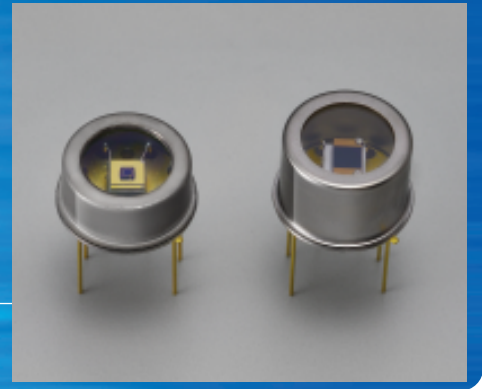


**NEW**

PHOTODIODE

# 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

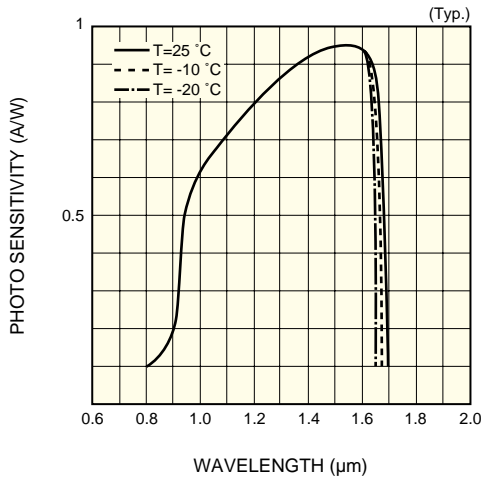
Type No.	Dimensional outline/ Window material *	Package	Cooling	Active area (mm)	Absolute maximum ratings					
					Thermistor power dissipation (mW)	TE-cooler allowable current (A)	Reverse voltage $V_R$ Max. (V)	Operating temperature $T_{opr}$ (°C)	Storage temperature $T_{stg}$ (°C)	
G8605-11	①/K	TO-8	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
G8605-24				$\phi 4$						5
G8605-25		$\phi 5$		2						

### Electrical and optical characteristics (Typ. unless otherwise noted)

Type No.	Measurement condition	Spectral response range $\lambda$	Peak sensitivity wavelength $\lambda_p$	Photo sensitivity S		Dark current $I_D$ $V_R=1$ V		Cut-off frequency $f_c$ $V_R=1$ V $R_L=50$ $\Omega$	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			$\lambda$	$\lambda=\lambda_p$	Typ. (nA)	Max. (nA)					
	(°C)	( $\mu$ m)	( $\mu$ m)					(A/W)	(A/W)			
G8605-11	-10	0.9 to 1.67	1.55	0.9	0.95	0.07	0.35	18	150	1500	$2 \times 10^{13}$	$5 \times 10^{-15}$
G8605-12						0.3	1.5	4	550	300		$1 \times 10^{-14}$
G8605-13						1	5	2	1000	100		$2 \times 10^{-14}$
G8605-15						2.5	12.5	0.6	3500	30		$3 \times 10^{-14}$
G8605-21	-20	0.9 to 1.65	1.55	0.9	0.95	0.03	0.15	18	150	3000	$3 \times 10^{13}$	$3 \times 10^{-15}$
G8605-22						0.15	0.75	4	550	600		$7 \times 10^{-15}$
G8605-23						0.5	2.5	2	1000	200		$1 \times 10^{-14}$
G8605-24						1.2	6	0.6	3500	60		$2 \times 10^{-14}$
G8605-25						1.2	6	0.6	3500	60		$2 \times 10^{-14}$

\* Window material K: borosilicate glass with anti-reflective coating (optimized for 1.55  $\mu$ m peak)

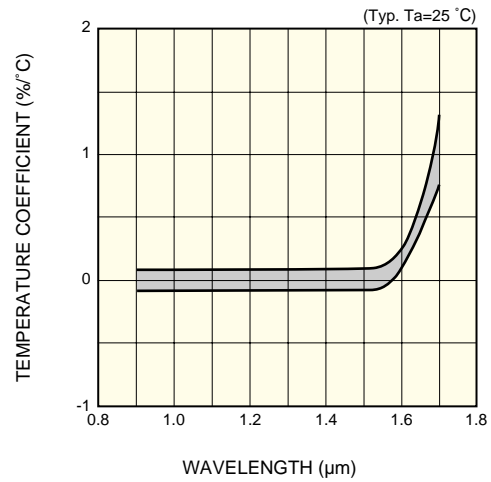
## Spectral response



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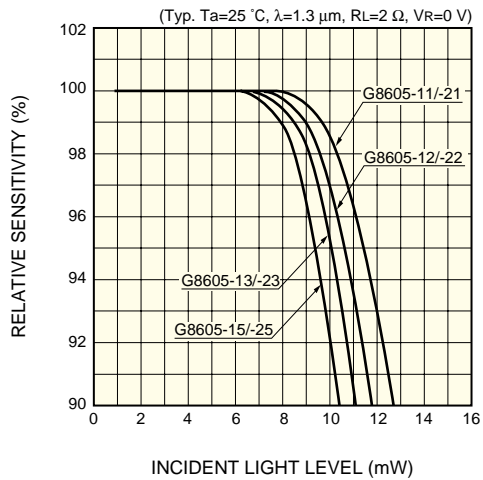
Spectral response shifts towards the short wavelength side when cooled.  
 One-stage TE-cooled type:  $\lambda_c=1.67 \mu\text{m}$   
 Two-stage TE-cooled type:  $\lambda_c=1.65 \mu\text{m}$

## Photo sensitivity temperature characteristic



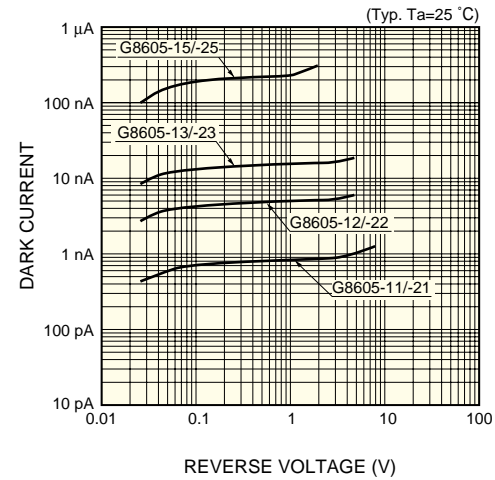
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## Photo sensitivity linearity



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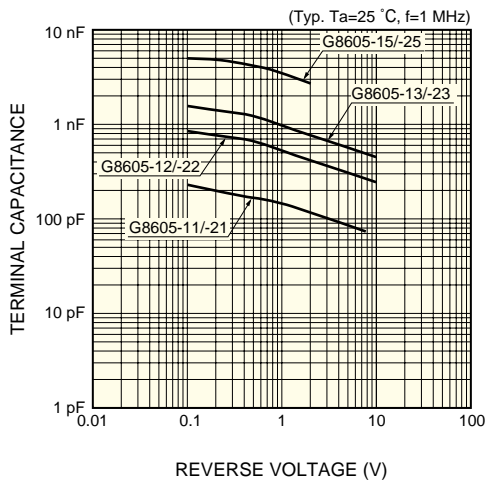
## Dark current vs. reverse voltage



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

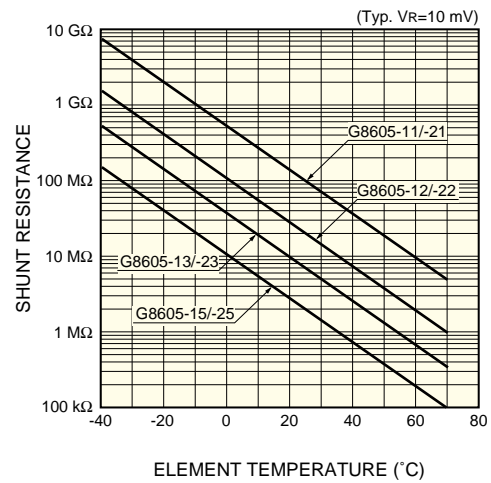
## Terminal capacitance vs. reverse voltage



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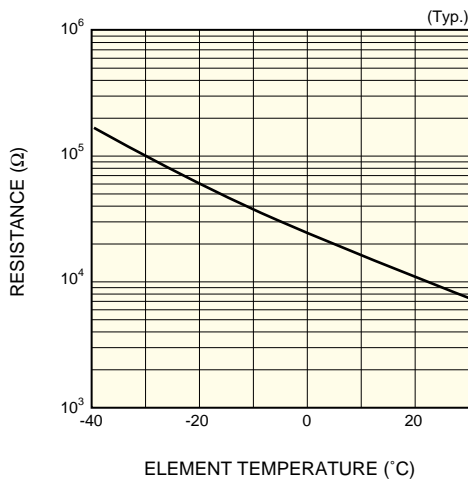
In applications requiring high-speed response, the lead length should be as short as possible to minimize the terminal capacitance.

## Shunt resistance vs. element temperature



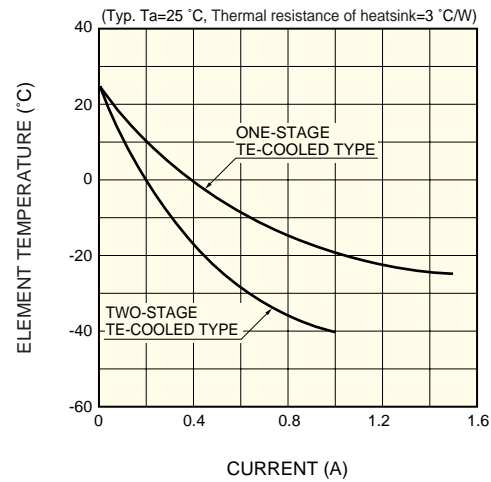
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## Thermistor temperature characteristic



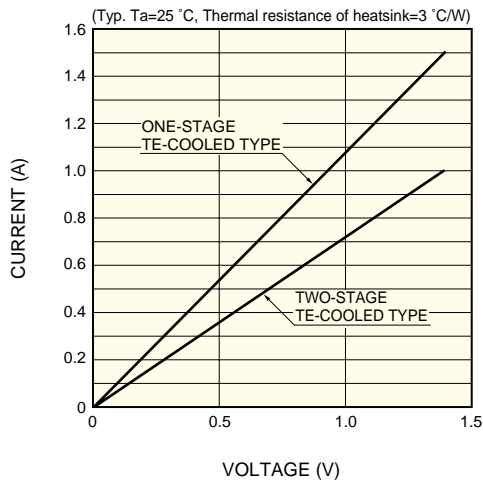
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## Cooling characteristics of TE-cooler



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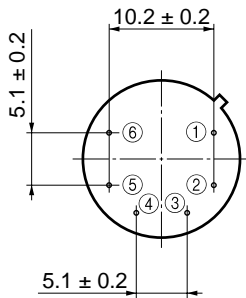
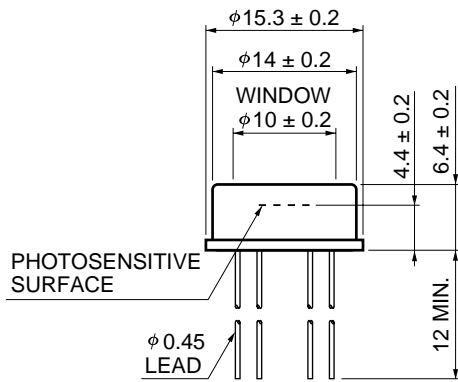
## Current vs. voltage characteristics of TE-cooler



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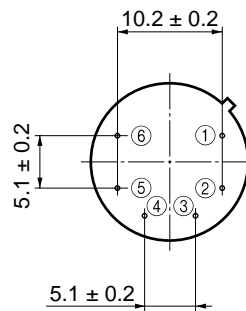
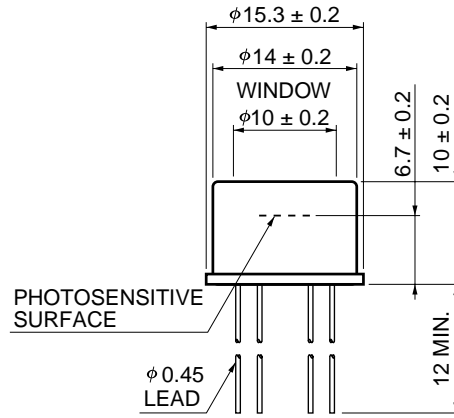
## Dimensional outlines (unit: mm)

① G8605-11/-12/-13/-15



- ① DETECTOR (ANODE)
- ② DETECTOR (CATHODE)
- ③ TE-COOLER (-)
- ④ TE-COOLER (+)
- ⑤⑥ THERMISTOR

② G8605-21/-22/-23/-25



- ① DETECTOR (ANODE)
- ② DETECTOR (CATHODE)
- ③ TE-COOLER (-)
- ④ TE-COOLER (+)
- ⑤⑥ THERMISTOR

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