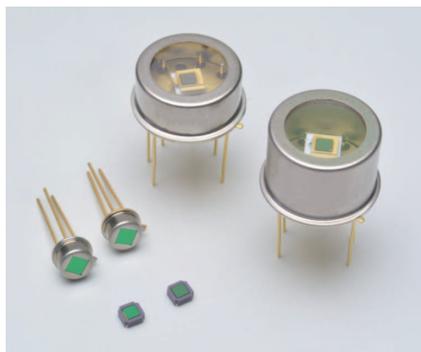


InAsSb photovoltaic detectors

P13243 series



High-speed response and high sensitivity in the spectral band up to 5 μm Infrared detectors

The P13243 series are photovoltaic type infrared detectors that have achieved high sensitivity in the spectral band up to 5 μm using Hamamatsu original crystal growth technology and process technology. The room temperature operation type offering easy handling includes the surface mount ceramic type which supports lead free reflow soldering. This type enables support for automation of mounting and a reduced mounting area achieved through miniaturization. The lineup also includes the TE-cooled type, which deliver stable high S/N measurement through their large photosensitive area.

Features

- High sensitivity
- High-speed response
- High shunt resistance
- Small size ceramic package for surface mount (P13243-013CA)
- Applicable to lead-free solder reflow (P13243-013CA)
- Thermoelectrically cooled type (P13243-122MS/-222MS)

Applications

- Gas detection (CH₄, CO₂, CO, etc.)
- Radiation thermometer
- Flame detection

Option (sold separately)

- Heatsink for one-stage TE-cooled type **A3179**
- Heatsink for two-stage TE-cooled type **A3179-01**
- Temperature controller **C1103-04**
- Amplifier for infrared detector **C4159-01**

Structure

Typ no.	Dimensional outline/ Windsow material	Package	Cooling	Photosensitive area (mm)	Field of view (degrees)
P13243-011MA	①/Si with AR coating	TO-46	-	0.7 × 0.7	82
P13243-013CA	②/Si with AR coating	Ceramic	-		102
P13243-122MS	③/Sapphire	TO-8	One-stage TE-cooled	2 × 2	134
P13243-222MS	④/Sapphire		Two-stage TE-cooled		116

Absolute maximum rating

Typ no.	TE-cooler allowable current (A)	Thermistor power dissipation (mW)	Reverse voltage V _R (V)	Operationg temperature T _{opr} (°C)	Storage temperature T _{stg} (°C)	Incident light level (W/cm ²)	Soldering conditions
P13243-011MA	-	-	1	-40 to +85	-40 to +85	1	260 °C or less, within 10 s
P13243-013CA	-	-					Peak temperature 240 °C max*1
P13243-122MS	1.5	0.2		-40 to +60	-40 to +60		260 °C or less, within 10 s
P13243-222MS	1.0						260 °C or less, within 10 s

*1: Refer to P7. JEDEC level 2

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

Electrical and optical characteristics (Ta=25 °C)

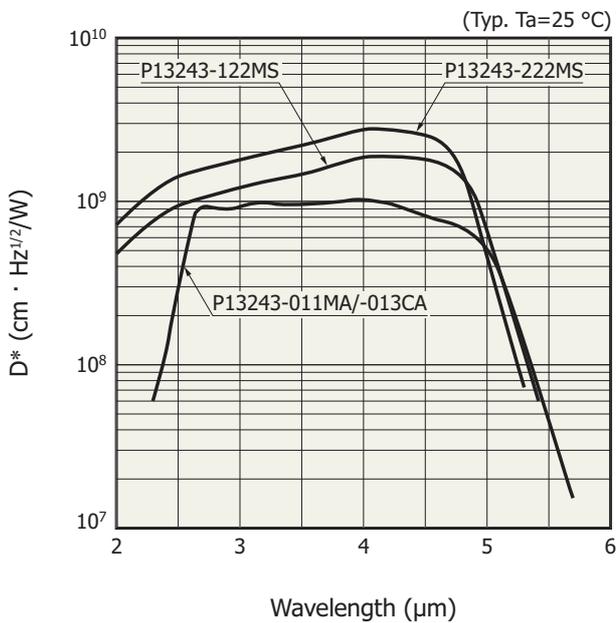
Typ no.	Measurement condition	Peak sensitivity wavelength λ_p (μm)	Cutoff wavelength λ_c (μm)	Photosensitivity S $\lambda=\lambda_p^{*2}$		Shunt resistance Rsh		Detectivity D* ($\lambda_p, 1200, 1$)		Noise equivalent power NEP $\lambda=\lambda_p$		Rise time t_r^{*3} (ns)
	Chip temperature ($^{\circ}\text{C}$)			(mA/W)	(V/W)	Min. (k Ω)	Typ. (k Ω)	Min. (cm \cdot Hz $^{1/2}$ /W)	Typ. (cm \cdot Hz $^{1/2}$ /W)	Typ. (W/Hz $^{1/2}$)	Max. (W/Hz $^{1/2}$)	
P13243-011MA P13243-013CA	25	4.1	5.3	4.5	1300	120	300	8.0×10^8	1.0×10^9	7.0×10^{-11}	8.8×10^{-11}	6
P13243-122MS	-10		5.2	8.6	50	9.5	19	1.0×10^9	1.9×10^9	1.0×10^{-10}	2.0×10^{-10}	100
P13243-222MS	-30		5.1	8.8	51	16.5	33	1.6×10^9	2.8×10^9	0.7×10^{-10}	1.3×10^{-10}	

*2: Uniform irradiation on the entire photosensitive area

*3: $V_R=0$ V, $R_L=50$ Ω , 10 to 90%, $\lambda=1.55$ μm

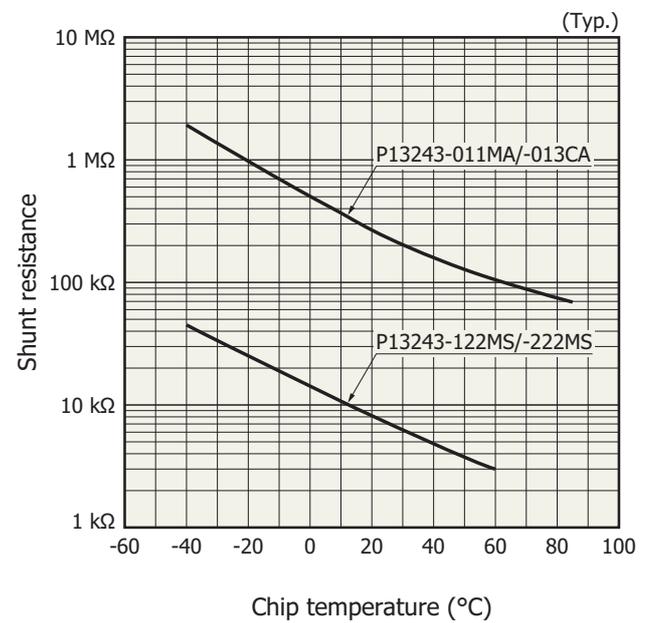
Note: Uniform irradiation must be applied to the entire photosensitive area.

Spectral response (D*)



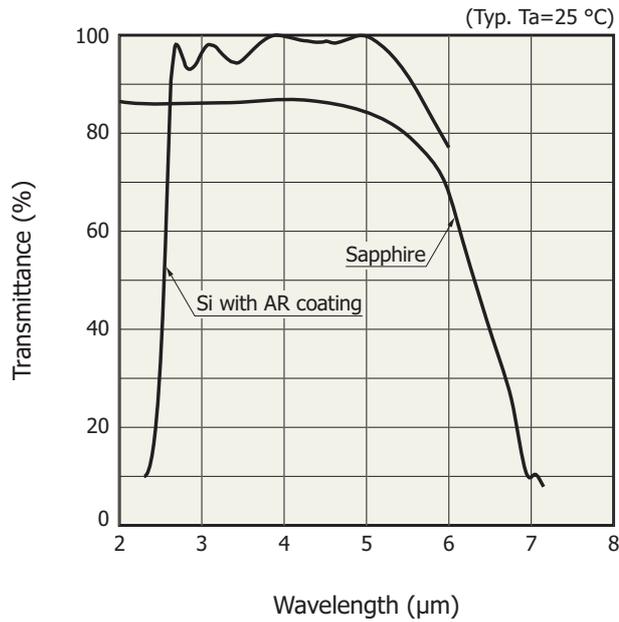
KIRD0658EA

Shunt resistance vs. chip temperature



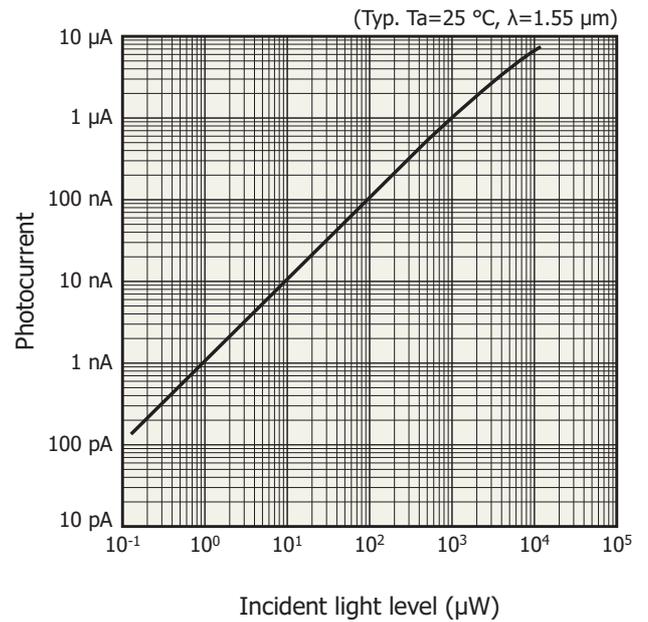
KIRD0659EA

Spectral transmittance characteristics of window materials



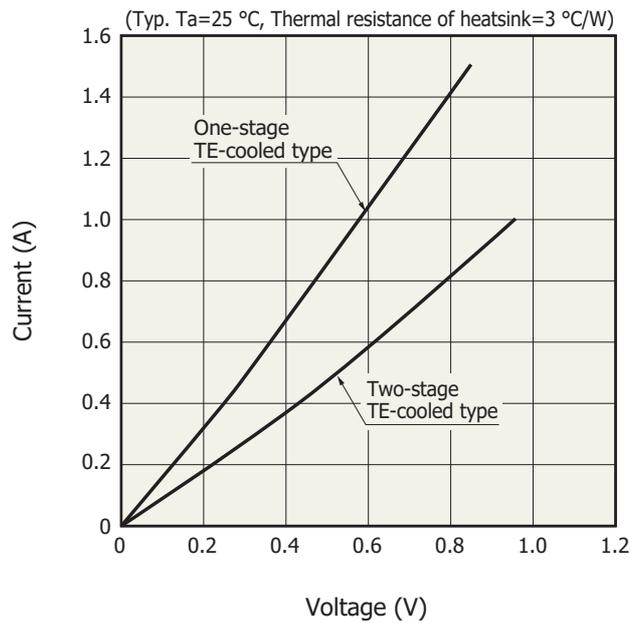
KIRDB0660EA

Linearity



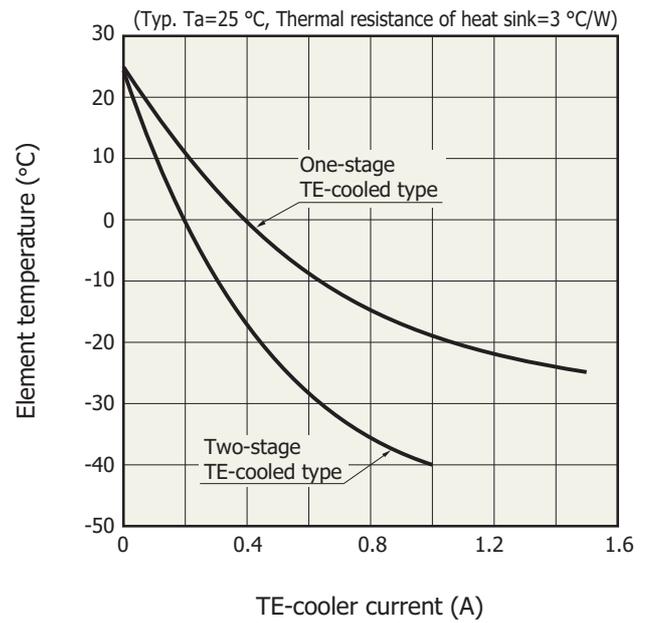
KIRDB0615EA

Current vs. voltage characteristics of TE-cooler



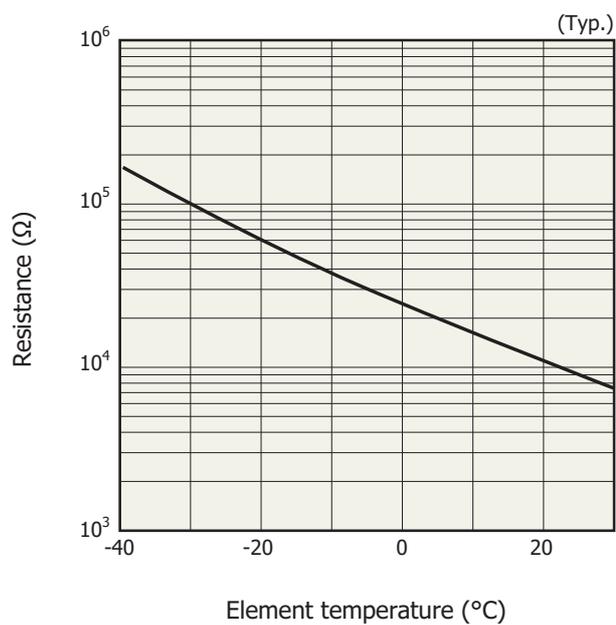
KIRDB0115EB

Cooling characteristics of TE-cooler



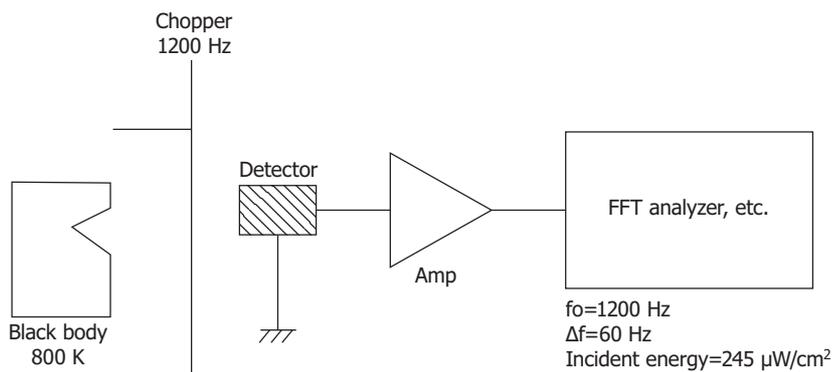
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Thermistor temperature characteristics



KIRD0649EA

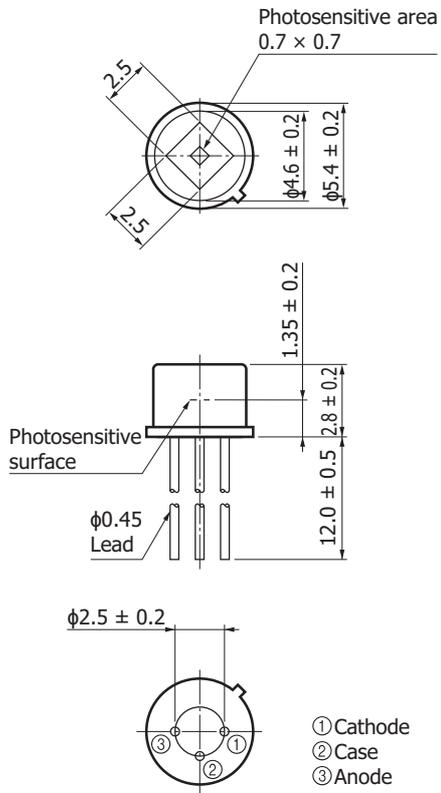
Measurement circuit example



KIRDC0125EA

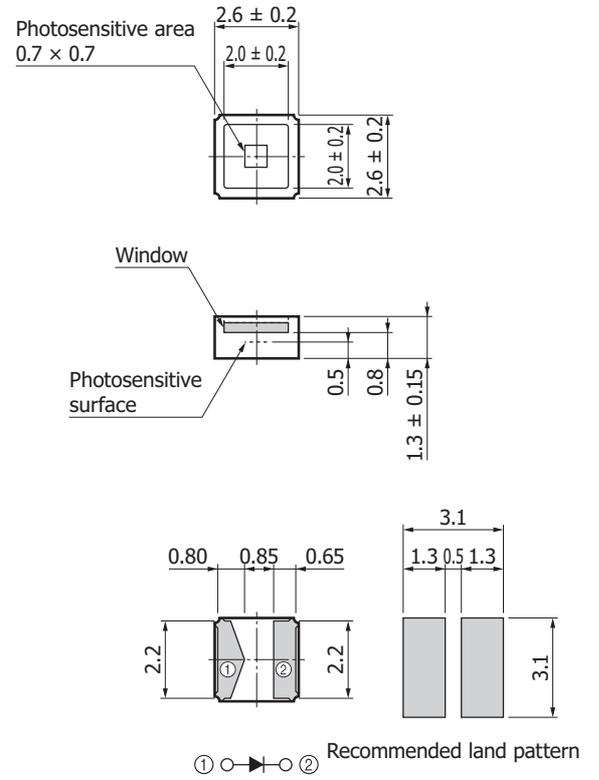
Dimensional outlines (unit: mm)

P13243-011MA



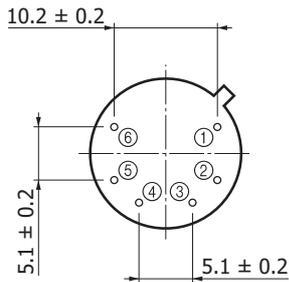
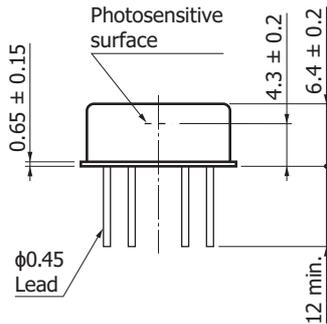
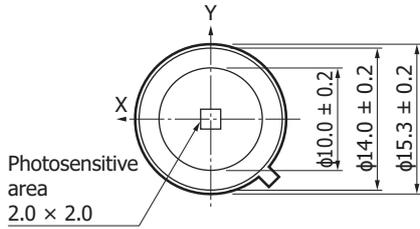
KIRDA0249EC

P13243-013CA



KIRDA0259EB

P13243-122MS

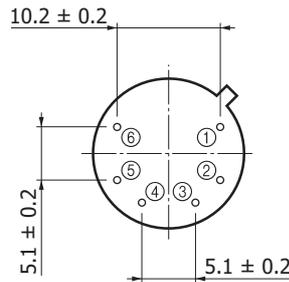
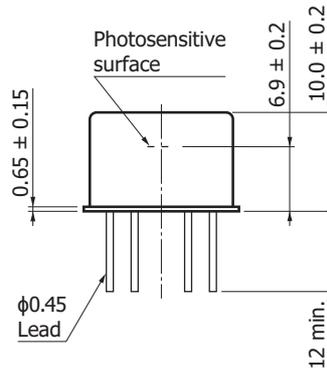
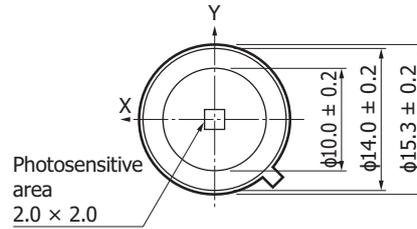


Distance from photosensitive area center to cap center
 $-0.3 \leq X \leq +0.3$
 $-0.3 \leq Y \leq +0.3$

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

KIRDA0260EC

P13243-222MS

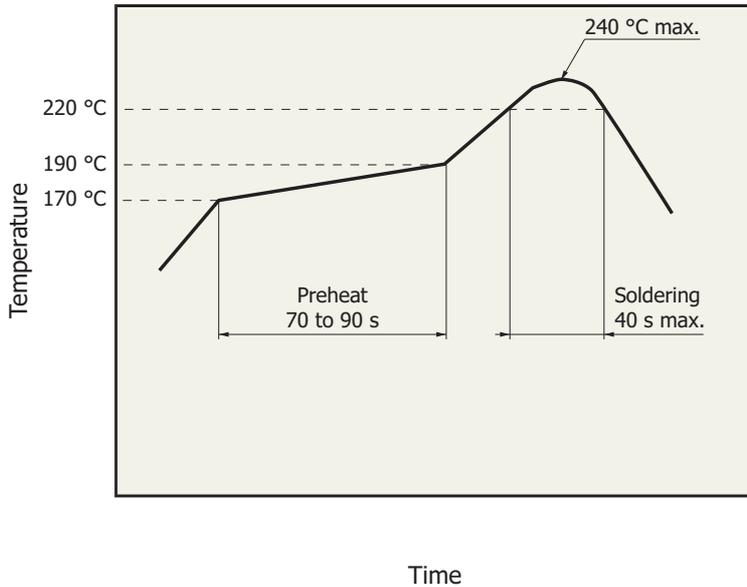


Distance from photosensitive area center to cap center
 $-0.3 \leq X \leq +0.3$
 $-0.3 \leq Y \leq +0.3$

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

KIRDA0261EC

Recommended temperature profile for reflow soldering (P13243-013CA)



KIRD0616EA

- After unpacking, store the device in an environment at a temperature range of 5 to 30 °C and a humidity of 60% or less, and perform reflow soldering with 1 year.
- The effect that the product is subject to during reflow soldering varies depending on the circuit board and reflow furnace that are used.
- When setting the reflow 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

- Precautions
- Disclaimer

Information described in this material is current as of October 2018.

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. Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

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