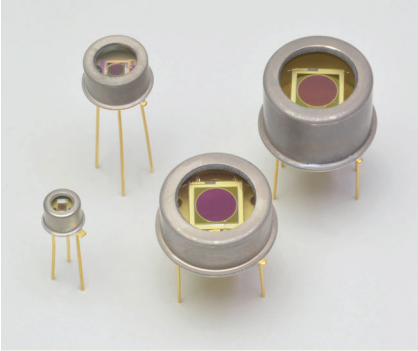
HAMAMATSU
PHOTON IS OUR BUSINESS

InGaAs PIN photodiodes



G12180 series

Photosensitive area from ϕ0.3 mm to ϕ5 mm

InGaAs PIN photodiodes have large shunt resistance and feature very low noise. Hamamatsu provides various types of InGaAs PIN photodiodes with photosensitive area from ϕ0.3 mm to ϕ5 mm.

Features

- **Low noise, low dark current**
- **Low terminal capacitance**
- **Large photosensitive area**
- **Various photosensitive area sizes available**

Applications

- **Laser monitors**
- **Optical power meters**
- **Laser diode life test**
- **NIR (near infrared) photometry**
- **Optical communications**

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-cooler type	**C1103-04**

Structure

Type no.	Dimensional outline/ Window material*1	Package	Cooling	Photosensitive area (mm)
G12180-003A	(1)/A	TO-18	Non-cooled	ϕ0.3
G12180-005A				ϕ0.5
G12180-010A				ϕ1
G12180-020A	(2)/A	TO-5		ϕ2
G12180-030A				ϕ3
G12180-050A	(3)/A	TO-8		ϕ5
G12180-110A	(4)/A		One-stage TE-cooled	ϕ1
G12180-120A				ϕ2
G12180-130A				ϕ3
G12180-150A				ϕ5
G12180-210A	(5)/A		Two-stage TE-cooled	ϕ1
G12180-220A				ϕ2
G12180-230A				ϕ3
G12180-250A				ϕ5

*1: A=Borosilicate glass with anti-reflective coating (optimized for 1.55 µm peak)

Absolute maximum ratings

Type no.	Thermistor 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)	Soldering conditions
G12180-003A	-	-	-	20	-40 to +100	-55 to +125	260 °C or less, within 10 s
G12180-005A							
G12180-010A				10			
G12180-020A				5			
G12180-030A							
G12180-050A				2			
G12180-110A	0.2	1.5	1	5	-40 to +70	-55 to +85	
G12180-120A							
G12180-130A							
G12180-150A				2			
G12180-210A		1	1.2	5			
G12180-220A							
G12180-230A							
G12180-250A				2			

*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.

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.

The G12180 series may be damaged by electrostatic discharge, etc. Be careful when using the G12180 series.

Electrical and optical characteristics (Typ. unless otherwise noted)

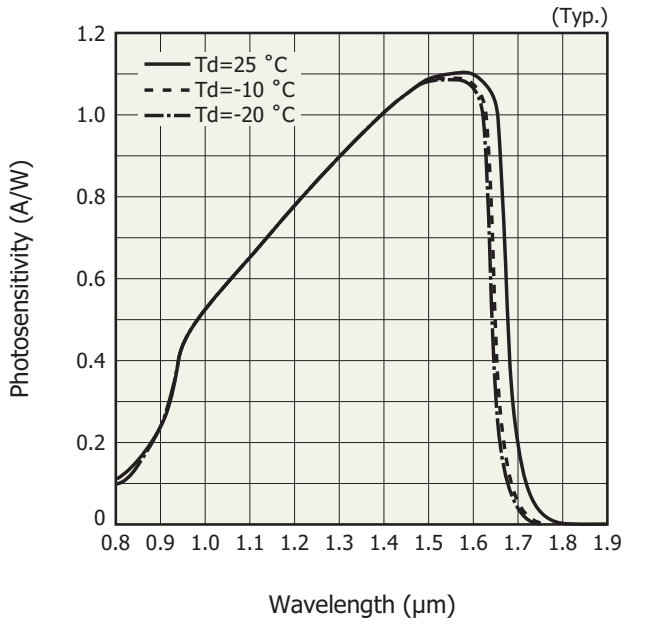
Type no.	Measurement condition Element temperature (°C)	Thermistor resistance Rth (kΩ)	Thermistor B constant B (K)	Spectral response range λ (μm)	Peak sensitivity wavelength λp (μm)	Photosensitivity S 1.3 μm Min. (A/W)	Photosensitivity S 1.3 μm Typ. (A/W)	Photosensitivity S λ=λp Min. (A/W)	Photosensitivity S λ=λp Typ. (A/W)	Dark current ID VR=1 V Typ. (nA)	Dark current ID VR=1 V Max. (nA)	Temp. coefficient of dark current ΔTID VR=1 V (times/°C)
G12180-003A	25	-	-	0.9 to 1.7	1.55	0.8	0.9	0.9	1.1	0.1*3	0.5*3	1.09
G12180-005A										0.15*3	0.75*3	
G12180-010A										0.8*3	4*3	
G12180-020A										1.5	7.5	
G12180-030A										2.5	12.5	
G12180-050A										5	25	
G12180-110A	-10	9.0	3.3	0.9 to 1.67						0.02	0.1	
G12180-120A										0.1	0.5	
G12180-130A										0.15	0.8	
G12180-150A										0.33	1.67	
G12180-210A	-20			0.9 to 1.65						0.01	0.06	
G12180-220A										0.04	0.2	
G12180-230A										0.07	0.35	
G12180-250A										0.15	0.75	

*3: VR=5 V

Type no.	Measurement condition: Element temperature (°C)	Cutoff frequency fc VR=1 V RL=50 Ω: Min. (MHz)	Cutoff frequency fc VR=1 V RL=50 Ω: Typ. (MHz)	Terminal capacitance Ct VR=1 V f=1 MHz: Typ. (pF)	Terminal capacitance Ct VR=1 V f=1 MHz: Max. (pF)	Shunt resistance Rsh VR=10 mV: Min. (MΩ)	Shunt resistance Rsh VR=10 mV: Typ. (MΩ)	Detectivity D* λ=λp: Min. (cm·Hz$^{1/2}$/W)	Detectivity D* λ=λp: Typ. (cm·Hz$^{1/2}$/W)	Noise equivalent power NEP λ=λp: Typ. (W/Hz$^{1/2}$)	Noise equivalent power NEP λ=λp: Max. (W/Hz$^{1/2}$)
G12180-003A	25	450*4	600*4	5*5	7.5*5	200	1000	2.4 × 10^{12}	6.3 × 10^{12}	4.2 × 10^{-15}	1.2 × 10^{-14}
G12180-005A		160*4	200*4	15*5	20*5	80	400			7.0 × 10^{-15}	1.9 × 10^{-14}
G12180-010A		25*4	60*4	55*5	120*5	25	125			1.4 × 10^{-14}	3.8 × 10^{-14}
G12180-020A		4	13	250	800	6.5	30			2.8 × 10^{-14}	7.5 × 10^{-14}
G12180-030A		2.5	7	450	1500	4	20			4.4 × 10^{-14}	1.1 × 10^{-13}
G12180-050A		0.5	3	1000	7000	1.3	6.5			7.0 × 10^{-14}	1.9 × 10^{-13}
G12180-110A	-10	20	40	75	140	750	3750	1.6 × 10^{13}	4.4 × 10^{13}	2.0 × 10^{-15}	5.4 × 10^{-15}
G12180-120A		4	13	250	800	200	900			4.0 × 10^{-15}	1.1 × 10^{-14}
G12180-130A		2.5	7	450	1500	120	600			4.9 × 10^{-15}	1.4 × 10^{-14}
G12180-150A		0.5	3	1000	7000	40	200			8.6 × 10^{-15}	2.3 × 10^{-14}
G12180-210A	-20	20	40	75	140	1750	8750	2.6 × 10^{13}	6.7 × 10^{13}	1.3 × 10^{-15}	3.5 × 10^{-15}
G12180-220A		4	13	250	800	500	2000			2.7 × 10^{-15}	6.5 × 10^{-15}
G12180-230A		2.5	7	450	1500	280	1400			3.2 × 10^{-15}	8.7 × 10^{-15}
G12180-250A		0.5	3	1000	7000	90	500			5.3 × 10^{-15}	1.5 × 10^{-14}

*4: VR=5 V, RL=50 Ω, -3 dB
*5: VR=5 V, f=1 MHz

Spectral response



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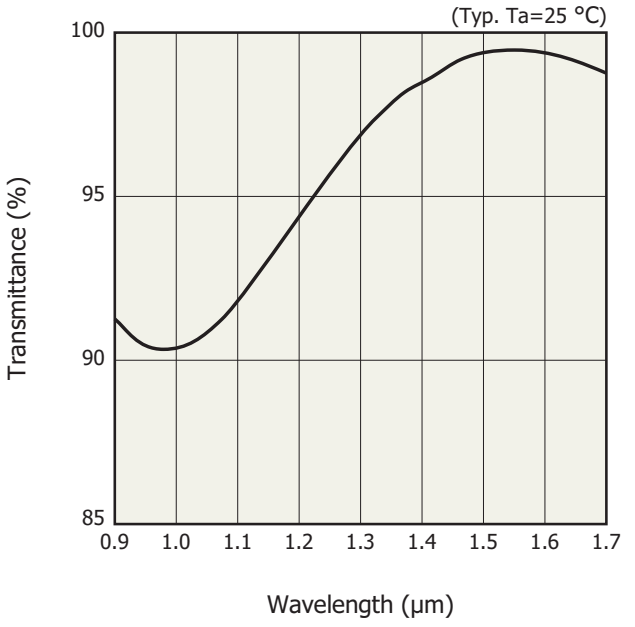
Spectral transmittance characteristics of window material



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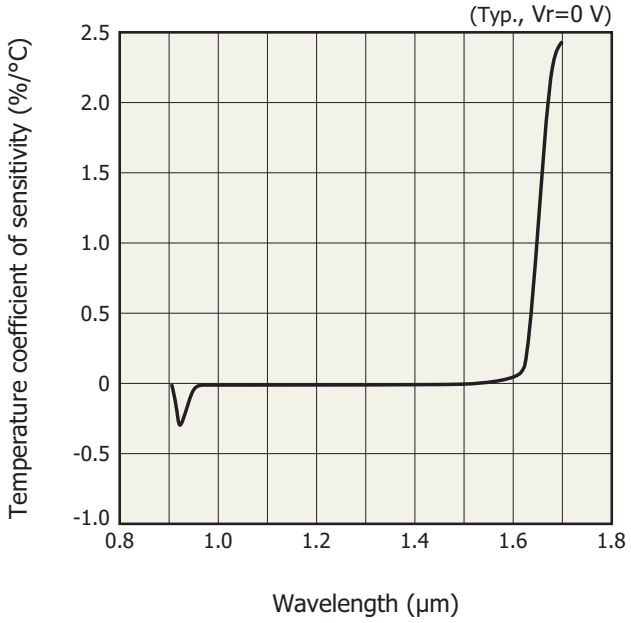
Photosensitivity temperature characteristics



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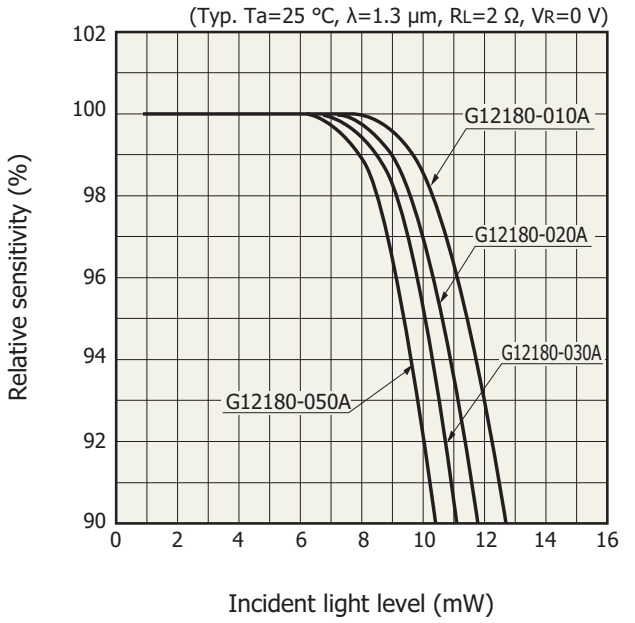
Linearity



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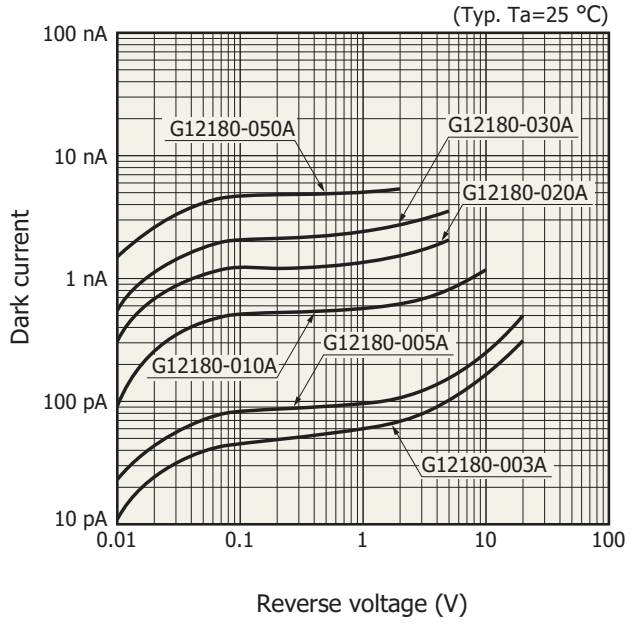
Dark current vs. reverse voltage

Non-cooled type



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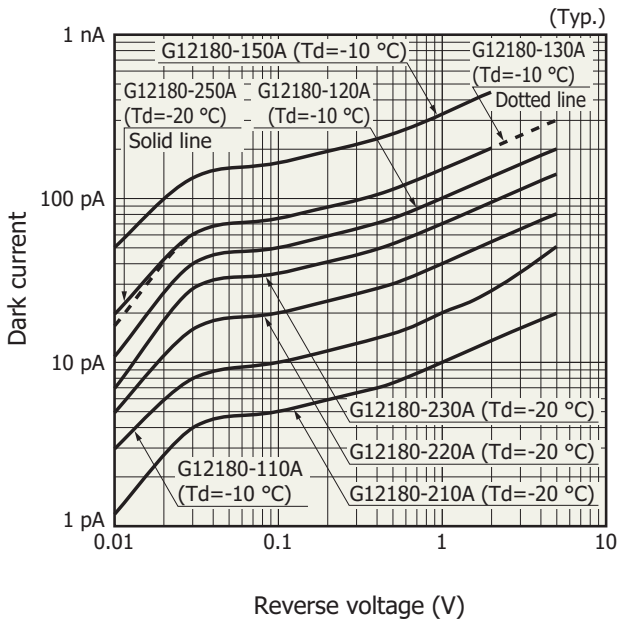
TE-cooled type



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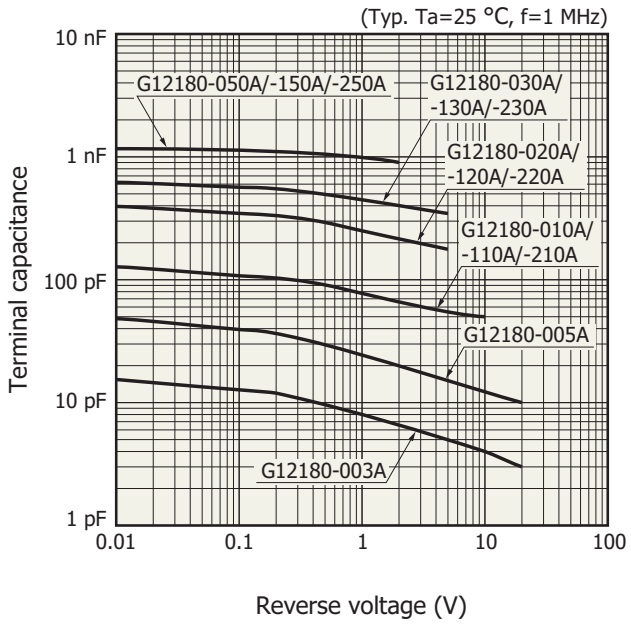
Terminal capacitance vs. reverse voltage



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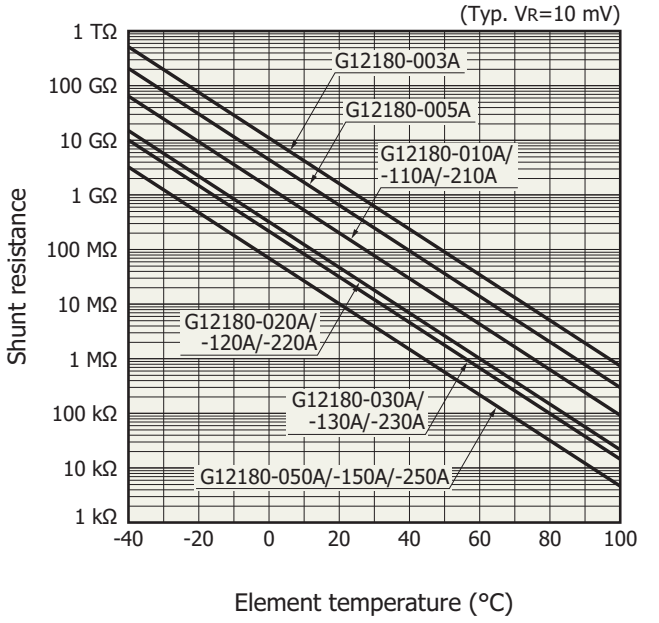
Shunt resistance vs. element temperature



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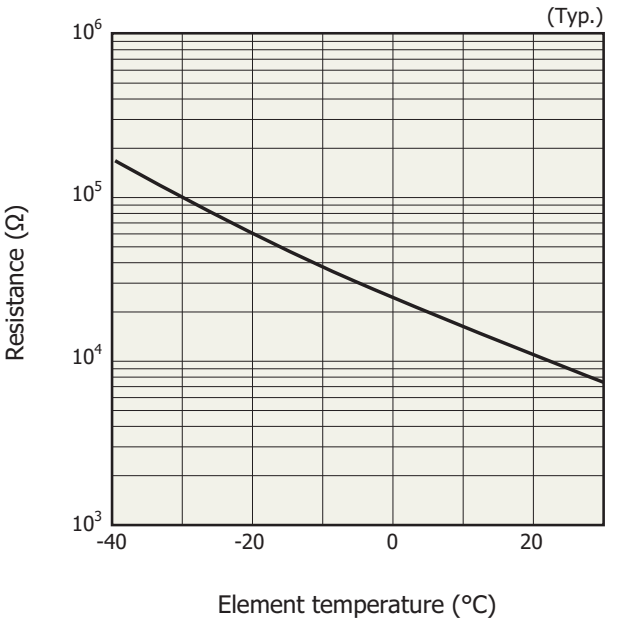
Thermistor temperature characteristics



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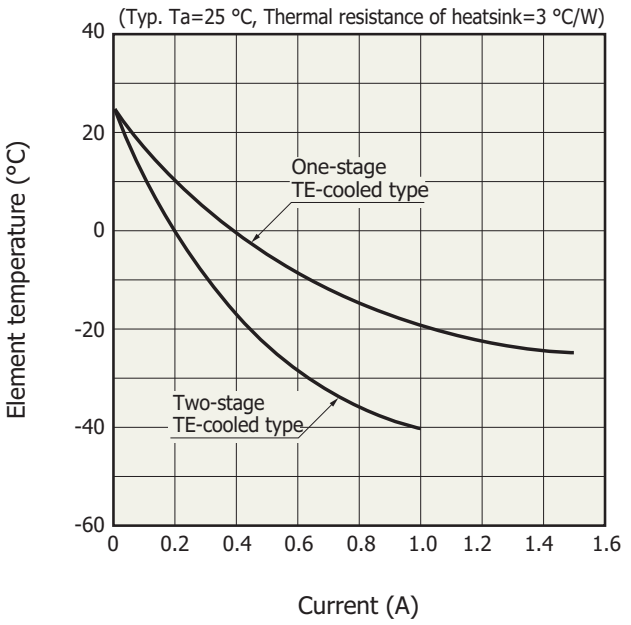
Cooling characteristics of TE-cooler



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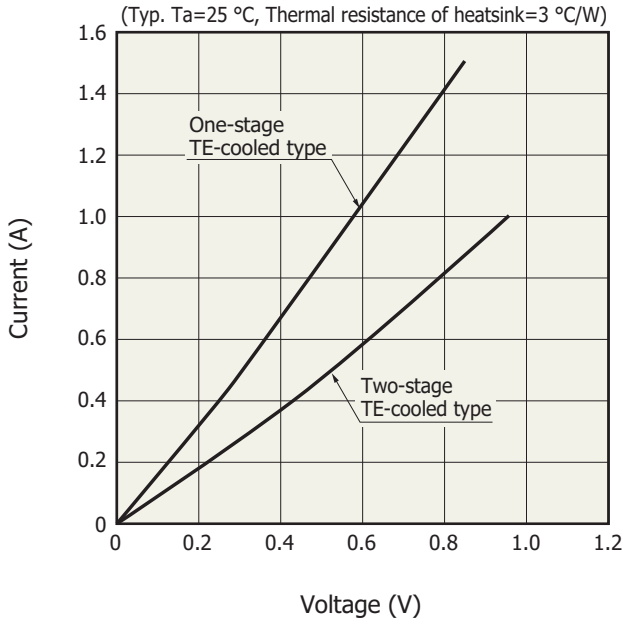
Current vs. voltage (TE-cooler)



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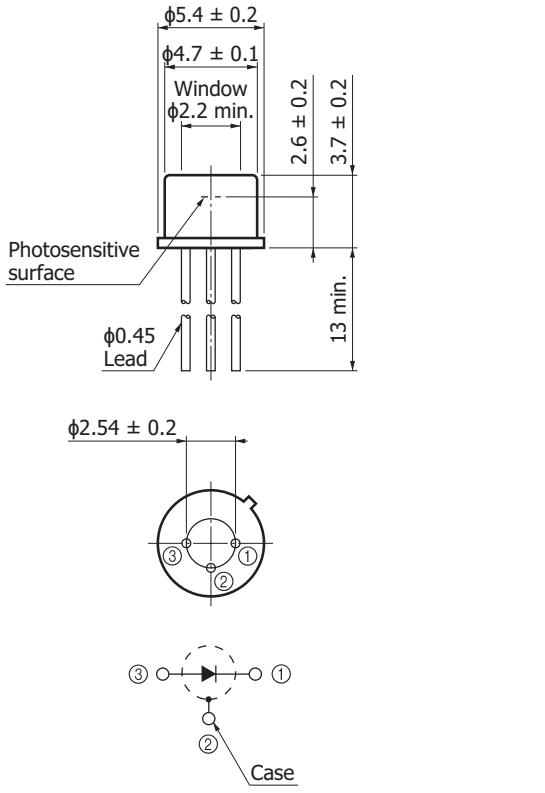
Dimensional outlines (unit: mm)

(1) G12180-003A/-005A/-010A



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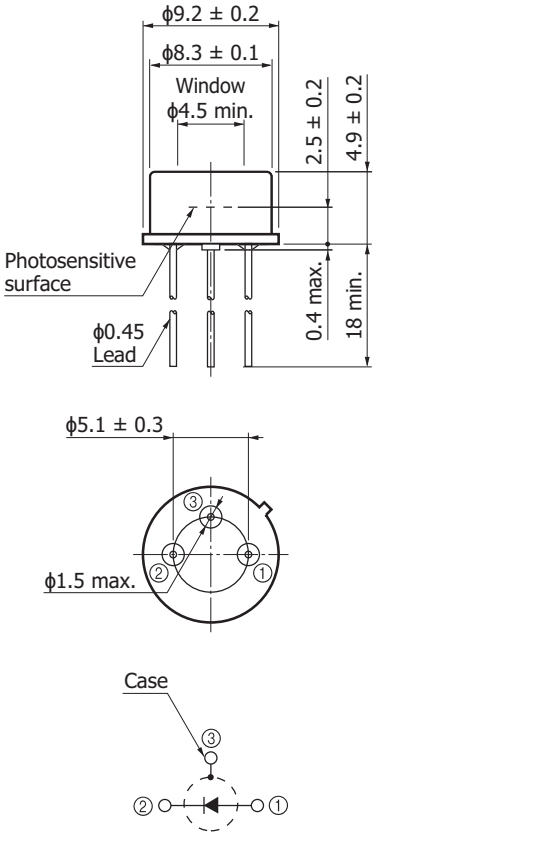
(2) G12180-020A/-030A



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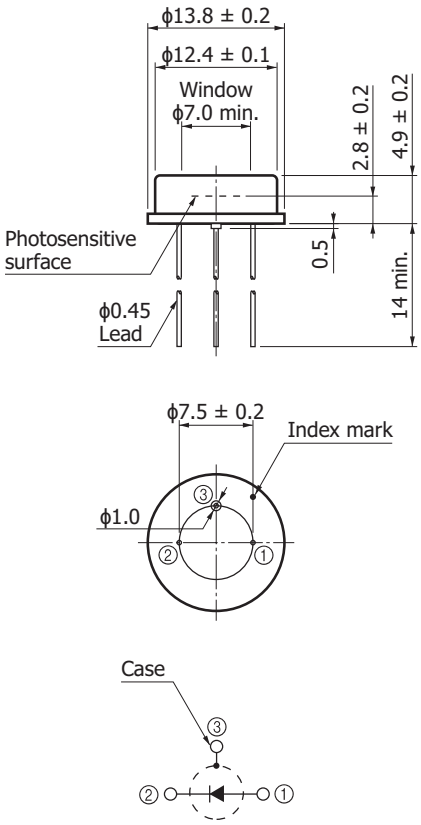
(3) G12180-050A



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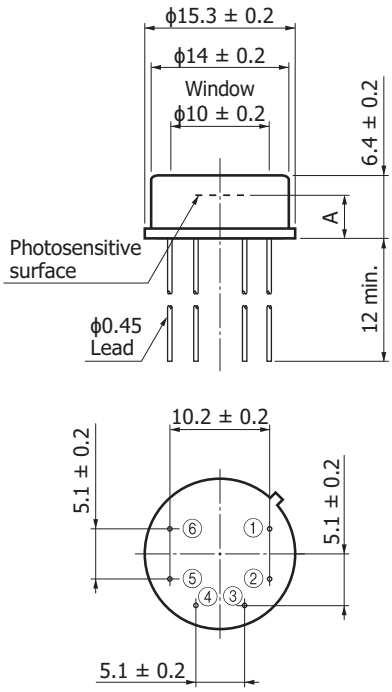
(4) G12180-110A/-120A/-130A/-150A



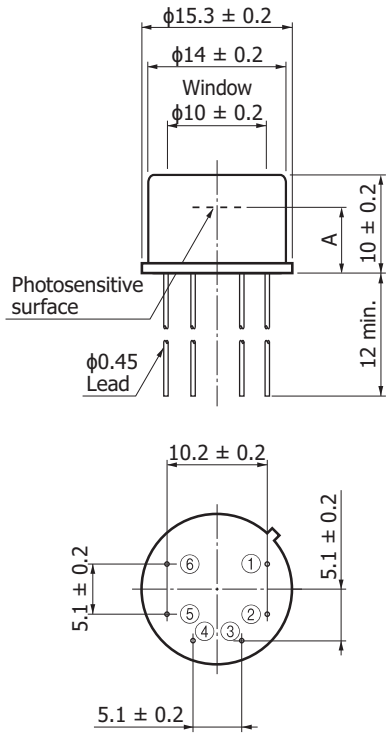
① Detector (anode)
② Detector (cathode)
③ TE-cooler (-)
④ TE-cooler (+)
⑤⑥ Thermistor

Distance from photosensitive area center to cap center
-0.3≤X≤+0.3
-0.3≤Y≤+0.3

	G12180-110A	G12180-120A /-130A/-150A
A	4.3 ± 0.2	4.4 ± 0.2

KIRDA0246EA

(5) G12180-210A/-220A/-230A/-250A



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

Distance from photosensitive area center to cap center
-0.3≤X≤+0.3
-0.3≤Y≤+0.3

	G12180-210A	G12180-220A /-230A/-250A
A	6.6 ± 0.2	6.7 ± 0.2

KIRDA0247EA

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer
· Safety consideration
· Metal, ceramic, plastic package products

HAMAMATSU

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