

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. P10090 series is a new family of InAs photovoltaic detectors that deliver even lower noise than our conventional products (P8079 series).

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 series: C4159-06, P7163: C4159-05)

Structure/Absolute maximum ratings

Type No.	Dimensional outline/ Window material *1	Package	Cooling	Nitrogen hold time (h)	Photosensitive area (mm)	Absolute maximum ratings					
						Thermoelectric cooler allowable current (A)	Thermistor power dissipation (mW)	Reverse voltage V_R (V)	Operating temperature T_{opr} ($^{\circ}\text{C}$)	Storage temperature T_{stg} ($^{\circ}\text{C}$)	Maximum incident light level (W)
P10090-01	①/S	TO-5	Non-cooled	-	$\phi 1$	-	-	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	LN ₂	12 *2	$\phi 1$	-	-			-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

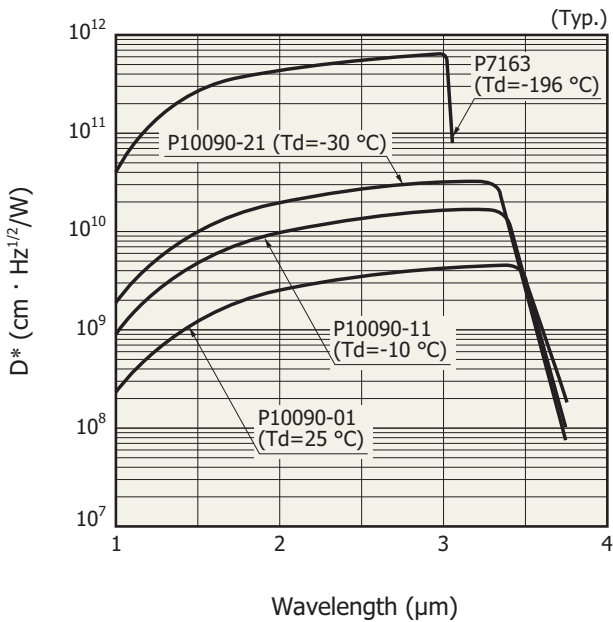
*2: At the time of shipment

Electrical and optical characteristics (Typ. unless otherwise noted)

Type no.	Measurement condition	Peak sensitivity wavelength λ_p (μm)	Cutoff wavelength λ_c (μm)	Photo sensitivity $S_{\lambda=\lambda_p}$ (A/W)	Shunt resistance R_{sh}		D^* ($\lambda_p, 600, 1$)		NEP $\lambda=\lambda_p$ ($\text{W}/\text{Hz}^{1/2}$)	Rise time t_r $V_R=0\text{ V}$ $R_L=50\ \Omega$ 0 to 63% (μs)
	Element temperature T_d				Min. (Ω)	Typ. (Ω)	Min. ($\text{cm} \cdot \text{Hz}^{1/2}/\text{W}$)	Typ. ($\text{cm} \cdot \text{Hz}^{1/2}/\text{W}$)		
	($^{\circ}\text{C}$)									
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	$3.5 \times 10^{11} *3$	$6.0 \times 10^{11} *3$	1.5×10^{-13}	0.10

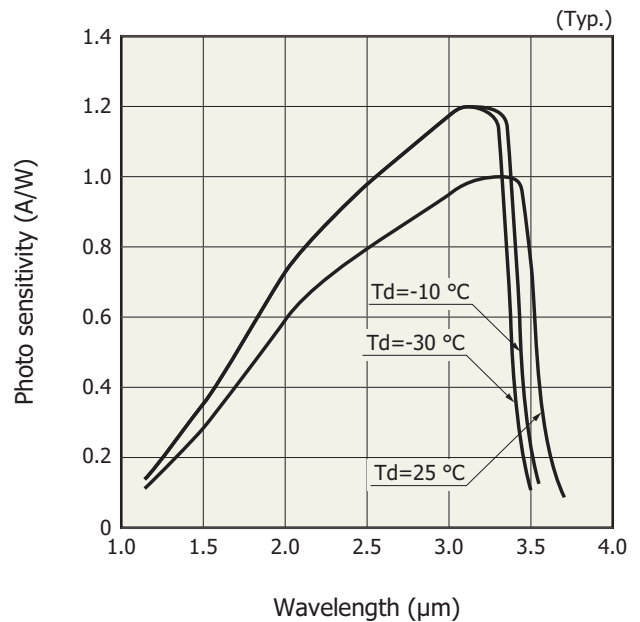
3: D^ ($\lambda_p, 1200, 1$)

Spectral response (D^*)



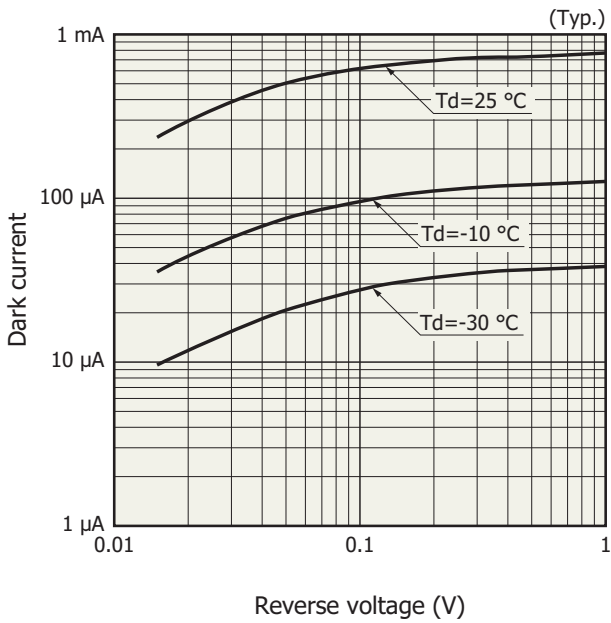
KIRDB0356ED

Spectral response



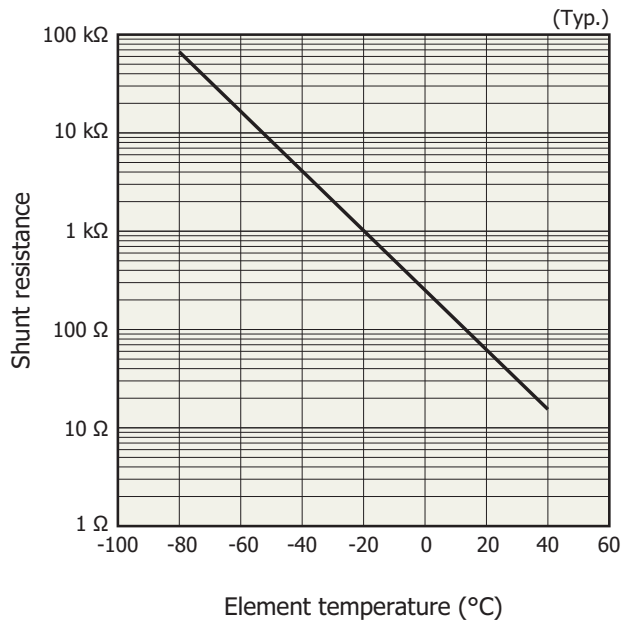
KIRDB0381EB

Dark current vs. reverse voltage



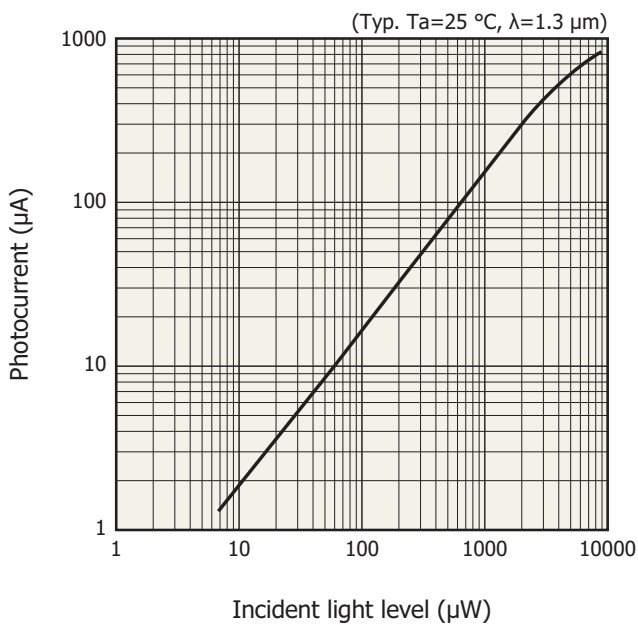
KIRDB0382EB

Shunt resistance vs. element temperature (P10090 series)



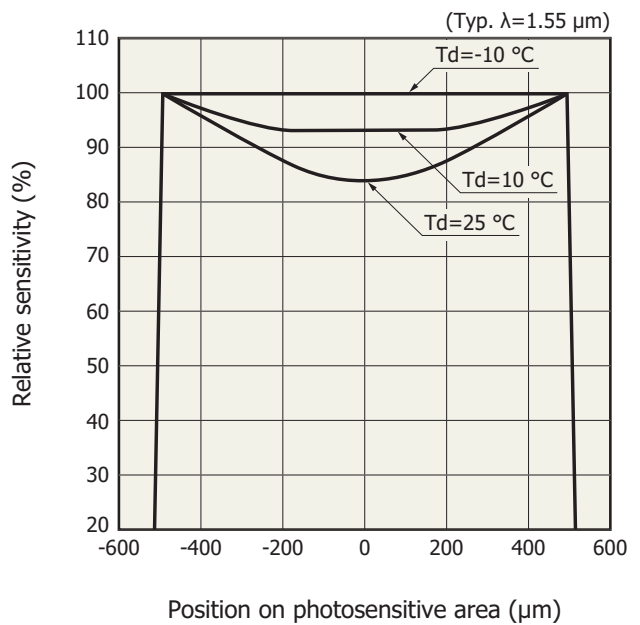
KIRDB0383EA

Linearity



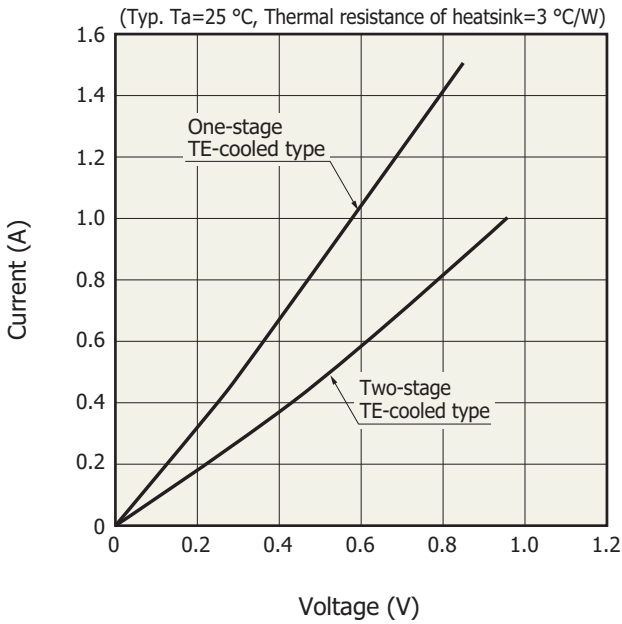
KIRDB0384EB

Sensitivity uniformity



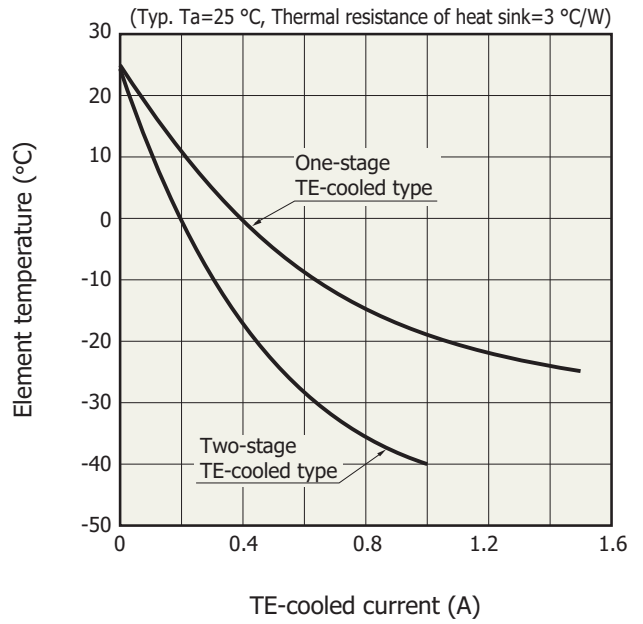
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Current vs. voltage of TE-cooled type



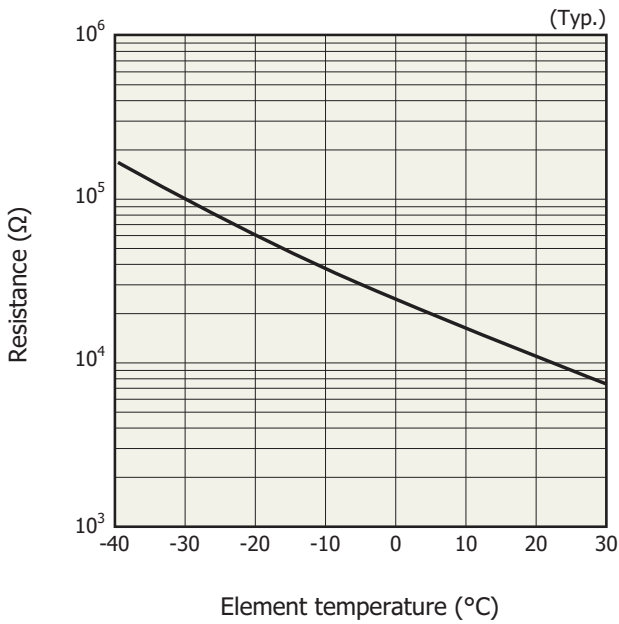
KIRDB0115EB

Cooling characteristics of TE-cooled type



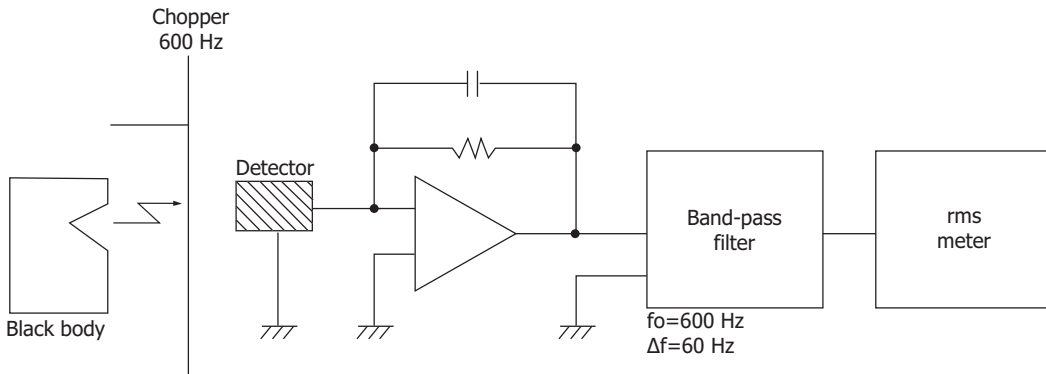
KIRDB0181EA

Thermistor temperature characteristic



KIRDB0116EA

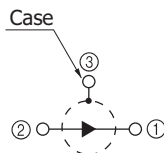
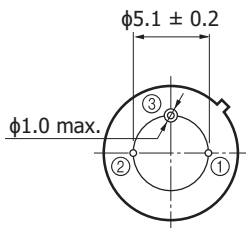
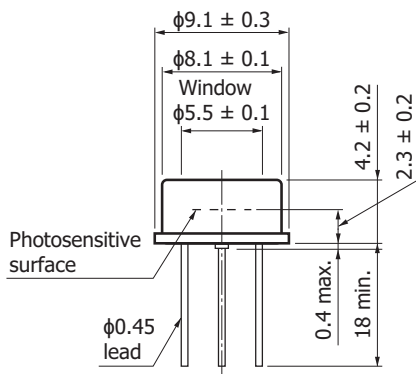
Measurement circuit



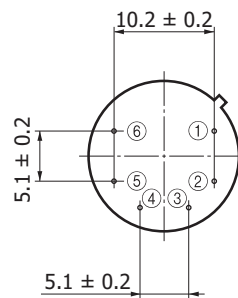
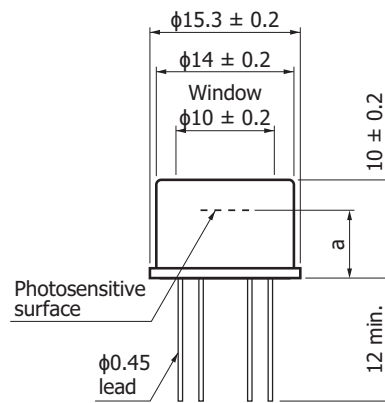
KIRDC0075EA

Dimensional outline (unit: mm)

① P10090-01



② P10090-11/-21



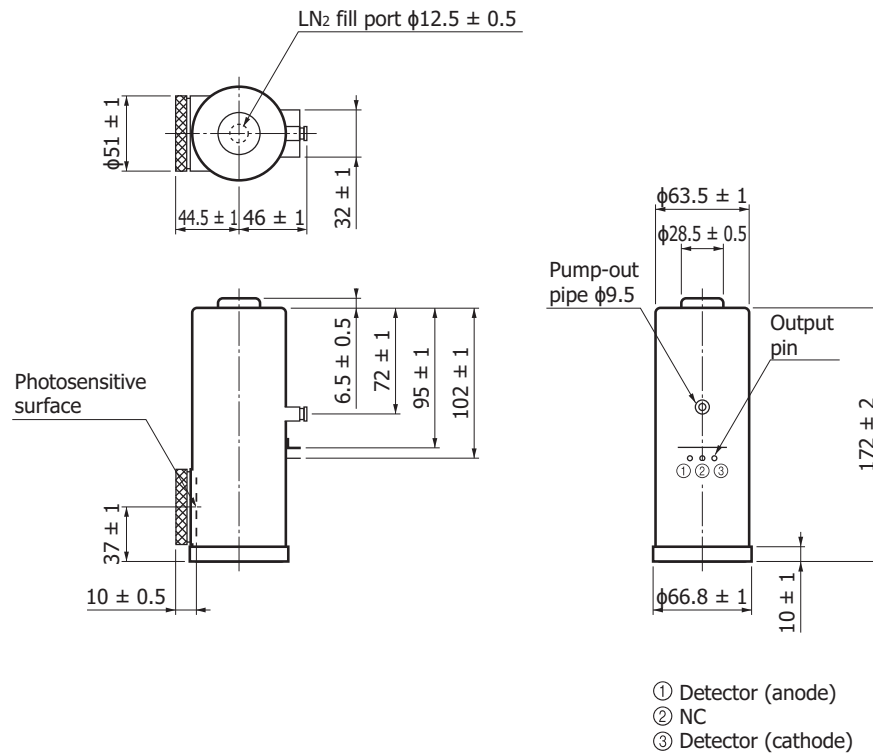
- ① Detector (anode)
- ② Detector (cathode)
- ③ TE-cooler (-)
- ④ TE-cooler (+)
- ⑤ ⑥ Thermistor

	P10090-11	P10090-21
a	4.5 ± 0.2	6.9 ± 0.2

KIRDA0191EA

KIRDA0219EA

③ P7163



KIRDA0033EE

Related information

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

Precautions

- Notice
- Metal, Ceramic, Plastic products

Technical information

- Infrared detector / technical information

Information described in this material is current as of August, 2014.

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.

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.

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