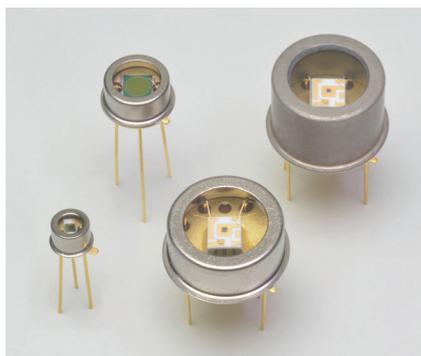


# InGaAs PIN photodiodes

G12183 series



## Long wavelength type (cutoff wavelength: 2.55 to 2.6 μm)

### Features

- Cutoff wavelength: 2.55 to 2.6 μm
- Low cost
- Photosensitive area: φ0.3 to φ3 mm
- Low noise
- High sensitivity
- High reliability
- High-speed response

### Applications

- Optical power meters
- Gas analyzers
- Moisture meters
- NIR (near infrared) photometry

### Options

- Amplifier for InGaAs PIN photodiode **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**

### Structure

Type no.	Dimensional outline /Window material*1	Package	Cooling	Photosensitive area (mm)
G12183-003K	(1)/K	TO-18	Non-cooled	φ0.3
G12183-005K				φ0.5
G12183-010K				φ1
G12183-020K	(2)/K	TO-5		φ2
G12183-030K				φ3
G12183-103K				(3)/K
G12183-105K	One-stage TE-cooled	φ0.5		
G12183-110K		φ1		
G12183-120K		φ2		
G12183-130K		φ3		
G12183-203K	(4)/K	TO-8	Two-stage TE-cooled	
G12183-205K				φ0.5
G12183-210K				φ1
G12183-220K				φ2
G12183-230K				φ3

\*1: K=Borosilicate glass

### ▣ Absolute maximum ratings

Type no.	Thermister power dissipation Pd_th (mW)	TE-cooler allowable current ITE max (A)	TE-cooler allowable voltage VTE max (V)	Reverse voltage VR max (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)	Soldering conditions
G12183-003K	-	-	-	1	-40 to +85*2	-55 to +125*2	260 °C or less, within 10 s
G12183-005K							
G12183-010K							
G12183-020K							
G12183-030K							
G12183-103K	0.2	1.5	1.0	1	-40 to +70*2	-55 to +85*2	
G12183-105K							
G12183-110K							
G12183-120K							
G12183-130K							
G12183-203K	0.2	1.0	1.2	1	-40 to +70*2	-55 to +85*2	
G12183-205K							
G12183-210K							
G12183-220K							
G12183-230K							

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

\*2: No dew condensation

When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

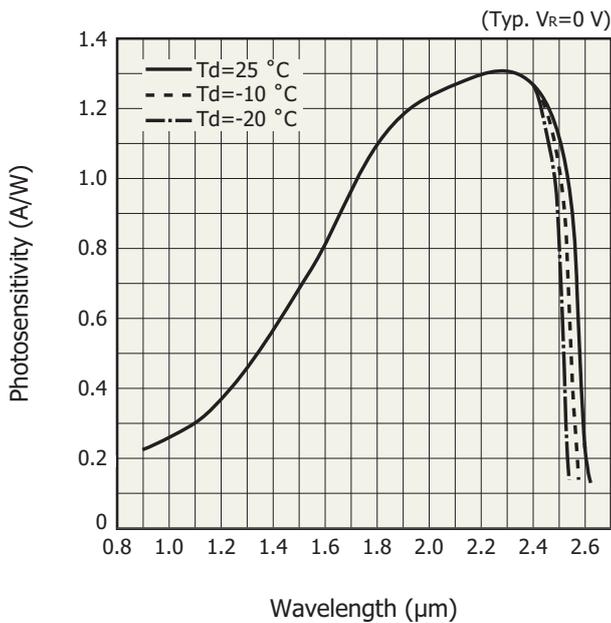
The G12183 series may be destroyed or deteriorated by electrostatic discharge, etc. Be carefull when using the G12183 series.

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

Type no.	Measurement Condition	Thermistor resistance Rth (kΩ)	Thermistor B constant B (K)	Spectral response range λ (μm)	Peak sensitivity wavelength λp (μm)	Photo sensitivity S λ=λp		Dark current ID VR=0.5 V		Temp. coefficient of ID VR=0.5 V (times/°C)
	Element temperature Tchip (°C)					Min. (A/W)	Typ. (A/W)	Typ. (μA)	Max. (μA)	
G12183-003K	25	-	-	0.9 to 2.6	2.3	1	1.3	0.4	4	1.035
G12183-005K										
G12183-010K										
G12183-020K										
G12183-030K										
G12183-103K	-10	9.0	3.3	0.9 to 2.57	2.3	1	1.3	0.12	1.2	
G12183-105K										
G12183-110K										
G12183-120K										
G12183-130K										
G12183-203K	-20	9.0	3.3	0.9 to 2.55	2.3	1	1.3	0.085	0.85	
G12183-205K										
G12183-210K										
G12183-220K										
G12183-230K										

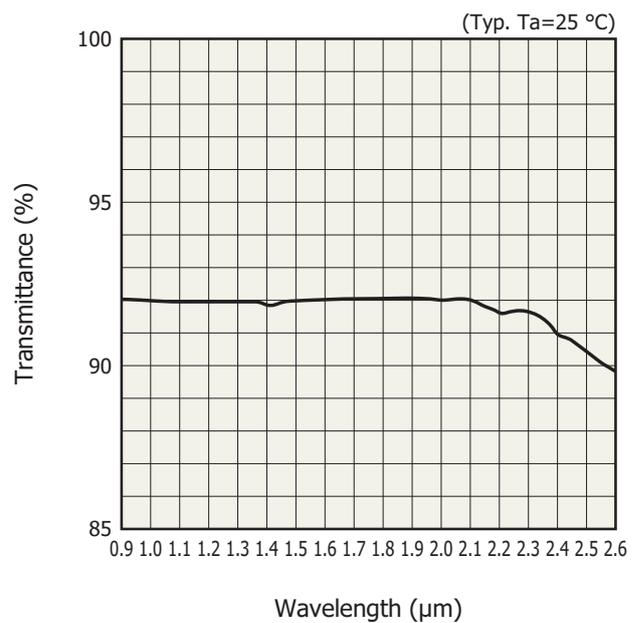
Type no.	Measurement Condition	Cutoff frequency $f_c$		Terminal capacitance $C_t$		Shunt resistance $R_{sh}$		Detectivity $D^*$		Noise equivalent power NEP	
	Element temperature	$V_R=0\text{ V}$ $R_L=50\ \Omega$		$V_R=0\text{ V}$ $f=1\text{ MHz}$		$V_R=10\text{ mV}$		$\lambda=\lambda_p$		$\lambda=\lambda_p$	
	$T_{chip}$ (°C)	Min. (MHz)	Typ. (MHz)	Typ. (pF)	Max. (pF)	Min. (k $\Omega$ )	Typ. (k $\Omega$ )	Min. (cm $\cdot$ Hz $^{1/2}$ /W)	Typ. (cm $\cdot$ Hz $^{1/2}$ /W)	Typ. (W/Hz $^{1/2}$ )	Max. (W/Hz $^{1/2}$ )
G12183-003K	25	20	50	50	100	20	100	$3 \times 10^{10}$	$9 \times 10^{10}$	$4 \times 10^{-13}$	$9 \times 10^{-13}$
G12183-005K		5	20	140	300	10	50			$5 \times 10^{-13}$	$1.5 \times 10^{-12}$
G12183-010K		2	6	500	1000	2.8	14			$1 \times 10^{-12}$	$3 \times 10^{-12}$
G12183-020K		1	1.5	1800	3000	0.65	3			$2 \times 10^{-12}$	$5 \times 10^{-12}$
G12183-030K		0.5	0.8	4000	5000	0.25	1.4			$3 \times 10^{-12}$	$8 \times 10^{-12}$
G12183-103K	-10	20	70	44	100	200	1000	$1 \times 10^{11}$	$3 \times 10^{11}$	$1 \times 10^{-13}$	$3 \times 10^{-13}$
G12183-105K		5	25	120	300	100	500			$1.5 \times 10^{-13}$	$4.5 \times 10^{-13}$
G12183-110K		2	7	440	1000	28	140			$2.5 \times 10^{-13}$	$8 \times 10^{-13}$
G12183-120K		1	2	1500	3000	6.5	30			$5.5 \times 10^{-13}$	$2 \times 10^{-12}$
G12183-130K		0.5	0.9	3400	5000	2.8	14			$8.5 \times 10^{-13}$	$2.5 \times 10^{-12}$
G12183-203K	-20	20	75	40	100	400	2000	$1.5 \times 10^{11}$	$4.5 \times 10^{11}$	$7 \times 10^{-14}$	$2 \times 10^{-13}$
G12183-205K		5	28	110	300	200	1000			$1 \times 10^{-13}$	$3 \times 10^{-13}$
G12183-210K		2	8	400	1000	55	280			$2 \times 10^{-13}$	$5.5 \times 10^{-13}$
G12183-220K		1	2.3	1400	3000	13	60			$4 \times 10^{-13}$	$1 \times 10^{-12}$
G12183-230K		0.5	1	3200	5000	5.5	28			$6 \times 10^{-13}$	$2 \times 10^{-12}$

**Spectral response**



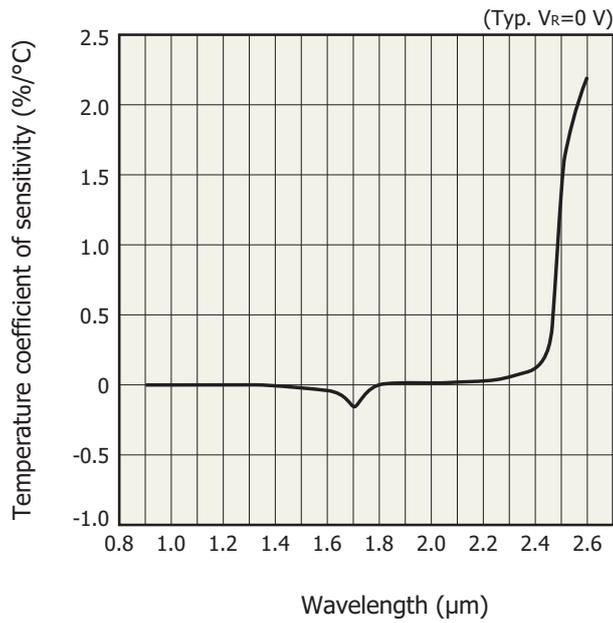
KIRDB0491EC

**Spectral transmittance of window material**

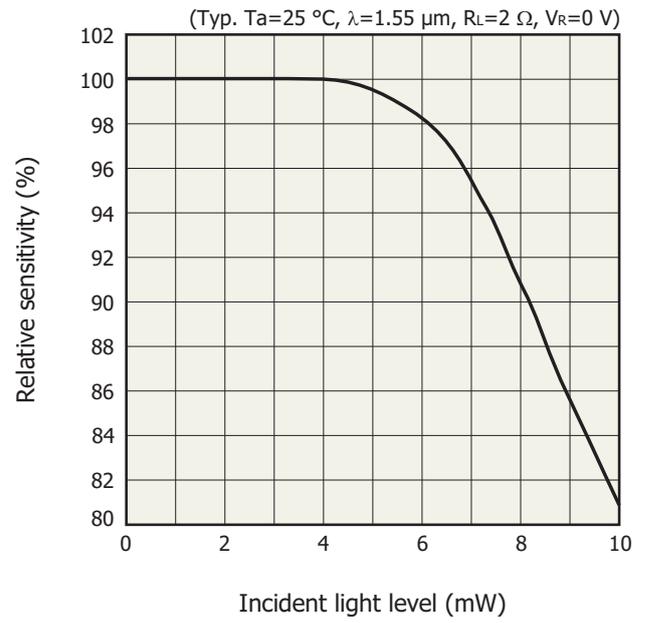


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Photosensitivity temperature characteristics

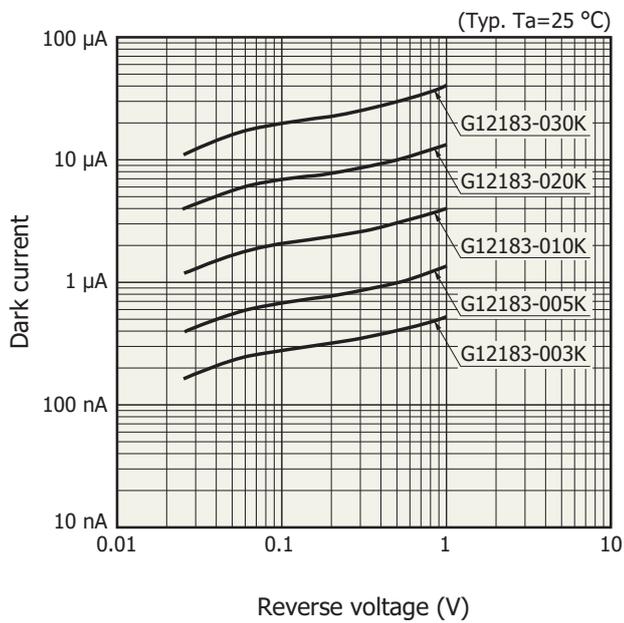


Linearity (G12183-010K)

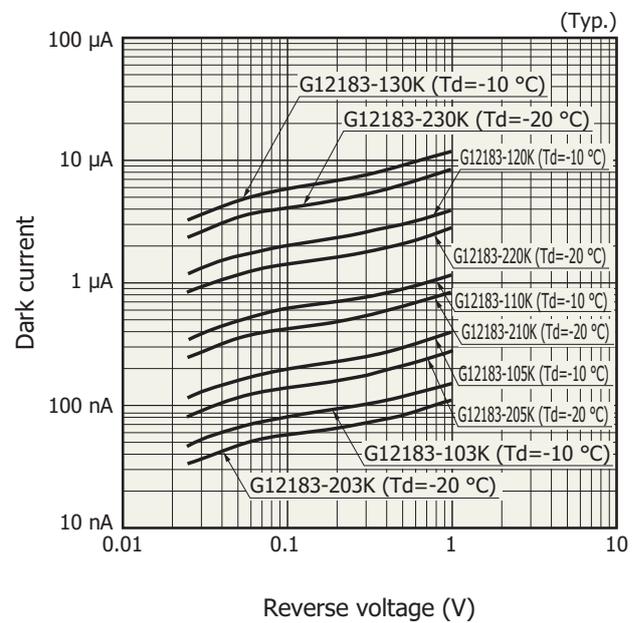


Dark current vs. reverse voltage

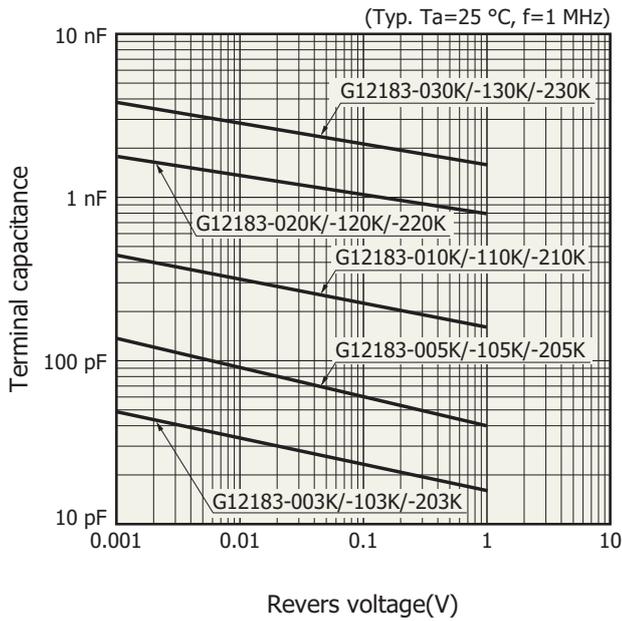
Non-cooled type



TE-cooled type

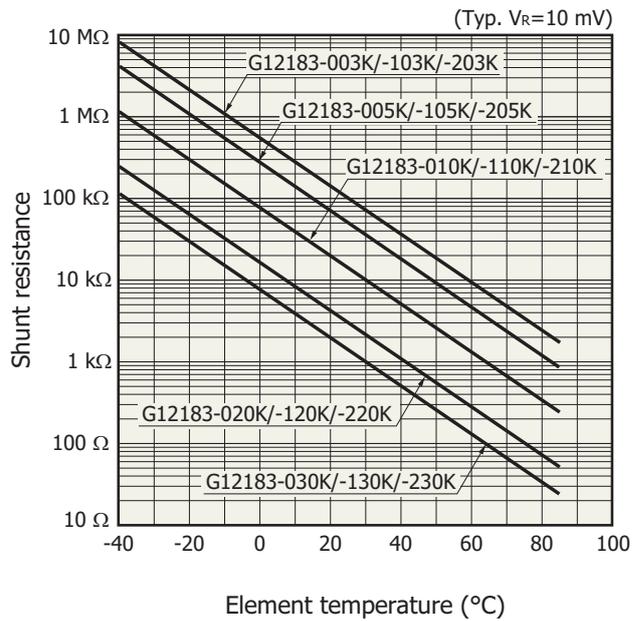


Terminal capacitance vs. reverse voltage



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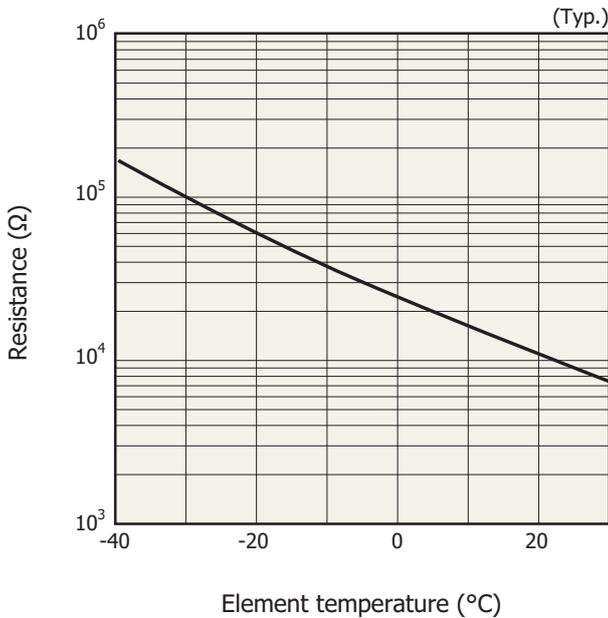
Shunt resistance vs. element temperature



KIRD0494EB

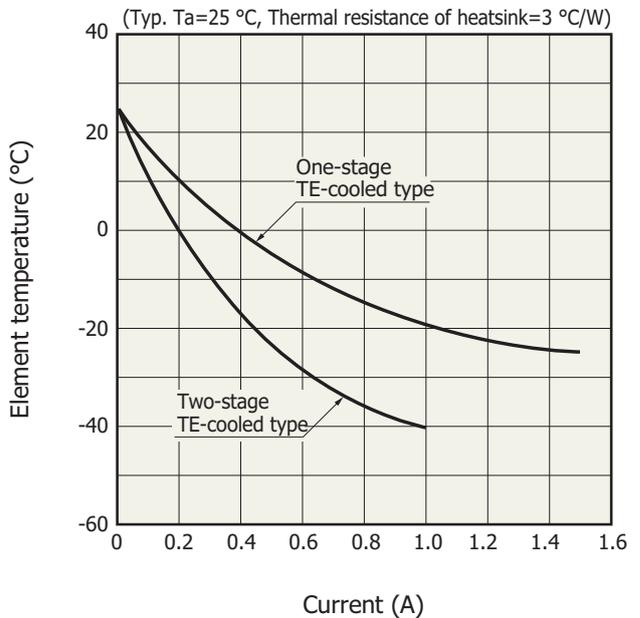
The operating temperature for one-stage and two-stage TE-cooled types is up to 70  $^\circ\text{C}$ .

Thermistor temperature characteristics



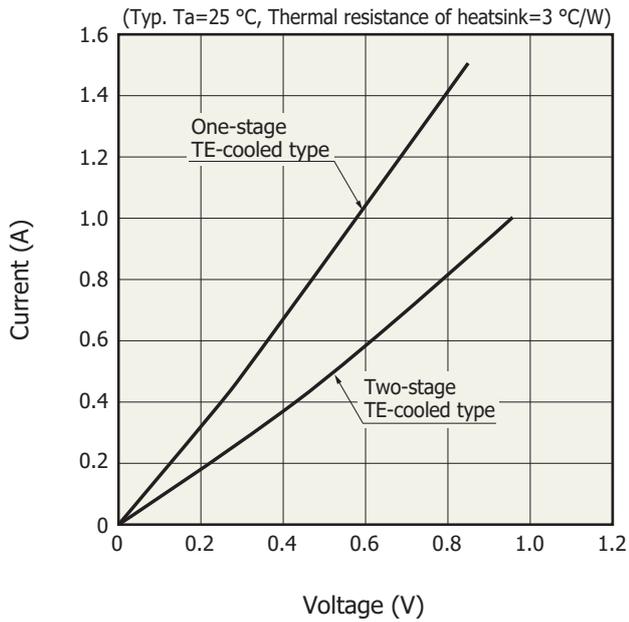
KIRD0116EA

Cooling characteristics of TE-cooler



KIRD0231EA

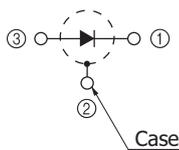
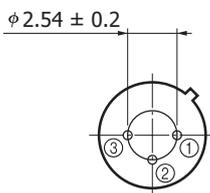
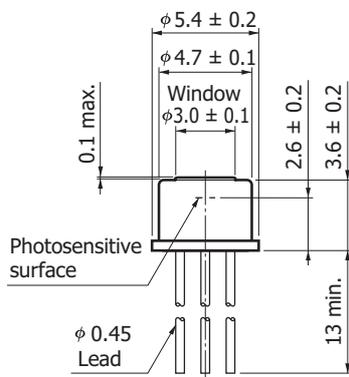
**Current vs. voltage (TE-cooler)**



KIRD0115EB

**Dimensional outlines (unit: mm)**

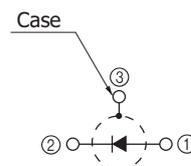
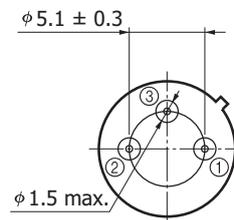
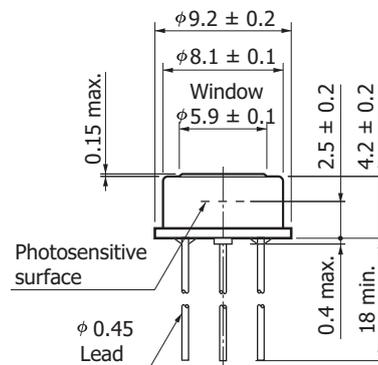
(1) G12183-003K/-005K/-010K



Distance from photosensitive area center to cap center  
 $-0.2 \leq X \leq +0.2$   
 $-0.2 \leq Y \leq +0.2$

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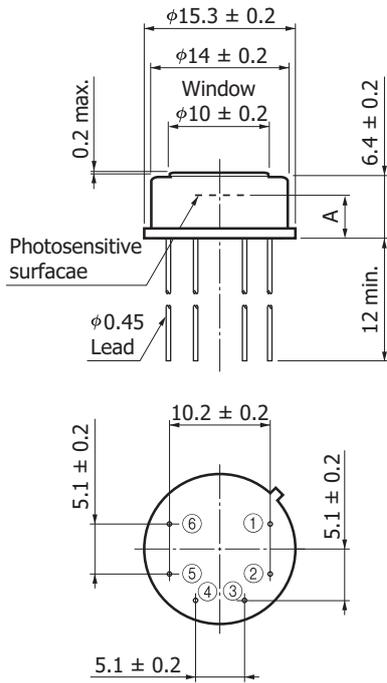
(2) G12183-020K/-030K



Distance from photosensitive area center to cap center  
 $-0.2 \leq X \leq +0.2$   
 $-0.2 \leq Y \leq +0.2$

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(3) G12183-103K/-105K/-110K/-120K/-130K



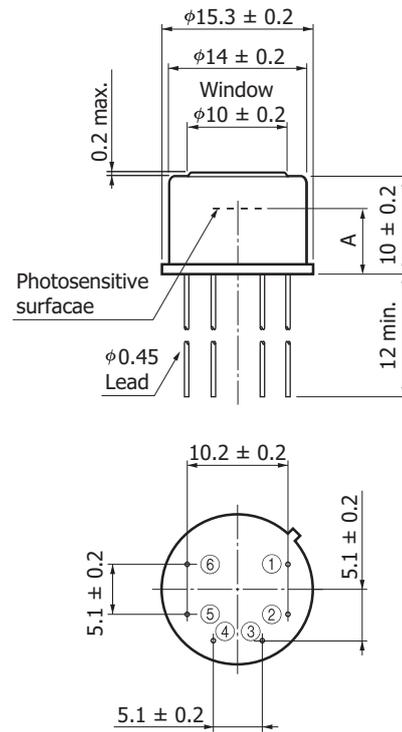
- ① Detector (anode)
- ② Detector (cathode)
- ③ TE-cooler (-)
- ④ Te-cooler (+)
- ⑤⑥ Thermistor

Distance from photosensitive area center to cap center  
 $-0.3 \leq X \leq +0.3$   
 $-0.3 \leq Y \leq +0.3$

	G12183-103K /-105K/110K	G12183-120K /-130K
A	4.3 ± 0.2	4.4 ± 0.2

KIRDA0228EA

(4) G12183-203K/-205K/-210K/-220K/-230K



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

Distance from photosensitive area center to cap center  
 $-0.3 \leq X \leq +0.3$   
 $-0.3 \leq Y \leq +0.3$

	G12183-203K /-205K/-210K	G12183-220K /-230K
A	6.6 ± 0.2	6.7 ± 0.2

KIRDA0229EA

## Related information

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

### ■ Precautions

- Disclaimer
- Safety consideration
- Metal, ceramic, plastic package products

Information described in this material is current as of March 2019.

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The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use. Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

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