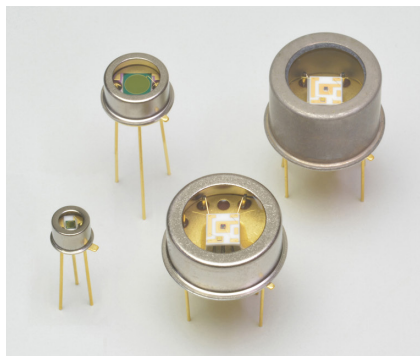


# InGaAs PIN photodiodes

G12182 series



**Long wavelength type  
(cutoff wavelength: 2.05 to 2.1 μm)**

## Features

- Cutoff wavelength: 2.05 to 2.1 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)
G12182-003K	(1)/K	TO-18	Non-cooled	φ0.3
G12182-005K				φ0.5
G12182-010K				φ1
G12182-020K	(2)/K	TO-5		φ2
G12182-030K				φ3
G12182-103K				(3)/K
G12182-105K	One-stage TE-cooled	φ0.5		
G12182-110K		φ1		
G12182-120K		φ2		
G12182-130K	φ3			
G12182-203K	(4)/K	TO-8	Two-stage TE-cooled	
G12182-205K				φ0.5
G12182-210K				φ1
G12182-220K				φ2
G12182-230K				φ3

\*1: K=Borosilicate glass

The G12182 series may be destroyed or deteriorated by electrostatic discharge, etc. Be carefull when using the G12182 series.

### ▣ Absolute maximum ratings (Ta=25 °C, unless otherwise noted)

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*2 Topr (°C)	Storage temperature*2 Tstg (°C)
G12182-003K	-	-	-	1	-40 to +85	-55 to +125
G12182-005K						
G12182-010K						
G12182-020K						
G12182-030K						
G12182-103K	0.2	1.5	1.0	-40 to +70*3	-55 to +85	
G12182-105K						
G12182-110K						
G12182-120K						
G12182-130K						
G12182-203K		1.0	1.2			
G12182-205K						
G12182-210K						
G12182-220K						
G12182-230K						

\*2: No dew condensation

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

\*3: Chip temperature and package temperature

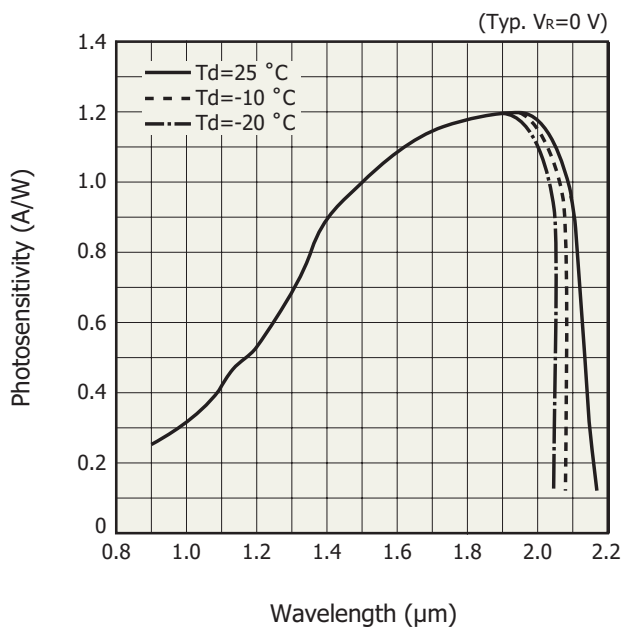
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

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

Type no.	Measurement Condition Element temperature Tchip (°C)	Thermistor resistance (+25 °C) Rth (kΩ)	Thermistor B constant (-20/+25 °C) 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)					
						Min. (A/W)	Typ. (A/W)	Typ. (nA)	Max. (nA)						
G12182-003K	25	-	-	0.9 to 2.1				10	100	1.07					
G12182-005K								20	200						
G12182-010K								100	1000						
G12182-020K								500	5000						
G12182-030K								1000	10000						
G12182-103K	-10	9.0	3300	0.9 to 2.07	1.95	1	1.2	1	10						
G12182-105K								3	30						
G12182-110K								10	100						
G12182-120K								50	500						
G12182-130K								100	1000						
G12182-203K				-20						0.9 to 2.05				0.5	5
G12182-205K														1.5	15
G12182-210K														5	50
G12182-220K														25	250
G12182-230K														50	500

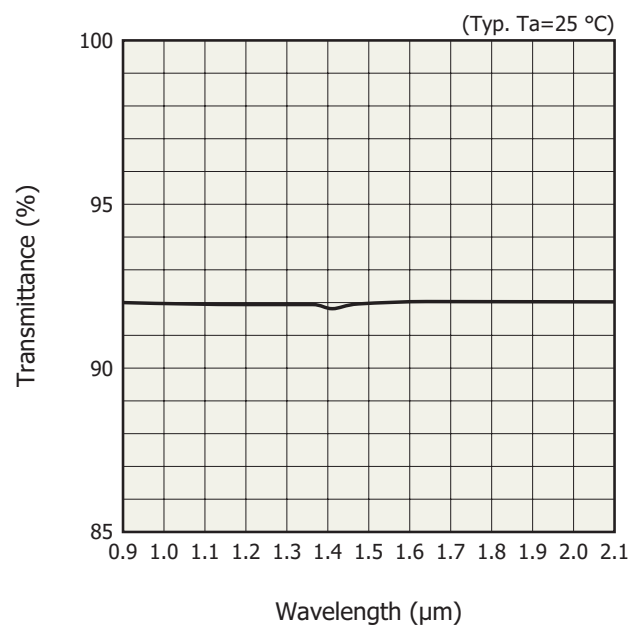
Type no.	Measurement Condition	Cutoff frequency fc		Terminal capacitance Ct		Shunt resistance Rsh		Detectivity D*		Noise equivalent power NEP	
	Element temperature	VR=0 V RL=50 Ω		VR=0 V f=1 MHz		VR=10 mV		λ=λp		λ=λp	
	Tchip (°C)	Min. (MHz)	Typ. (MHz)	Typ. (pF)	Max. (pF)	Min. (MΩ)	Typ. (MΩ)	Min. (cm·Hz <sup>1/2</sup> /W)	Typ. (cm·Hz <sup>1/2</sup> /W)	Typ. (W/Hz <sup>1/2</sup> )	Max. (W/Hz <sup>1/2</sup> )
G12182-003K	25	40	90	25	50	0.65	3	1 × 10 <sup>11</sup>	3.5 × 10 <sup>11</sup>	6.5 × 10 <sup>-14</sup>	2 × 10 <sup>-13</sup>
G12182-005K		15	35	70	150	0.2	1			1.5 × 10 <sup>-13</sup>	3.5 × 10 <sup>-13</sup>
G12182-010K		5	10	230	500	0.05	0.25			2.5 × 10 <sup>-13</sup>	6.5 × 10 <sup>-13</sup>
G12182-020K		1.2	2.5	1000	2000	0.01	0.05			5.5 × 10 <sup>-13</sup>	1.5 × 10 <sup>-12</sup>
G12182-030K		1	1.5	2000	3000	0.004	0.02			8.5 × 10 <sup>-13</sup>	2.5 × 10 <sup>-12</sup>
G12182-103K	-10	40	140	22	50	10	50	5 × 10 <sup>11</sup>	1.5 × 10 <sup>12</sup>	1.5 × 10 <sup>-14</sup>	4.5 × 10 <sup>-14</sup>
G12182-105K		15	50	64	150	2.8	14			3 × 10 <sup>-14</sup>	8 × 10 <sup>-14</sup>
G12182-110K		5	16	200	500	0.6	3			5.5 × 10 <sup>-14</sup>	1.5 × 10 <sup>-13</sup>
G12182-120K		1.2	3.5	900	2000	0.13	0.65			1.5 × 10 <sup>-13</sup>	4 × 10 <sup>-13</sup>
G12182-130K		1	1.8	1800	3000	0.055	0.28			2 × 10 <sup>-13</sup>	5.5 × 10 <sup>-13</sup>
G12182-203K	-20	40	150	20	50	20	100	7 × 10 <sup>11</sup>	2 × 10 <sup>12</sup>	1 × 10 <sup>-14</sup>	3 × 10 <sup>-14</sup>
G12182-205K		15	53	60	150	5.5	28			2 × 10 <sup>-14</sup>	5.5 × 10 <sup>-14</sup>
G12182-210K		5	17	195	500	1.4	7			4 × 10 <sup>-14</sup>	1 × 10 <sup>-13</sup>
G12182-220K		1.2	3.7	850	2000	0.28	1.4			9 × 10 <sup>-14</sup>	2.5 × 10 <sup>-13</sup>
G12182-230K		1	1.9	1700	3000	0.11	0.55			1.5 × 10 <sup>-13</sup>	4 × 10 <sup>-13</sup>

**Spectral response**



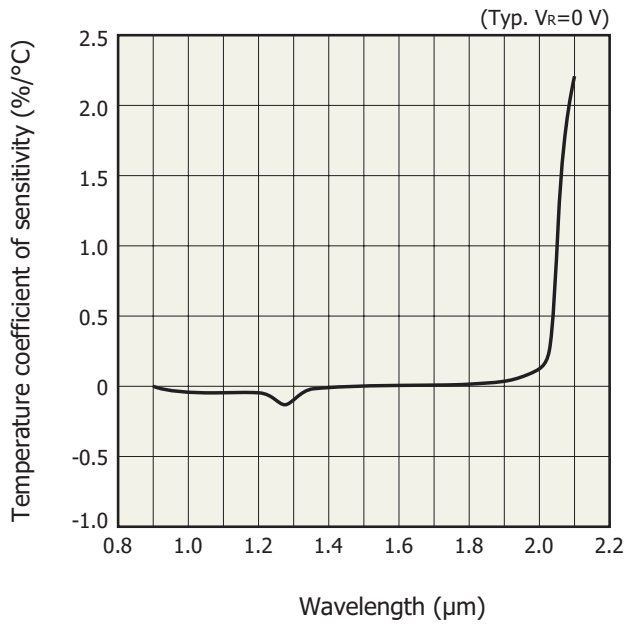
KIRD06487EC

**Spectral transmittance of window material**

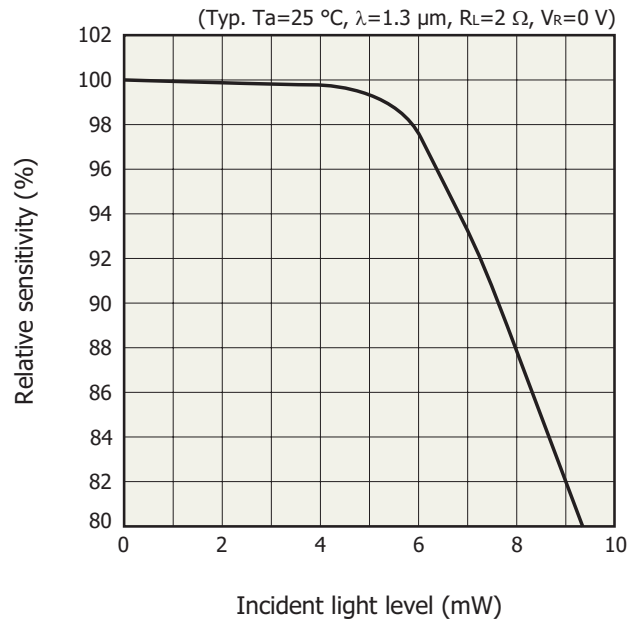


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Photosensitivity temperature characteristics

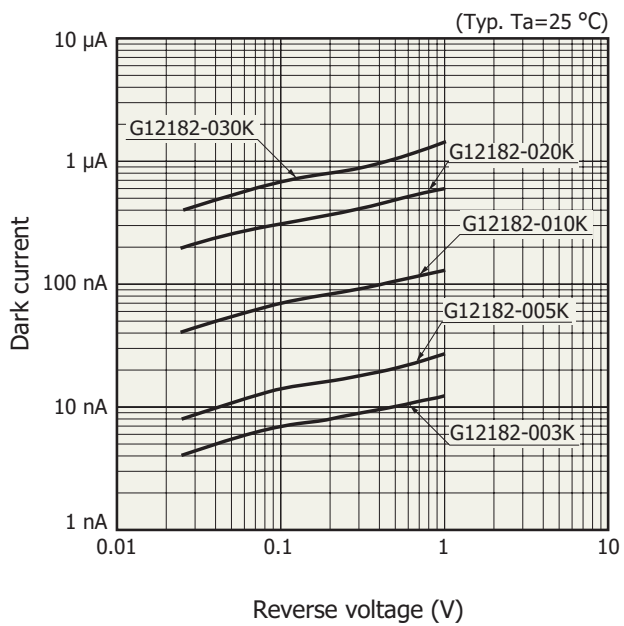


Linearity (G12182-010K)

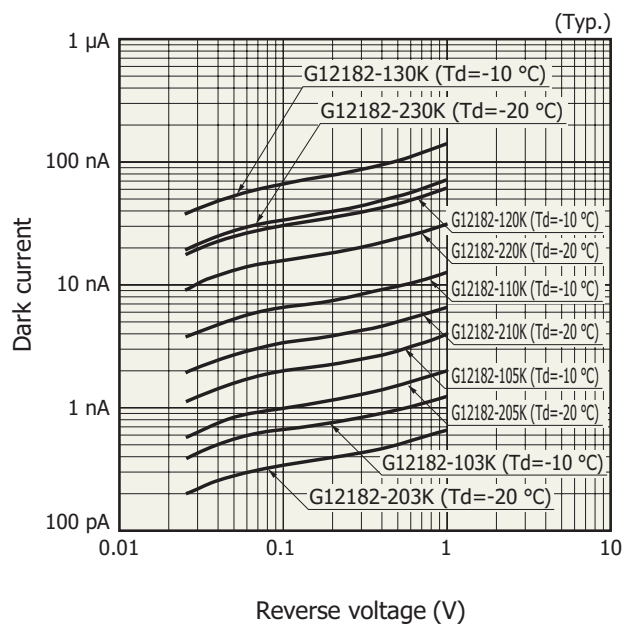


Dark current vs. reverse voltage

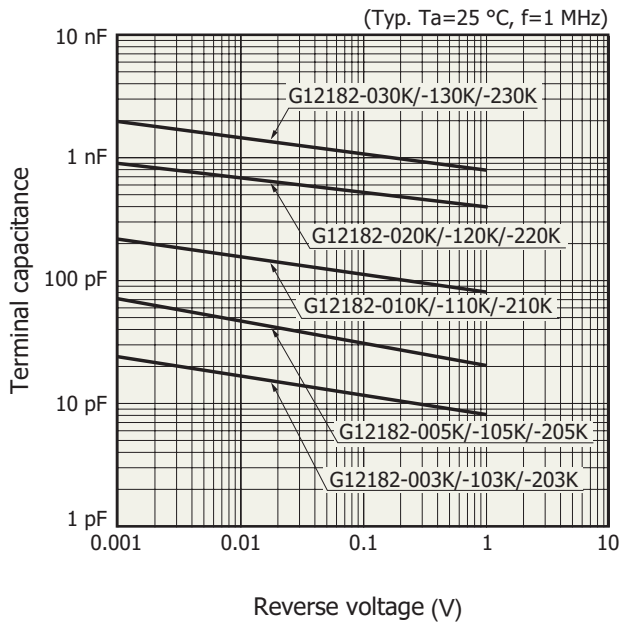
Non-cooled type



TE-cooled type

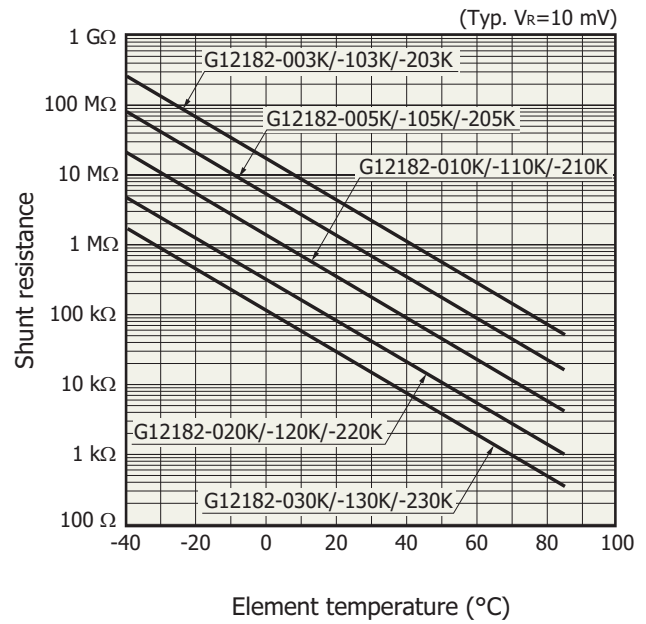


Terminal capacitance vs. reverse voltage



KIRD0489EB

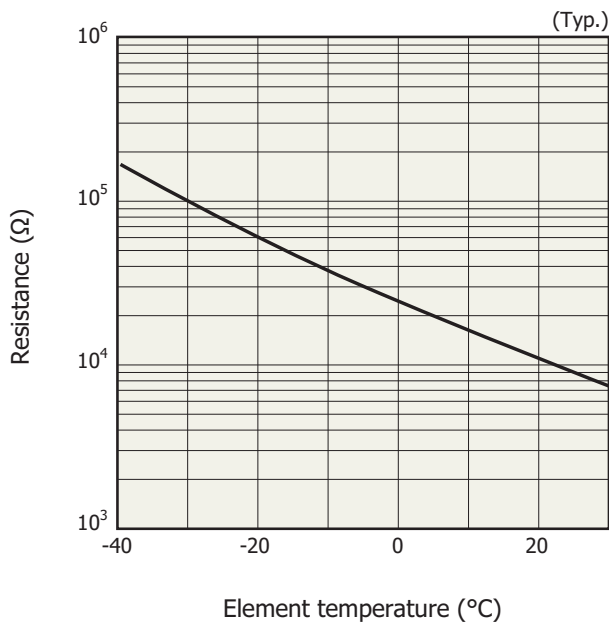
Shunt resistance vs. element temperature



KIRD0490EB

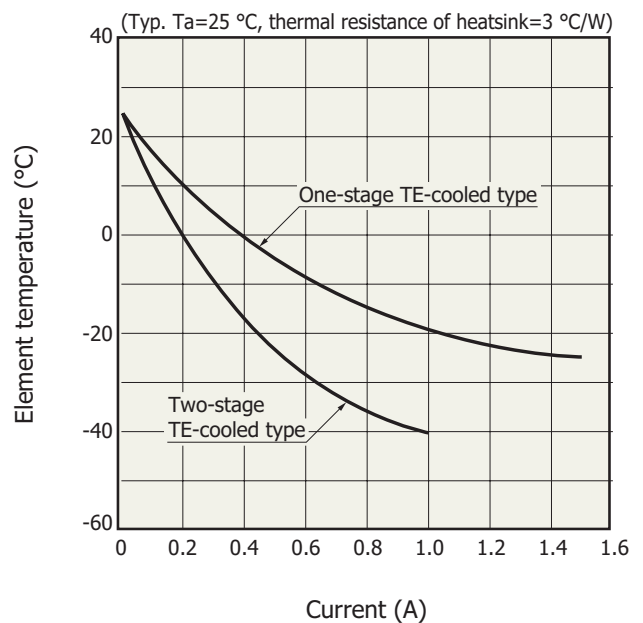
The operating temperature for one-stage and two-stage TE-cooled types is up to 70 °C.

Thermistor temperature characteristics



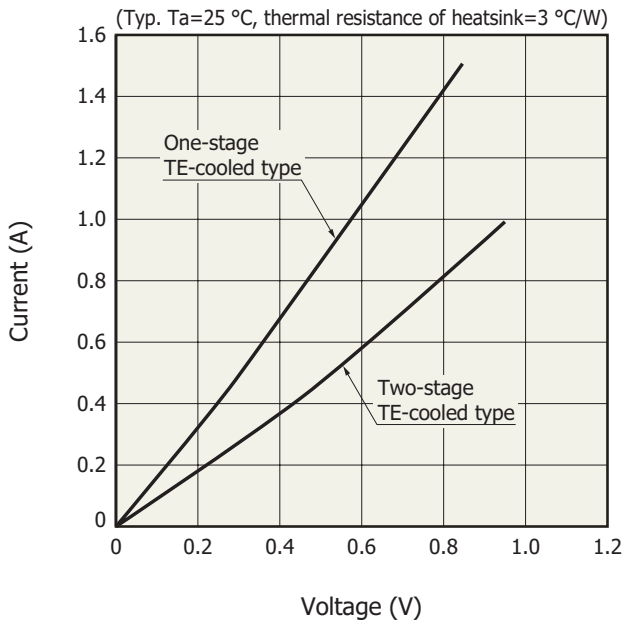
KIRD0116EA

Cooling characteristics of TE-cooler



KIRD0231EA

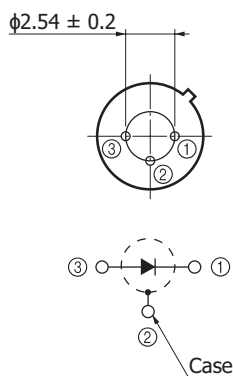
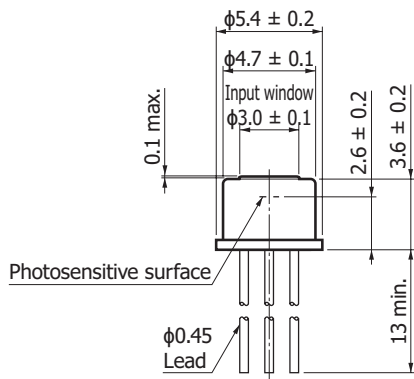
**Current vs. voltage (TE-cooler)**



KIRD0115EB

**Dimensional outlines (unit: mm)**

(1) G12182-003K/-005K/-010K



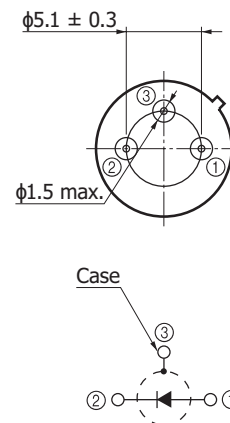
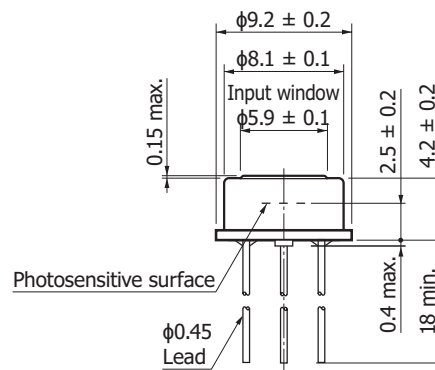
Distance from photosensitive area center to cap center

$$-0.2 \leq X \leq +0.2$$

$$-0.2 \leq Y \leq +0.2$$

KIRDA0220EA

(2) G12182-020K/-030K



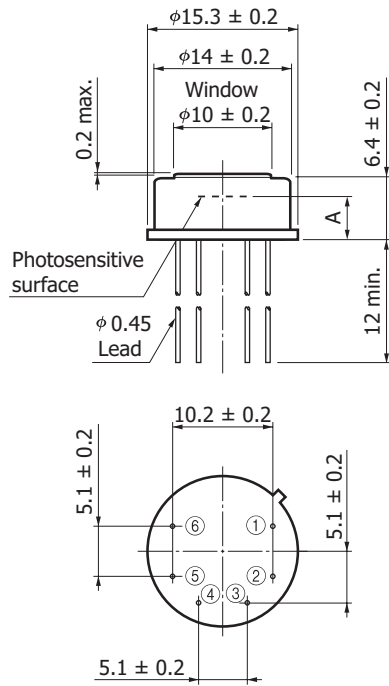
Distance from photosensitive area center to cap center

$$-0.2 \leq X \leq +0.2$$

$$-0.2 \leq Y \leq +0.2$$

KIRDA0221EA

(3) G12182-103K/-105K/-110K/-120K/-130K



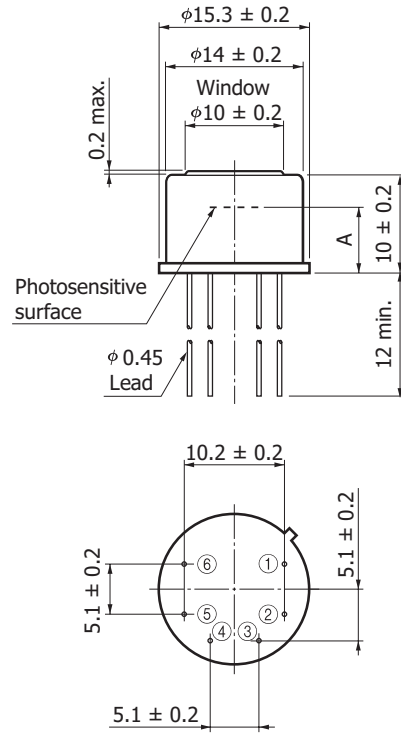
- ① Detector (anode)
- ② Detector (cathode)
- ③ TE-cooler (-)
- ④ TE-cooler (+)
- ⑤⑥ Thermistor

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

	G12182-103K /-105K/-110K	G12182-120K /-130K
A	4.3 ± 0.2	4.4 ± 0.2

KIRDA0226EA

(4) G12182-203K/-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  
 $-0.3 \leq X \leq +0.3$   
 $-0.3 \leq Y \leq +0.3$

	G12182-203K /-205K/-210K	G12182-220K /-230K
A	6.6 ± 0.2	6.7 ± 0.2

KIRDA0227EA

### Recommended soldering conditions

Solder temperature: 260 °C (10 s or less, once)

Solder the leads at a point at least 1 mm away from the package body.

Note: When you set soldering conditions, check that problems do not occur in the product by testing out the conditions in advance.

### Related information

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

#### ■ Precautions

- Disclaimer
- Safety consideration
- Compound opto-semiconductors (photosensors, light emitters)

Information described in this material is current as of January 2021.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

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