

InAs photovoltaic detectors



P10090 series
P7163

Low noise, high reliability infrared detectors (for 3 μm band)

InAs photovoltaic detectors have high sensitivity in the infrared region around 3 μm as with PbS photoconductive detectors, and also feature low noise, high speed and high reliability. Various types are available, including non-cooled type, thermoelectrically cooled type (P10090 series), and liquid nitrogen cooled type (P7163) that delivers high performance.

Features

- Low noise
- High detectivity (D*)
- High reliability
- Available in multi-element arrays (custom product)

Applications

- Gas analysis
- Laser detection
- Infrared spectrophotometry
- Radiation thermometer

Options (sold separately)

- Heatsink for one/two-stage TE-cooled type **A3179-01**
- Temperature controller **C1103-04**
- Infrared detector module with preamp **C12492-210**
- Amplifiers for InAs photovoltaic detector
(P10090-01: C4159-07, P10090-11/-21: C4159-06,
P7163: C4159-05)

Structure/Absolute maximum ratings

Type No.	Dimensional outline/ Window material*1	Package	Cooling	Liquid nitrogen hold time (h)	Photosensitive area (mm)	Absolute maximum ratings					
						Thermoelectric cooler allowable current (A)	Thermistor power dissipation (mW)	Reverse voltage VR (V)	Operating temperature Topr (°C)	Storage temperature Tstg (°C)	Maximum incident light level (W)
P10090-01	①/S	TO-5	Non-cooled	-	φ1	-	-	0.5	-40 to +60	-40 to +80	0.6
P10090-11	②/S	TO-8	One-stage TE-cooled			1.5	0.2				
P10090-21			Two-stage TE-cooled			1.0					
P7163	③/S	Metal dewar	LN2	12*2	φ1	-	-			-55 to +60	

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.

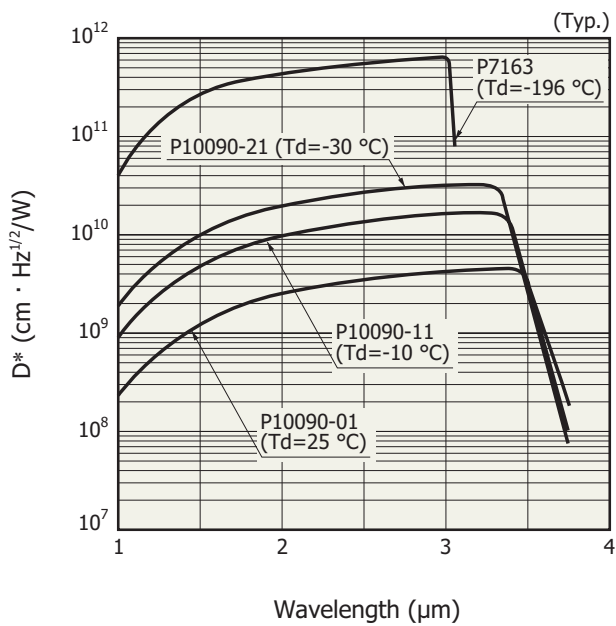
*1: S=Sapphire glass

*2: At the time of shipment

Electrical and optical characteristics (Typ. unless otherwise noted)

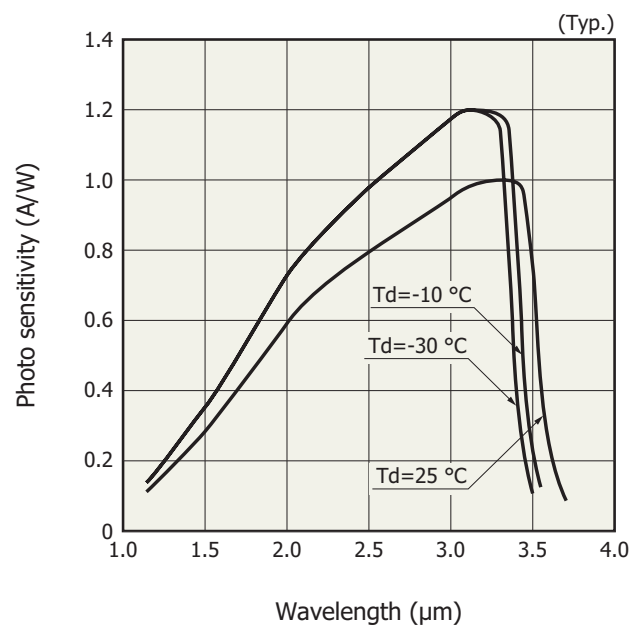
Type no.	Measurement condition Element temperature Td (°C)	Peak sensitivity wavelength λ_p (μm)	Cutoff wavelength λ_c (μm)	Photo sensitivity S $\lambda = \lambda_p$ (A/W)	Shunt resistance Rsh		D* ($\lambda_p, 1200, 1$)		NEP $\lambda = \lambda_p$ (W/Hz ^{1/2})	Rise time tr VR=0 V RL=50 Ω 0 to 63% (μs)
					Min. (Ω)	Typ. (Ω)	Min. (cm · Hz ^{1/2} /W)	Typ. (cm · Hz ^{1/2} /W)		
P10090-01	25	3.35	3.65	1.0	40	70	3.0×10^9	4.5×10^9	1.5×10^{-11}	0.70
P10090-11	-10	3.30	3.55	1.2	250	400	1.0×10^{10}	1.6×10^{10}	5.3×10^{-12}	0.45
P10090-21	-30	3.25	3.45		1000	1300	2.0×10^{10}	3.2×10^{10}	2.8×10^{-12}	0.30
P7163	-196	3.00	3.1	1.3	1×10^5	1×10^6	3.5×10^{11}	6.0×10^{11}	1.5×10^{-13}	0.10

Spectral response (D*)



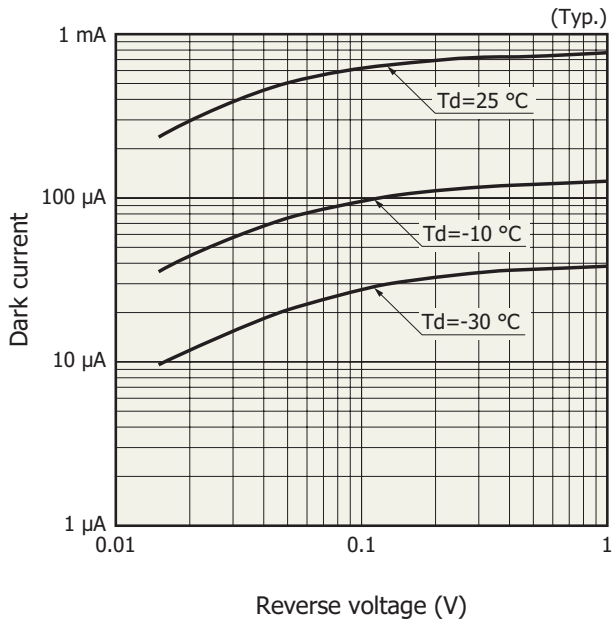
KIRDB0356ED

Spectral response



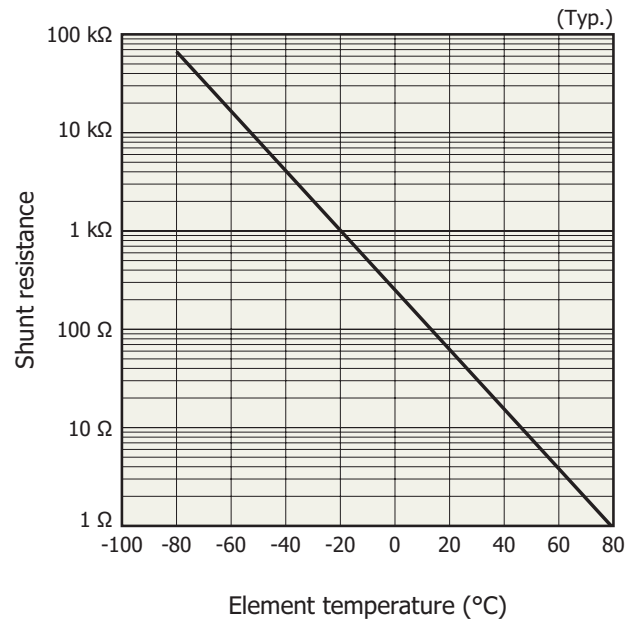
KIRDB0381EB

Dark current vs. reverse voltage



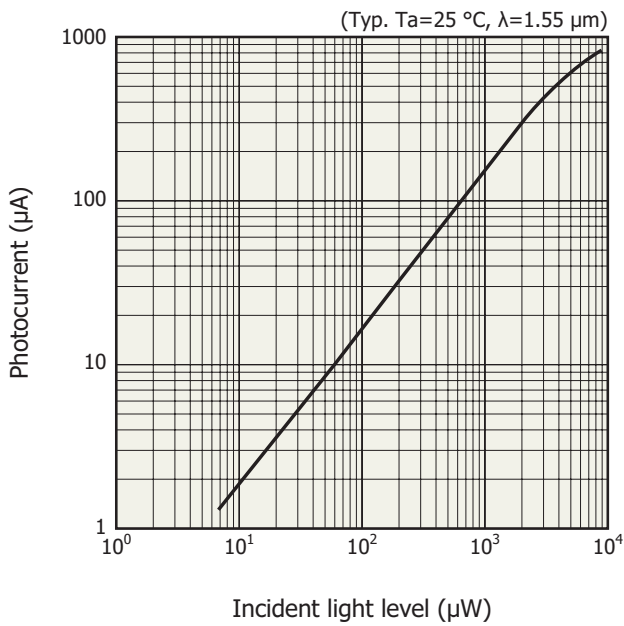
KIRD80382EB

Shunt resistance vs. element temperature (P10090 series)



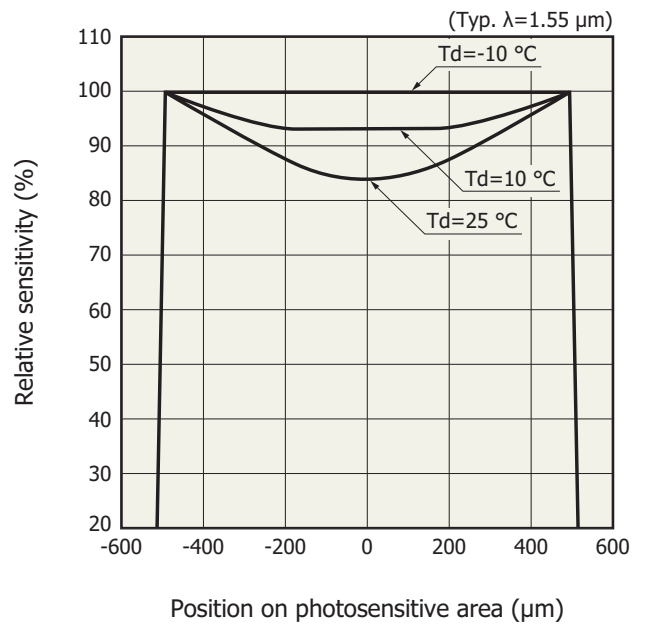
KIRD80383EA

Linearity



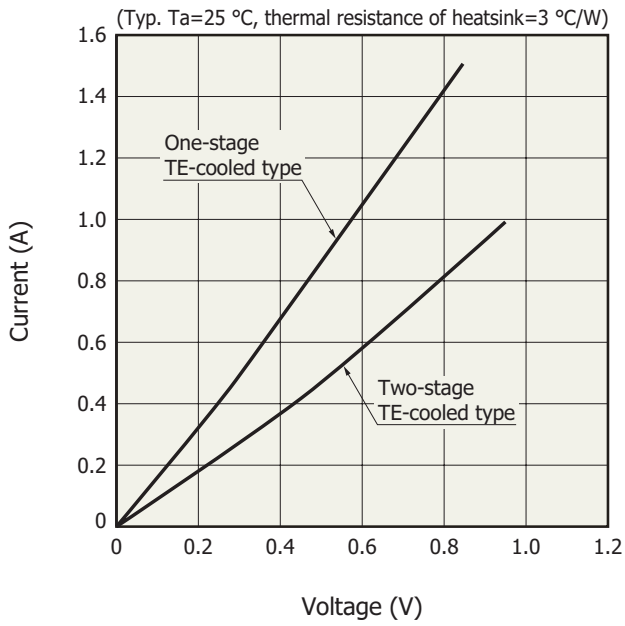
KIRD80384EB

Sensitivity uniformity

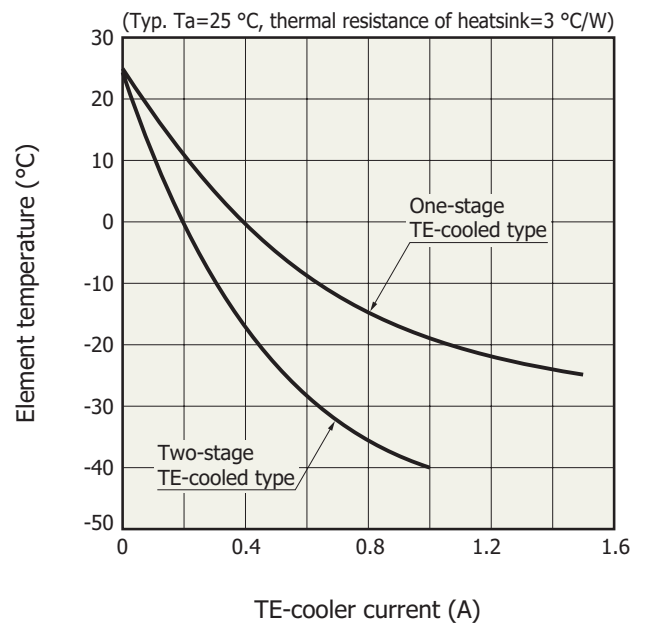


KIRD80385EB

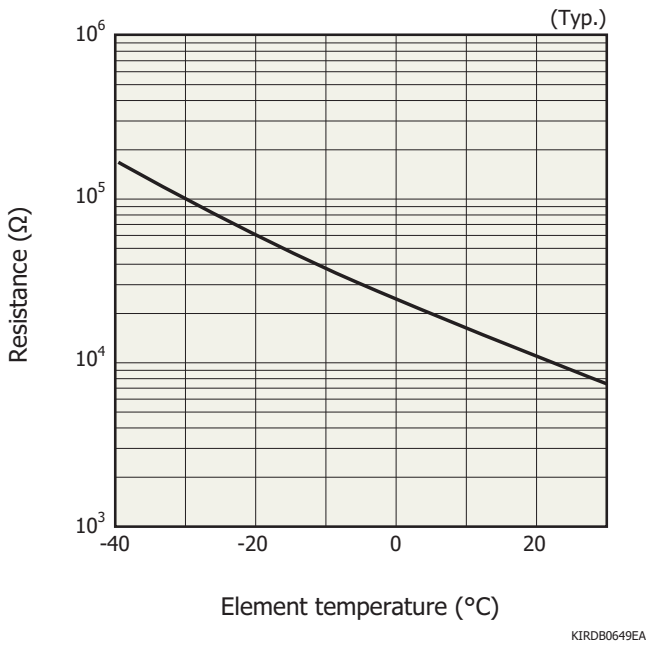
Current vs. voltage of TE-cooled type



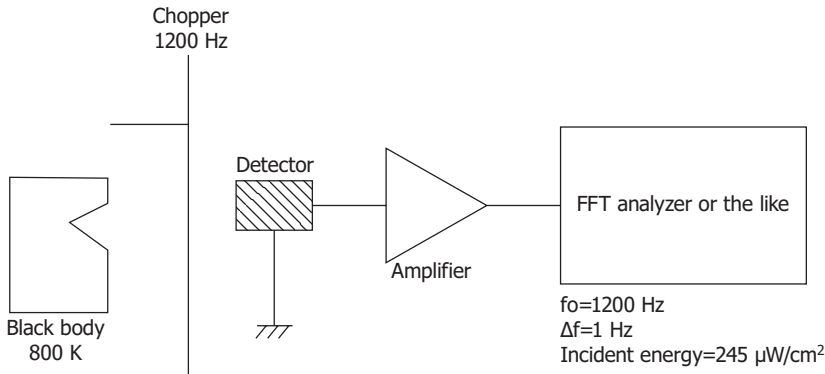
Cooling characteristics of TE-cooled type



Thermistor temperature characteristic



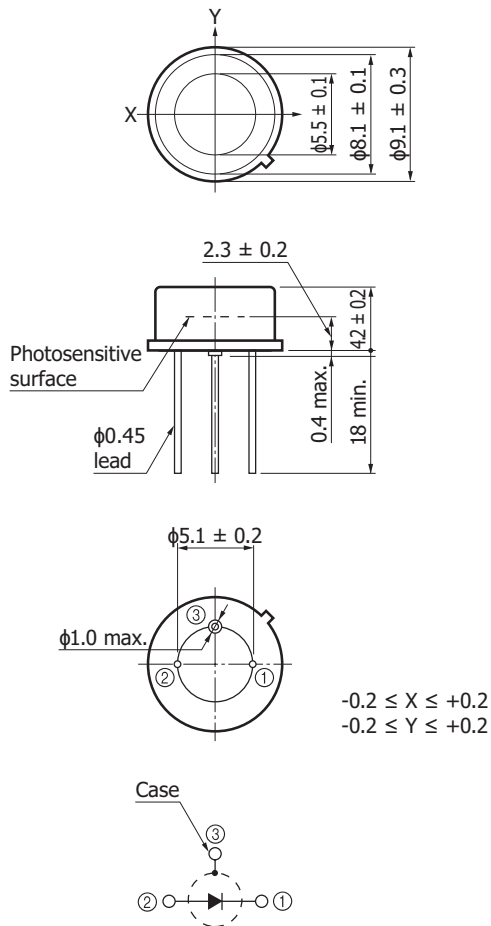
Measurement circuit



KIRDC0125EB

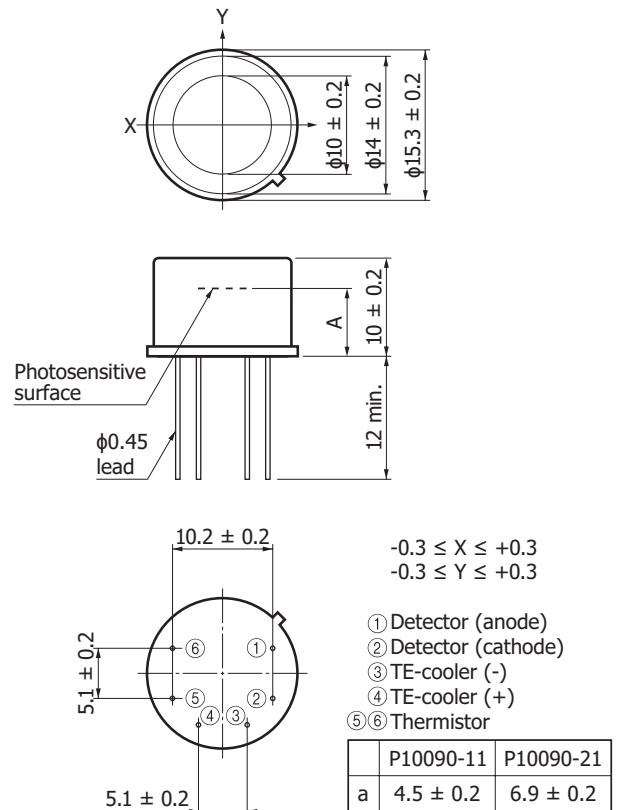
Dimensional outline (unit: mm)

① P10090-01



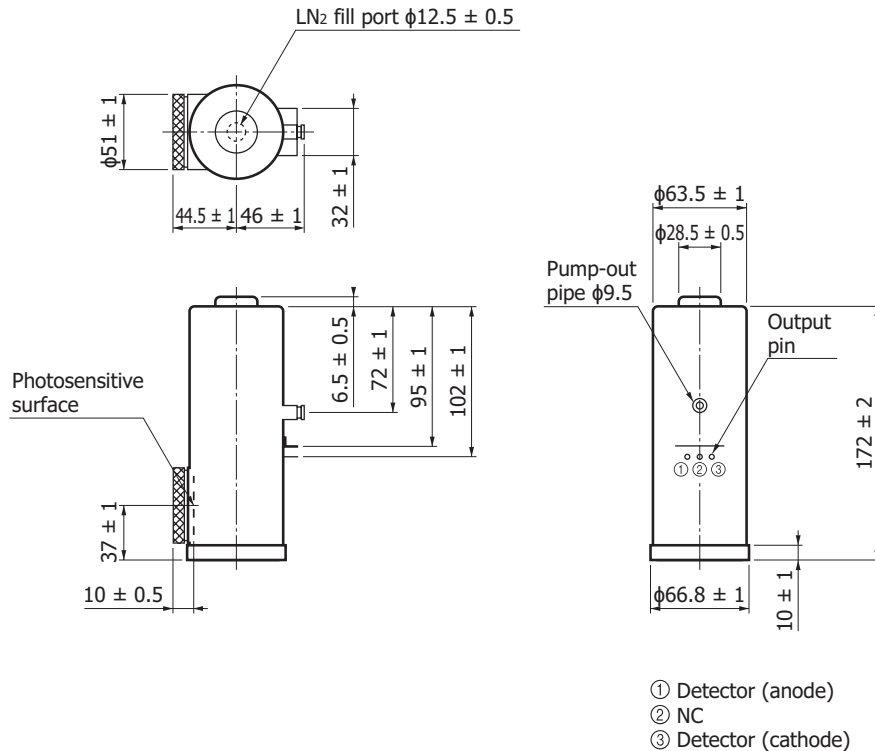
KIRDA0263EA

② P10090-11/-21



KIRDA0264EA

③ P7163



KIRDA0033EE

Related information

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

Precautions

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

Technical information

- Compound semiconductor photosensors / Technical note

Information described in this material is current as of February 2022.

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