

InAsSb photovoltaic detectors



P13243 series

High sensitivity, high-speed response infrared detectors with large photosensitive area (up to 5 μm band)

The P13243 series are photovoltaic type detectors that have high sensitivity in the spectral band up to 5 μm band. These products are environmentally friendly as they do not use lead, mercury, or cadmium which are substances restricted by the RoHS Directive. Therefore, they are replacements for previous products that contain these substances. The easily handled non-cooled type and the TE-cooled type capable of stable high S/N measurement are available.

Features

- High sensitivity
- High-speed response
- High shunt resistance
- RoHS compliant (lead, mercury, cadmium free)

Applications

- Gas detection (CH₄, CO₂, CO, etc.)
- Radiation thermometers
- Flame detection (CO₂ resonance radiation)

Options (sold separately)

- 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**
- Amplifier for infrared detector **C4159-01**

Structure

Type no.	Photosensitive area (mm)	Package	Window material	Cooling	Field of view FOV (degrees)
P13243-022MS	2 × 2	TO-5	Sapphire	Non-cooled	97
P13243-122MS		TO-8		One-stage TE-cooled	134
P13243-222MS				Two-stage TE-cooled	113

Absolute maximum ratings

Type no.	TE-cooler allowable current (A)	Thermistor power dissipation (mW)	Reverse voltage V _R (V)	Operating temperature T _{opr} ^{*1} (°C)	Storage temperature T _{stg} ^{*1} (°C)	Incident light level Pin (W/mm ²)
P13243-022MS	-	-	1	-40 to +85	-40 to +85	1
P13243-122MS	1.5	0.2		-40 to +60	-40 to +60	
P13243-222MS	1.0					

*1: No dew condensation

When there is a temperature difference between a product and the surrounding area in high humidity environments, 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.

Electrical and optical characteristics (Typ. Ta=25 °C, unless otherwise noted)

Type no.	Chip temperature Tchip (°C)	Peak sensitivity wavelength λp (μm)	Cutoff wavelength λc (μm)	Photosensitivity S*2 λ=λp (mA/W)	Shunt resistance Rsh VR=10mV (kΩ)	Detectivity D* (λp, 1200, 1)		Noise equivalent power NEP λ=λp		Rise time tr*3 (ns)	Terminal capacitance Ct*4 (pF)
						Min. (cm·Hz ^{1/2} /W)	Typ. (cm·Hz ^{1/2} /W)	Typ. (W/Hz ^{1/2})	Max. (W/Hz ^{1/2})		
P13243-022MS	25	4.1	5.3	8.0	7	8.0 × 10 ⁸	1.0 × 10 ⁹	2.0 × 10 ⁻¹⁰	2.5 × 10 ⁻¹⁰	100	20
P13243-122MS	-10		5.2	8.6	19	1.0 × 10 ⁹	1.9 × 10 ⁹	1.0 × 10 ⁻¹⁰	2.0 × 10 ⁻¹⁰		
P13243-222MS	-30		5.1	8.8	33	1.6 × 10 ⁹	2.8 × 10 ⁹	0.7 × 10 ⁻¹⁰	1.3 × 10 ⁻¹⁰		

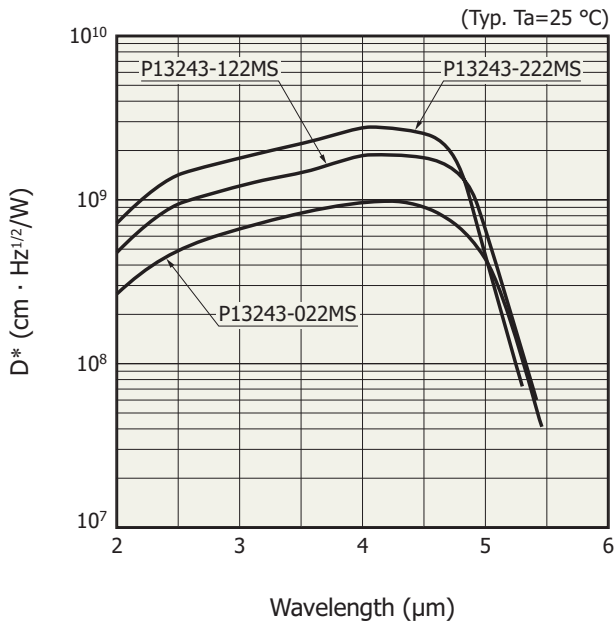
*2: Uniform irradiation on the entire photosensitive area

*3: VR=0 V, RL=50 Ω, 10 to 90%, λ=1.55 μm

*4: VR=0 V, f=1 MHz

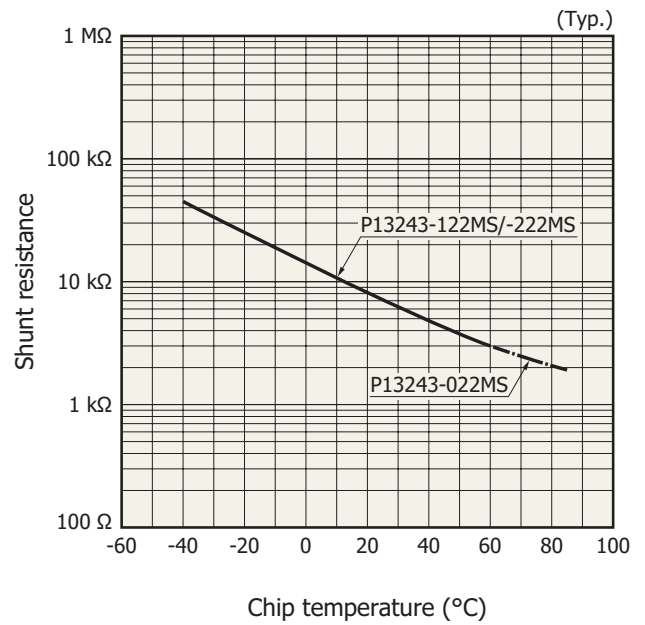
Note: Uniform irradiation must be applied to the entire photosensitive area during use.

Spectral response (D*)



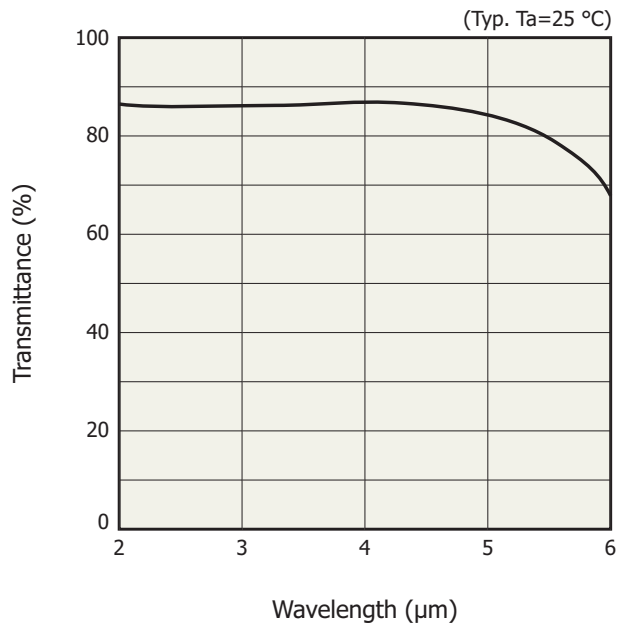
KIRD0658EE

Shunt resistance vs. chip temperature



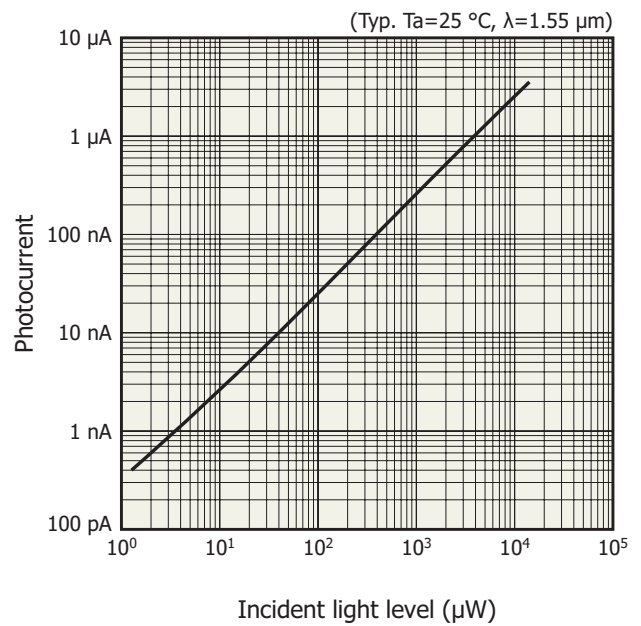
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Spectral transmittance of window materials



KIRDB0660EC

Linearity

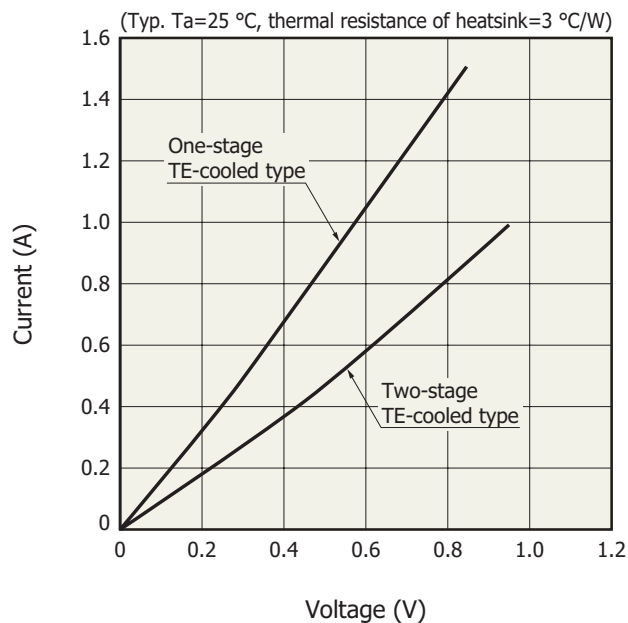


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TE-cooler specifications (Ta=25 °C, unless otherwise noted)

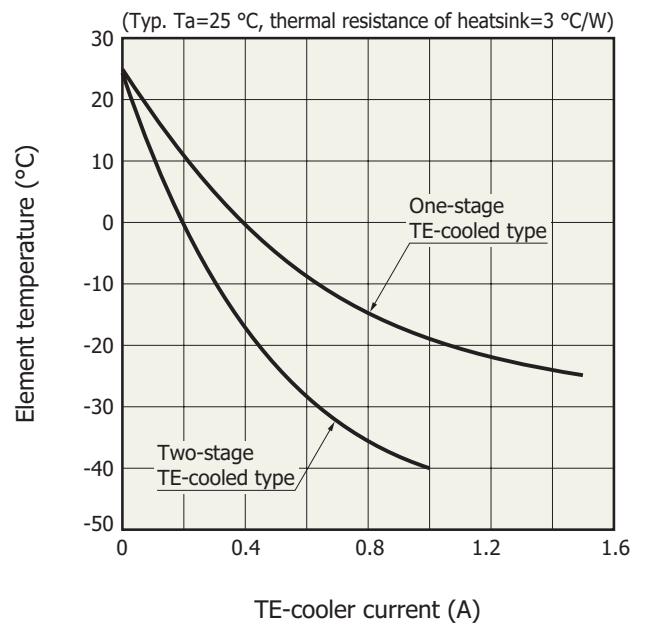
Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
TE-cooler allowable current	One-stage TE-cooled	Ic max	-	-	1.5	A
	Two-stage TE-cooled		-	-	1.0	
TE-cooler allowable voltage	One-stage TE-cooled	Vc max	-	-	1.0	V
	Two-stage TE-cooled		-	-	1.2	
Thermistor resistance		Rth	8.1	9.0	9.9	kΩ
Thermistor B constant	T ₁ =25 °C, T ₂ =-30 °C	B	-	3298	-	K
Thermistor power dissipation		Pth	-	-	0.2	mW

Current vs. voltage characteristics of TE-cooler



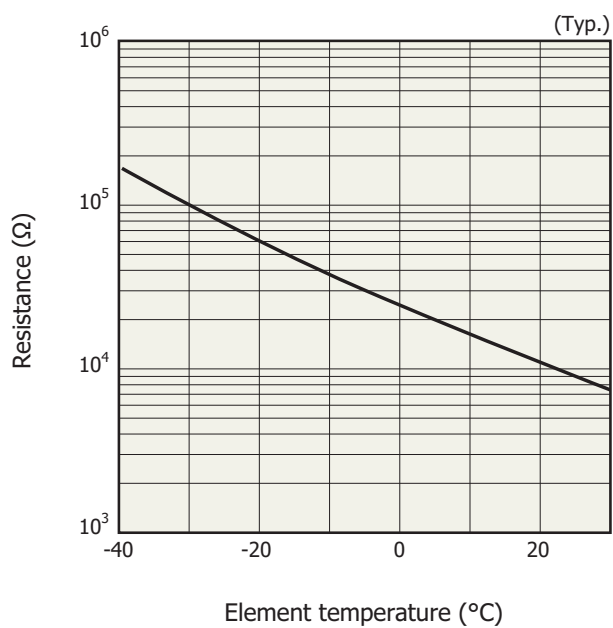
KIRDB0115EB

Cooling characteristics of TE-cooler



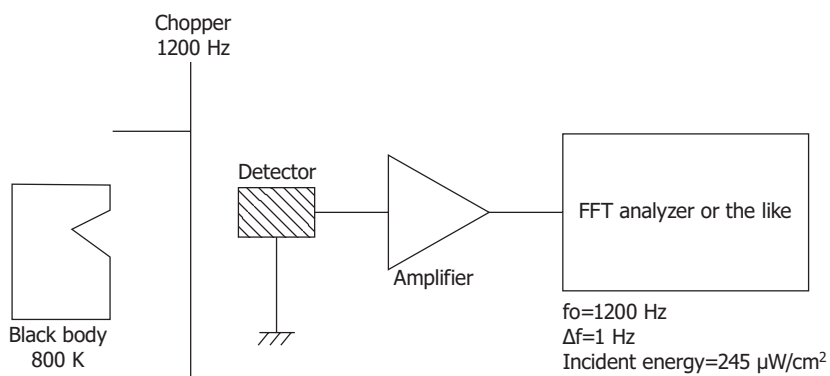
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Thermistor temperature characteristics



KIRDB0116EA

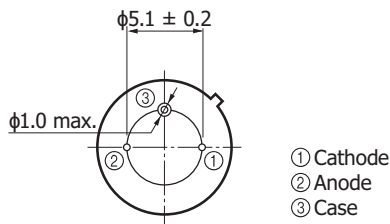
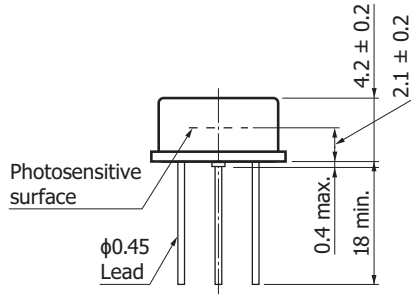
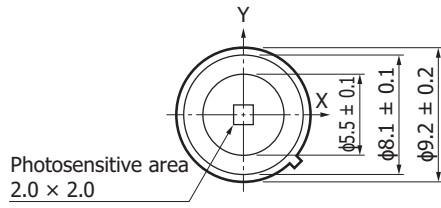
Block diagram for characteristic measurement



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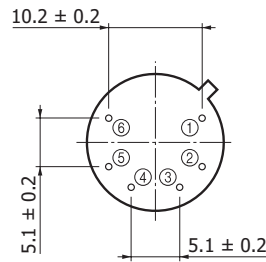
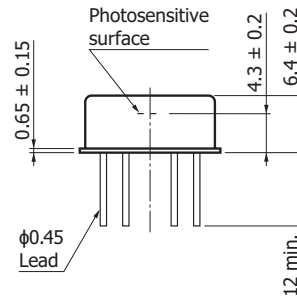
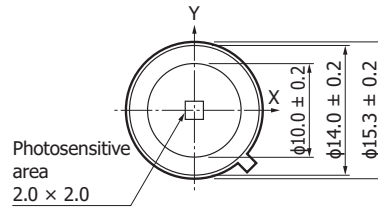
Dimensional outlines (unit: mm)

P13243-022MS



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P13243-122MS

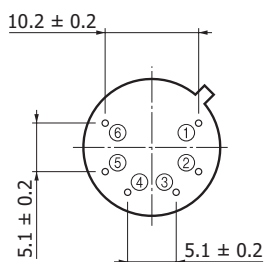
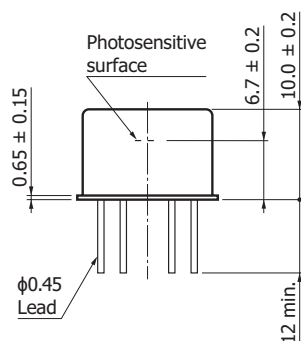
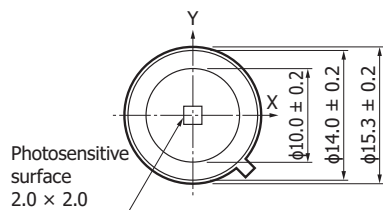


Distance from photosensitive area center to cap center
 $-0.3 \leq X \leq +0.3$
 $-0.3 \leq Y \leq +0.3$

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

KIRDA0260ED

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 (+)
- ⑤ ⑥ Thermistor

KTRDA0261EE

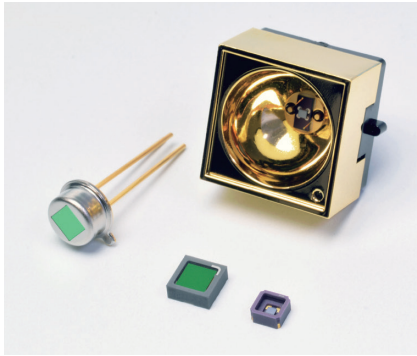
Recommended soldering conditions

- Solder temperature: 260 °C (10 s or less, once)
- Solder the leads at a point at least 1 mm away from the package body.

Note: When you set soldering conditions, check that problems do not occur in the product by testing out the condition in advance.

Related products

Mid infrared LED L15893/L15894/L15895 series



Hamamatsu's unique crystal growth and process technologies enable mid infrared LEDs with peak emission wavelengths of 3.3 μm , 3.9 μm , and 4.3 μm .

Type no.	Package
L15893-0330C/CN, L15894-0390C/CN, L15895-0430C/CN	Ceramic
L15893-0330MA, L15894-0390MA, L15895-0430MA	TO-46
L15893-0330ML, L15894-0390ML, L15895-0430ML	TO-46 with reflector

Related information

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

- Precautions
 - Disclaimer
 - Safety consideration
 - Compound opto-semiconductors (photosensors, light emitters)
- Technical note
 - Compound semiconductor photosensors

Information described in this material is current as of October 2023.

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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