteristics (Typ. unless otherwise noted)

Type No.	Measurement condition Element temperature (°C)	Spectral response range λ (μm)	Peak sensitivity wavelength λ_p (μm)	Photo sensitivity S		Dark current I_D $V_R=1\text{ V}$		Cut-off frequency f_c $V_R=1\text{ V}$ $R_L=50\ \Omega$ (MHz)	Terminal capacitance C_t $V_R=1\text{ V}$ $f=1\text{ MHz}$ (pF)	Shunt resistance R_{sh} $V_R=10\text{ mV}$ (M Ω)	D^* $\lambda=\lambda_p$ ($\text{cm}\cdot\text{Hz}^{1/2}/\text{W}$)	NEP $\lambda=\lambda_p$ ($\text{W}/\text{Hz}^{1/2}$)
				$1.3\ \mu\text{m}$ (A/W)	$\lambda=\lambda_p$ (A/W)	Typ. (nA)	Max. (nA)					
	G8605-11	-10	0.9 to 1.67	1.55	0.9	0.95	0.07	0.35	18	150	1500	2×10^{13}
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	1.55	0.9	0.95	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)

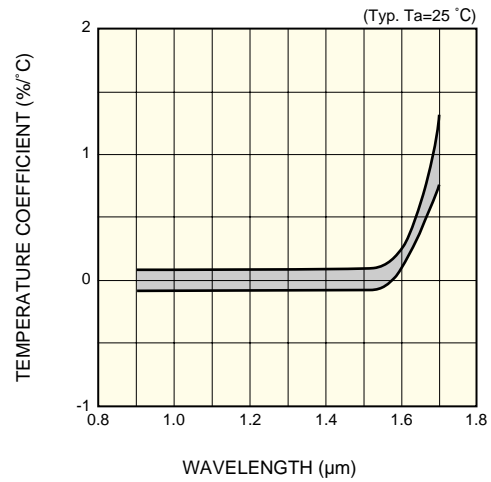
Spectral response



KIRDB0184EA

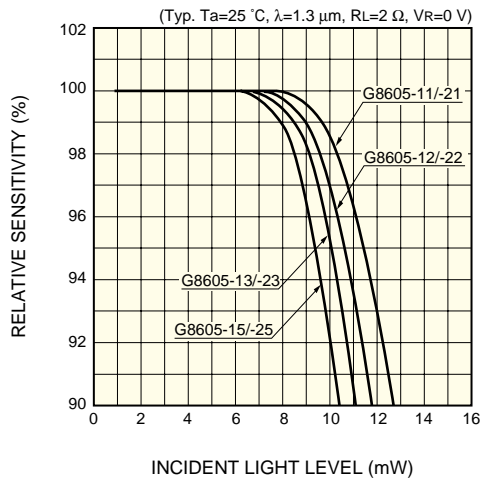
Spectral response shifts towards the short wavelength side when cooled.
 One-stage TE-cooled type: $\lambda_c=1.67 \mu\text{m}$
 Two-stage TE-cooled type: $\lambda_c=1.65 \mu\text{m}$

Photo sensitivity temperature characteristic



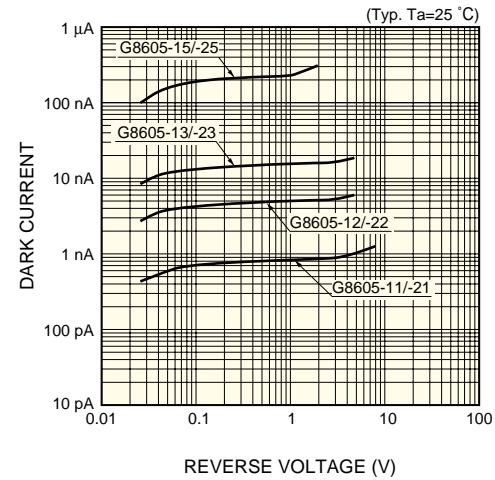
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Photo sensitivity linearity



KIRDB0241EA

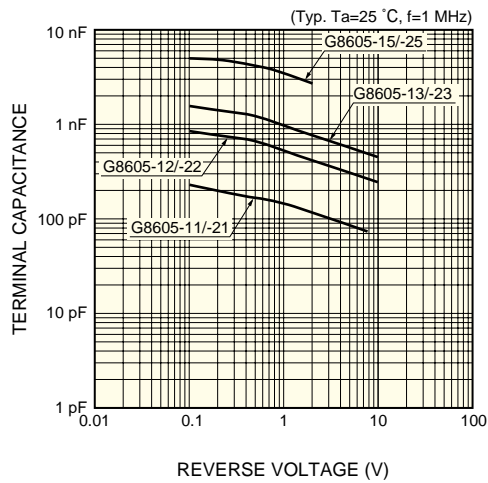
Dark current vs. reverse voltage



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

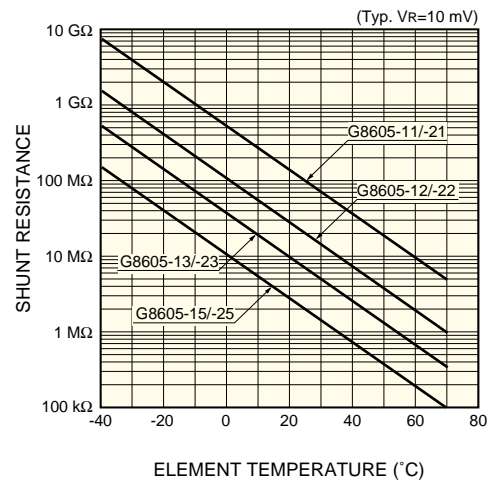
Terminal capacitance vs. reverse voltage



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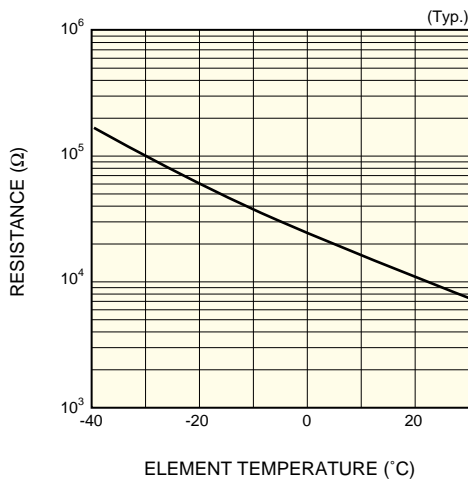
In applications requiring high-speed response, the lead length should be as short as possible to minimize the terminal capacitance.

Shunt resistance vs. element temperature



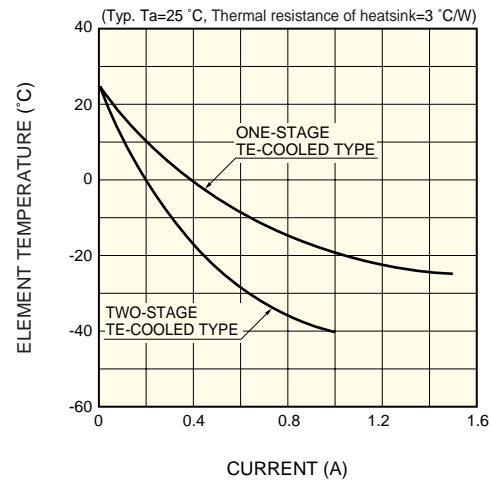
KIRDB0244EA

Thermistor temperature characteristic



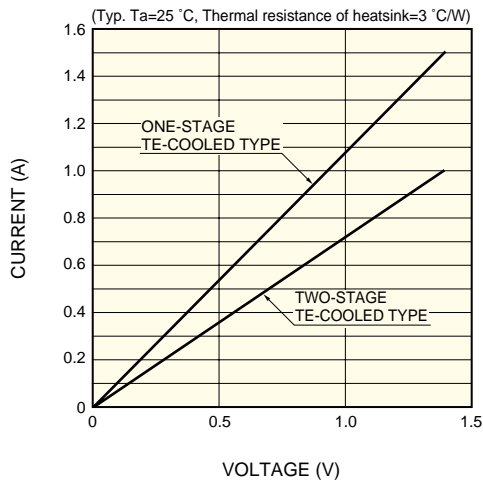
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Cooling characteristics of TE-cooler



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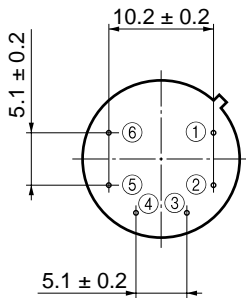
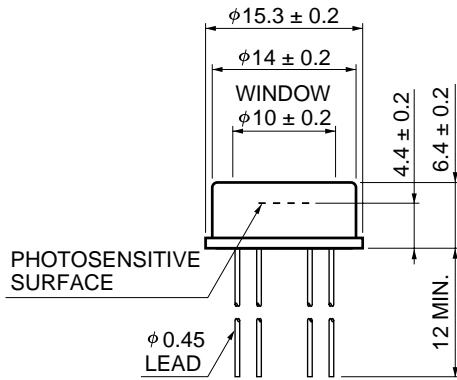
Current vs. voltage characteristics of TE-cooler



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Dimensional outlines (unit: mm)

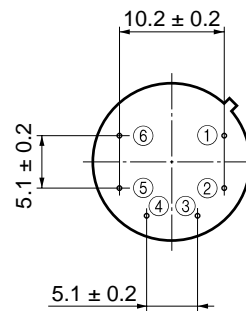
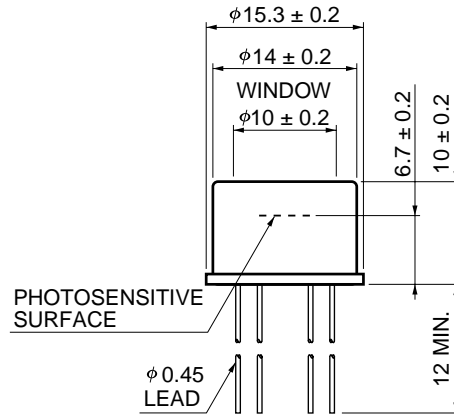
① G8605-11/-12/-13/-15



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

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