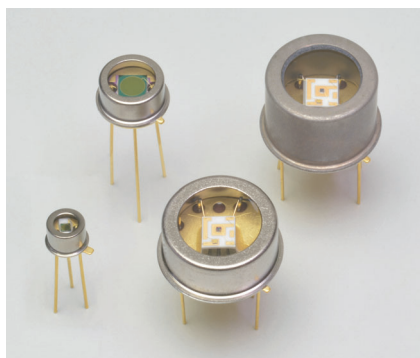




InGaAs PIN photodiodes

G12181 series

Long wavelength type
(cutoff wavelength: 1.85 to 1.9 μm)

Features

- Cutoff wavelength: 1.85 to 1.9 μm
- Low cost
- Photosensitive area: $\phi 0.3$ to $\phi 3$ 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)		
G12181-003K	(1)/K	TO-18	Non-cooled	φ0.3		
G12181-005K				φ0.5		
G12181-010K				φ1		
G12181-020K	(2)/K	TO-5		φ2		
G12181-030K				φ3		
G12181-103K				One-stage TE-cooled	φ0.3	
G12181-105K	φ0.5					
G12181-110K	(3)/K	TO-8	φ1			
G12181-120K			φ2			
G12181-130K			φ3			
G12181-203K			(4)/K		TO-8	Two-stage TE-cooled
G12181-205K				φ0.5		
G12181-210K	φ1					
G12181-220K	φ2					
G12181-230K	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
G12181-003K	-	-	-	1	-40 to +85*2	-55 to +125*2	260 °C or less, within 10 s
G12181-005K							
G12181-010K							
G12181-020K							
G12181-030K							
G12181-103K	0.2	1.5	1.0		-40 to +70*2	-55 to +85*2	
G12181-105K							
G12181-110K							
G12181-120K							
G12181-130K							
G12181-203K		1.0	1.2				
G12181-205K							
G12181-210K							
G12181-220K							
G12181-230K							

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.

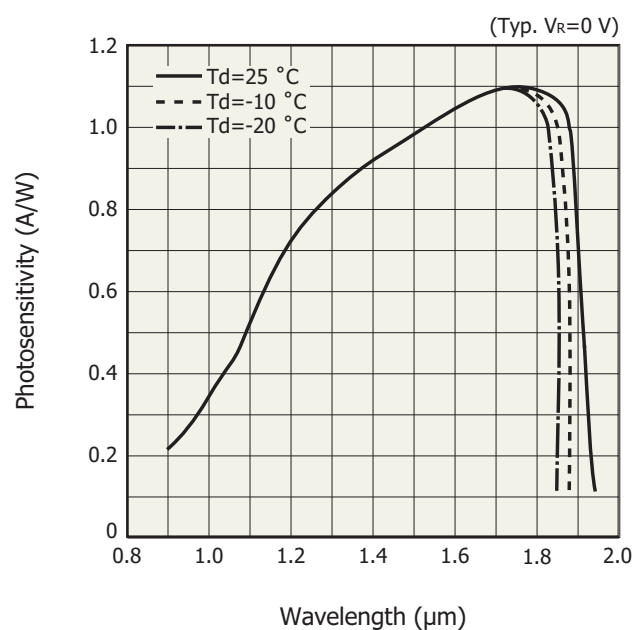
The G12181 series may be destroyed or deteriorated by electrostatic discharge, etc. Be carefull when using the G12181 series.

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. (nA)	Max. (nA)		
G12181-003K	25	-	-	0.9 to 1.9				1	10	1.07	
G12181-005K								3	30		
G12181-010K								10	100		
G12181-020K								50	500		
G12181-030K								100	1000		
G12181-103K	-10	9.0	3.3	0.9 to1.87	1.75	0.9	1.1	0.1	1		
G12181-105K								0.3	3		
G12181-110K								1	10		
G12181-120K								5	50		
G12181-130K								10	100		
G12181-203K	-20							0.9 to1.85	0.05		0.5
G12181-205K									0.15		1.5
G12181-210K									0.5		5
G12181-220K									2.5		25
G12181-230K									5		50

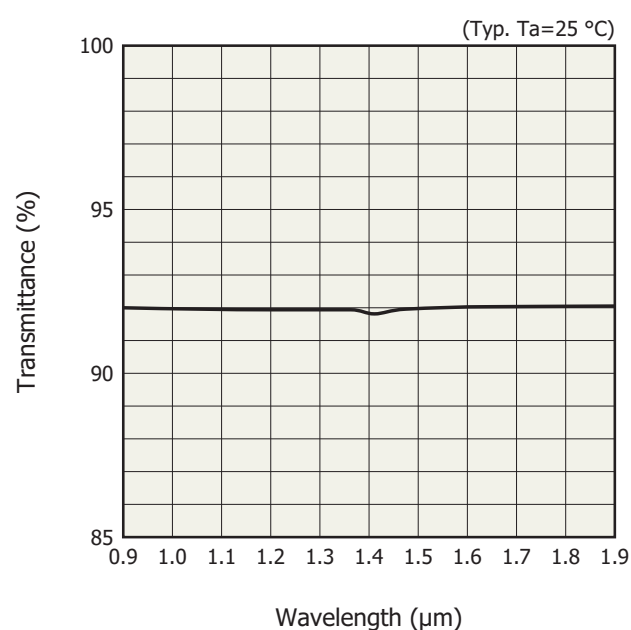
Type no.	Measurement Condition	Cutoff frequency fc		Terminal capacitance Ct		Shunt resistance Rsh		Detectivity D*		Noise equivalent power NEP	
	Element temperature	VR=0 V RL=50 Ω		VR=0 V f=1 MHz		VR=10 mV		$\lambda=\lambda_p$		$\lambda=\lambda_p$	
	Tchip (°C)	Min. (MHz)	Typ. (MHz)	Typ. (pF)	Max. (pF)	Min. (MΩ)	Typ. (MΩ)	Min. (cm·Hz ^{1/2} /W)	Typ. (cm·Hz ^{1/2} /W)	Typ. (W/Hz ^{1/2})	Max. (W/Hz ^{1/2})
G12181-003K	25	40	90	25	50	10	50	3×10^{11}	1×10^{12}	2×10^{-14}	5×10^{-14}
G12181-005K		15	35	70	150	4	20			3×10^{-14}	8.5×10^{-14}
G12181-010K		5	10	230	500	1	5			6×10^{-14}	2×10^{-13}
G12181-020K		1.2	2.5	1000	2000	0.2	1			1.5×10^{-13}	4×10^{-13}
G12181-030K		1	1.5	2000	3000	0.1	0.5			2×10^{-13}	5×10^{-13}
G12181-103K	-10	40	140	22	50	130	650	2×10^{12}	5.5×10^{12}	5×10^{-15}	1.5×10^{-14}
G12181-105K		15	50	64	150	50	250			7×10^{-15}	2×10^{-14}
G12181-110K		5	16	200	500	13	65			1.5×10^{-14}	4×10^{-14}
G12181-120K		1.2	3.5	900	2000	2.8	14			3.5×10^{-14}	9×10^{-14}
G12181-130K		1	1.8	1800	3000	1.3	6.5			5×10^{-14}	1.5×10^{-13}
G12181-203K	-20	40	150	20	50	280	1400	3×10^{12}	8.5×10^{12}	3.5×10^{-15}	9×10^{-15}
G12181-205K		15	53	60	150	110	550			5×10^{-15}	1.5×10^{-14}
G12181-210K		5	17	195	500	28	150			1×10^{-14}	3×10^{-14}
G12181-220K		1.2	3.7	850	2000	5.5	28			2.5×10^{-14}	6.5×10^{-14}
G12181-230K		1	1.9	1700	3000	2.8	14			3.5×10^{-14}	9×10^{-14}

Spectral response



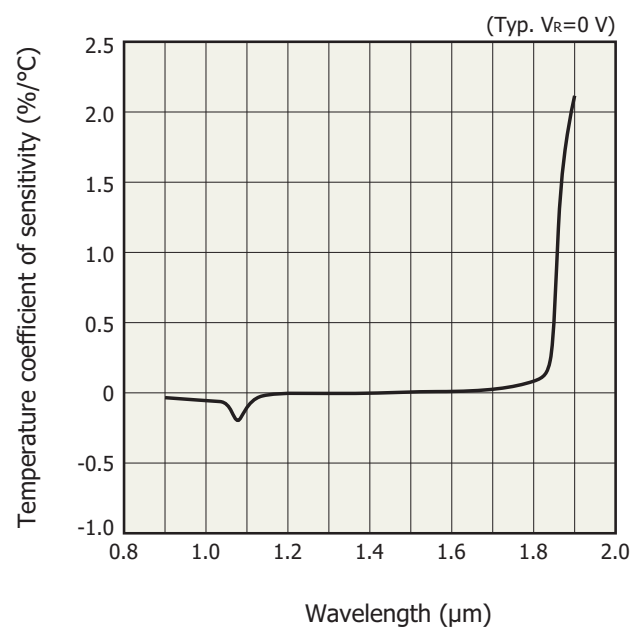
KIRDB0483EC

Spectral transmittance of window material

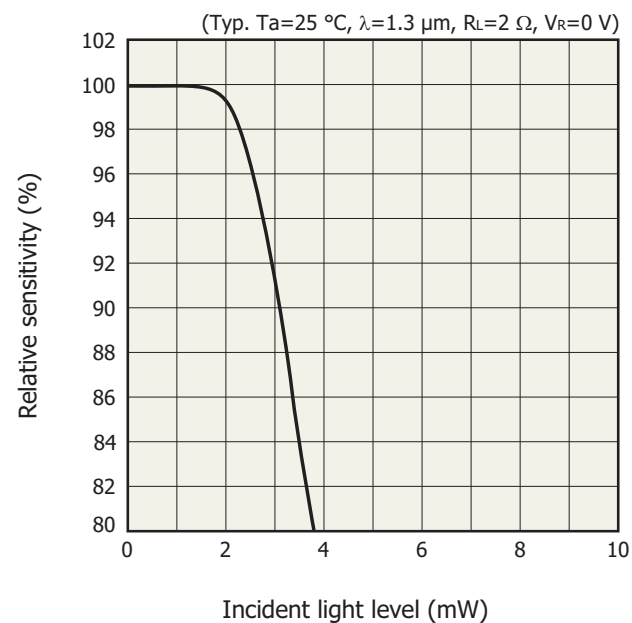


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Photosensitivity temperature characteristics

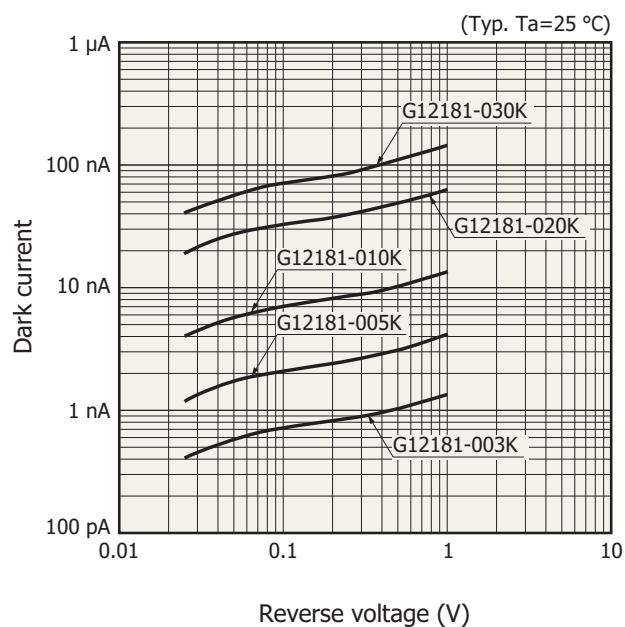


Linearity (G12181-010K)

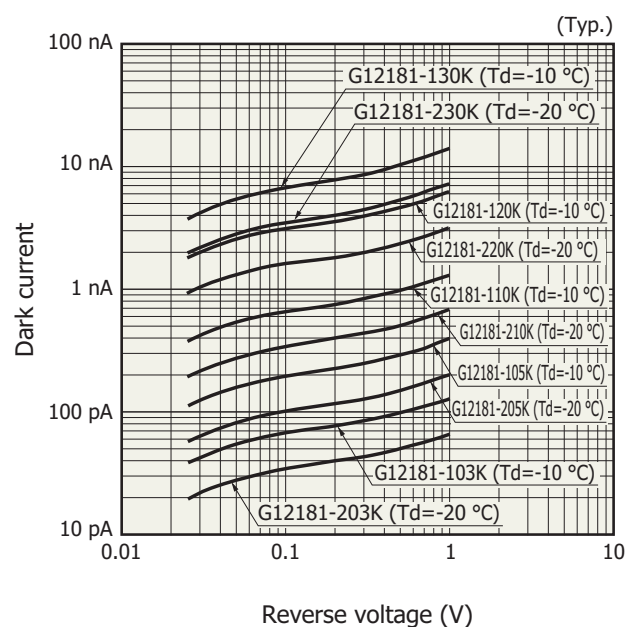


Dark current vs. reverse voltage

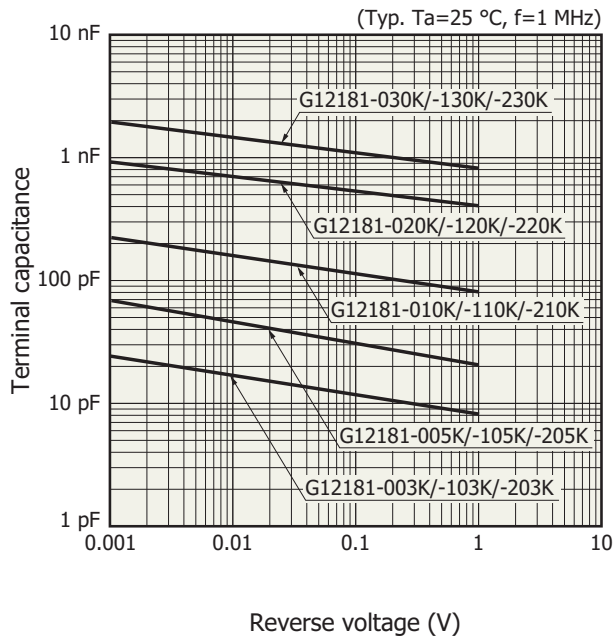
Non-cooled type



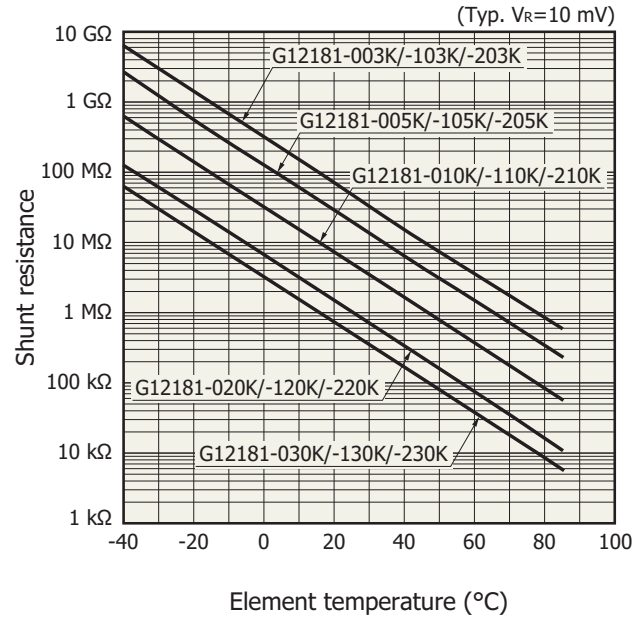
TE-cooled type



Terminal capacitance vs. reverse voltage

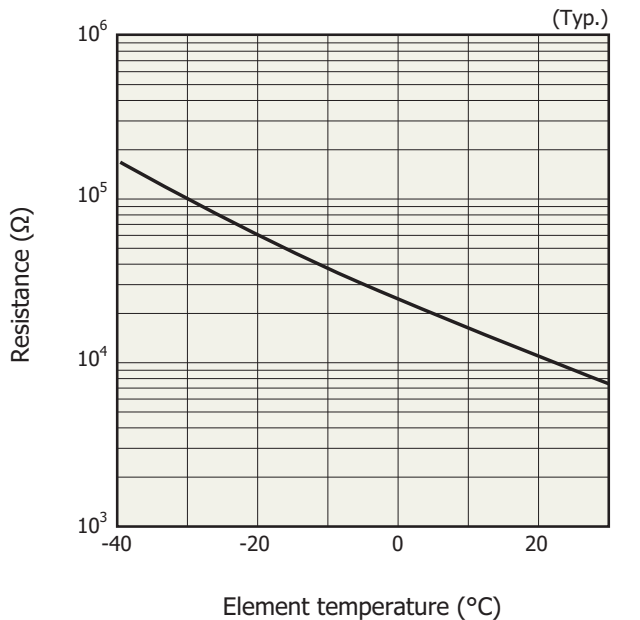


Shunt resistance vs. element temperature

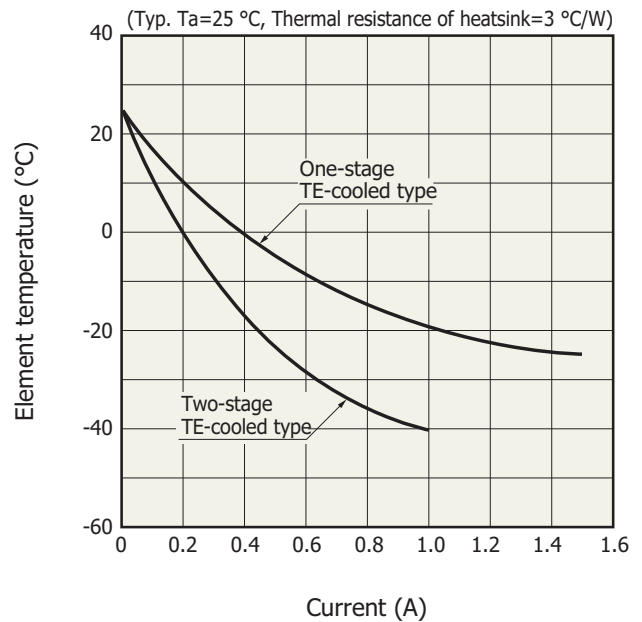


The operating temperature for one-stage and two-stage TE-cooled types is up to 70°C .

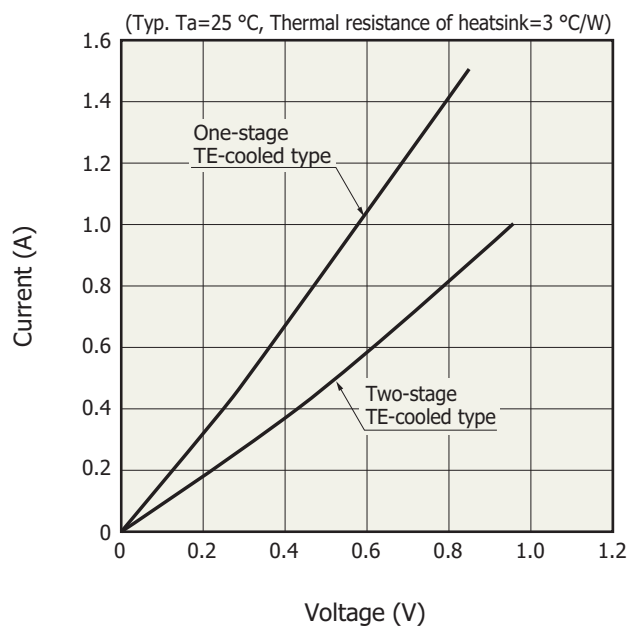
Thermistor temperature characteristics



Cooling characteristics of TE-cooler



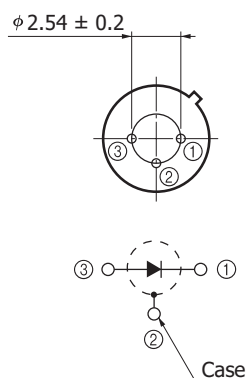
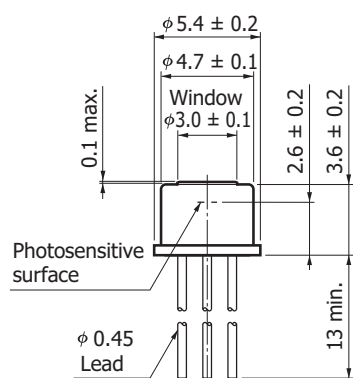
Current vs. voltage (TE-cooler)



KIRD00115EB

Dimensional outlines (unit: mm)

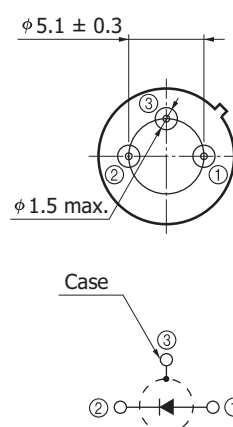
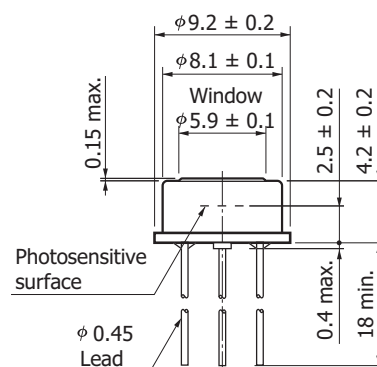
(1) G12181-003K/-005K/-010K



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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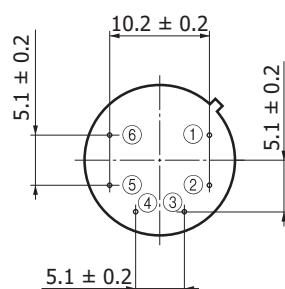
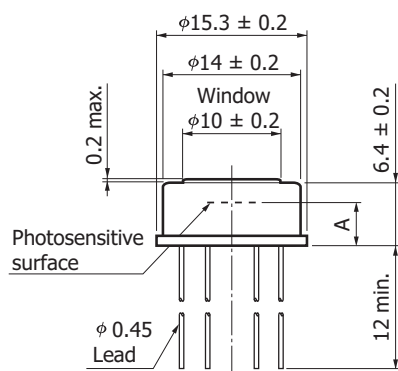
(2) G12181-020K/-030K



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) G12181-103K/-105K/-110K/-120K/-130K



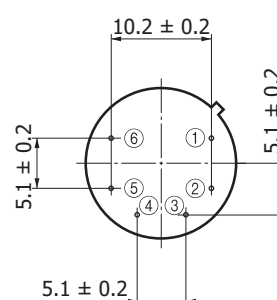
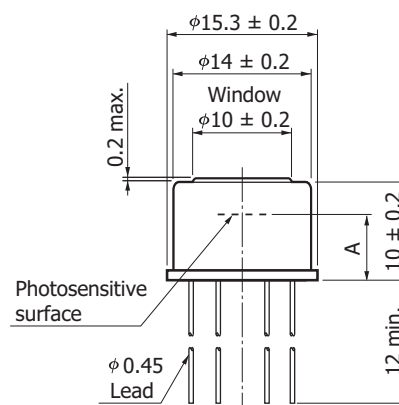
- ① Detector (anode)
- ② Detector (cathode)
- ③ TE-cooler (-)
- ④ TE-cooler (+)
- ⑤⑥ Thermistor

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

	G12181-103K /-105K/-110K	G12181-120K /-130K
A	4.3 ± 0.2	4.4 ± 0.2

KIRDA0224EA

(4) G12181-203K/-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
 $-0.3 \leq X \leq +0.3$
 $-0.3 \leq Y \leq +0.3$

	G12181-203K /-205K/-210K	G12181-220K /-230K
A	6.6 ± 0.2	6.7 ± 0.2

KIRDA0225EA

Related information

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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