HAMAMATSU
PHOTON IS OUR BUSINESS

InAsSb photovoltaic detectors

P13243 series

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

The P13424 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 (CH_4, CO_2, CO, etc.)**
- **Radiation thermometers**
- **Flame detection (CO_2 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 Topr*1 (°C)	Storage temperature Tstg*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.

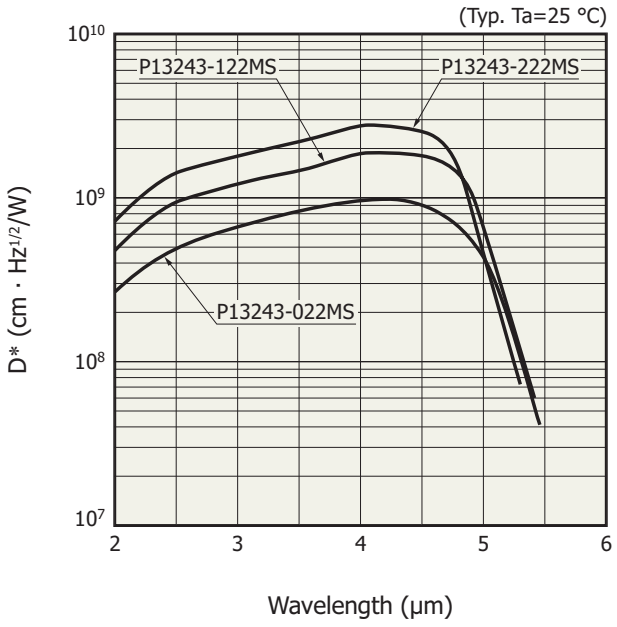
Electrical and optical characteristics (Typ. Ta=25 °C, unless otherwise noted)

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) Min. (cm·Hz$^{1/2}$/W)	Detectivity D* (λp, 1200, 1) 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$^{1/2}$)	Rise time tr*3 (ns)	Terminal capacitance Ct*4 (pF)
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}		

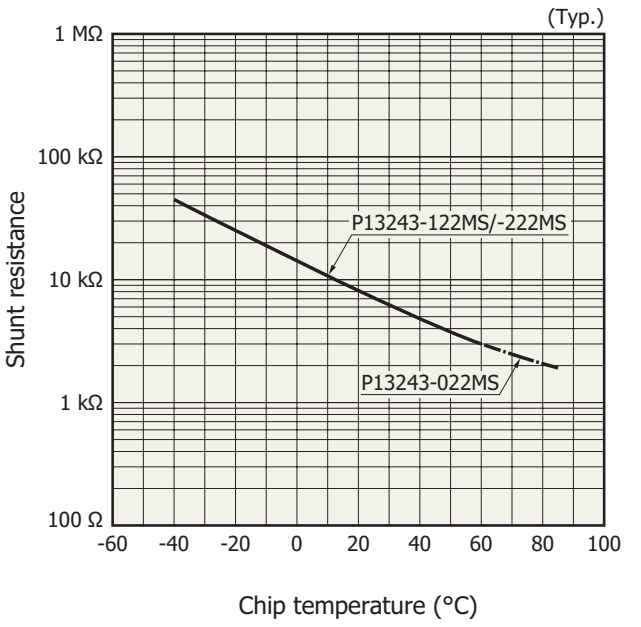
*2: Uniform irradiation on the entire photosensitive area
*3: VR=0 V, RL=50 Ω, 10 to 90%, λ=1.55 μm
*4: VR=0 V, f=1 MHz

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

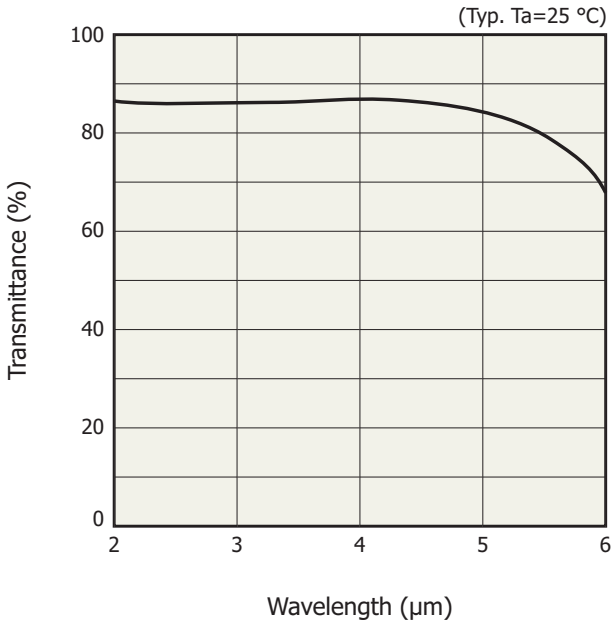
Spectral response (D*)



Shunt resistance vs. chip temperature



Spectral transmittance of window materials



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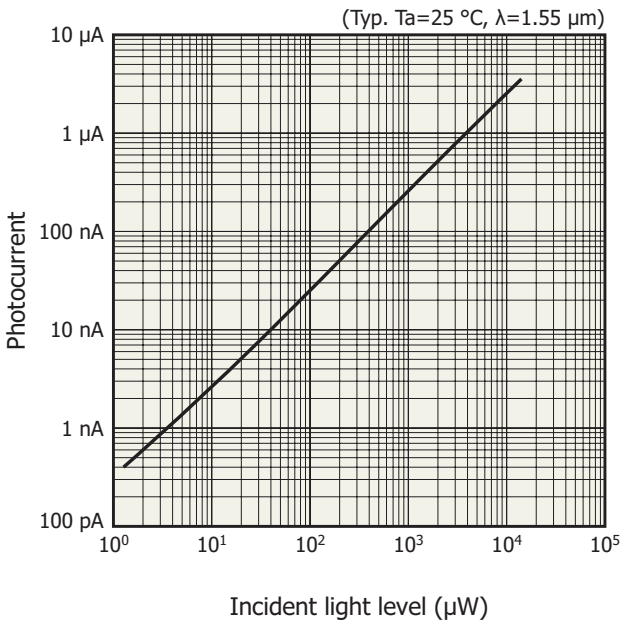
Linearity



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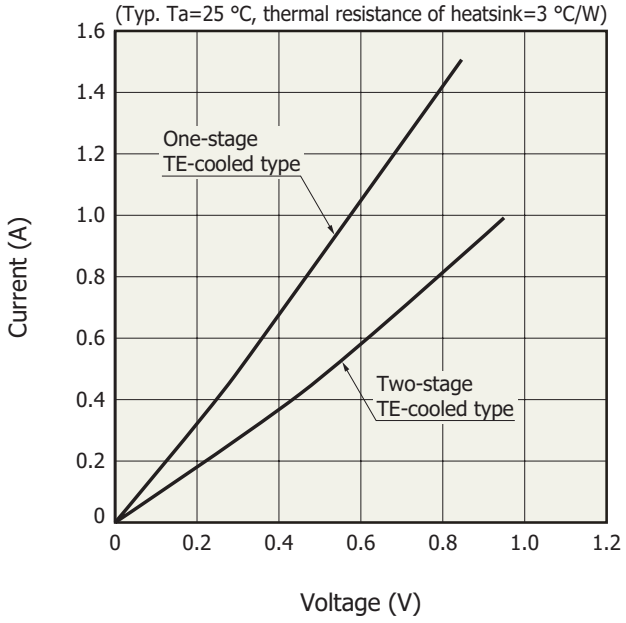
TE-cooler specifications (Ta=25 °C, unless otherwise noted)

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	3232	3298	3364	K
Thermistor power dissipation		Pth	-	-	0.2	mW

Current vs. voltage characteristics of TE-cooler



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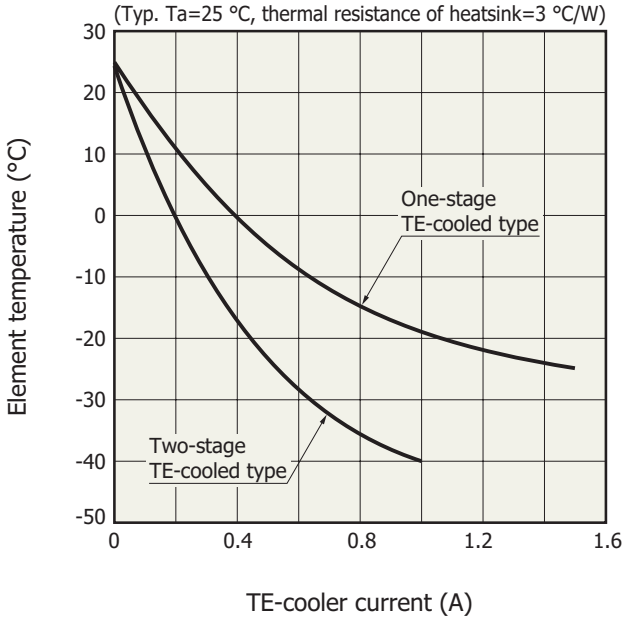
Cooling characteristics of TE-cooler



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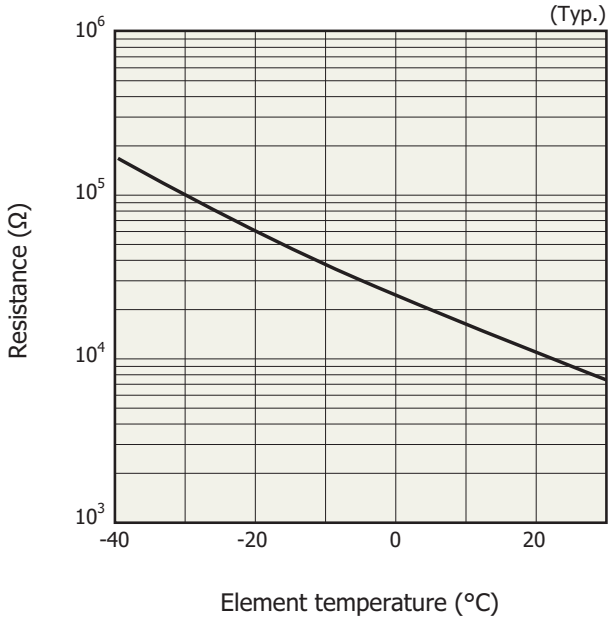
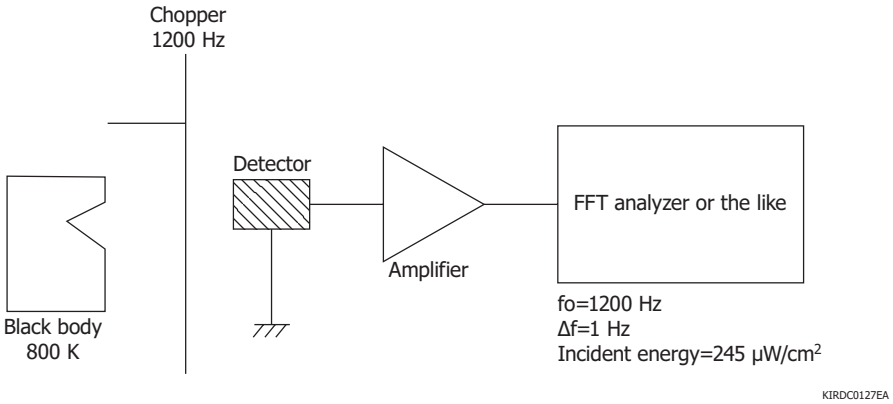
Thermistor temperature characteristics

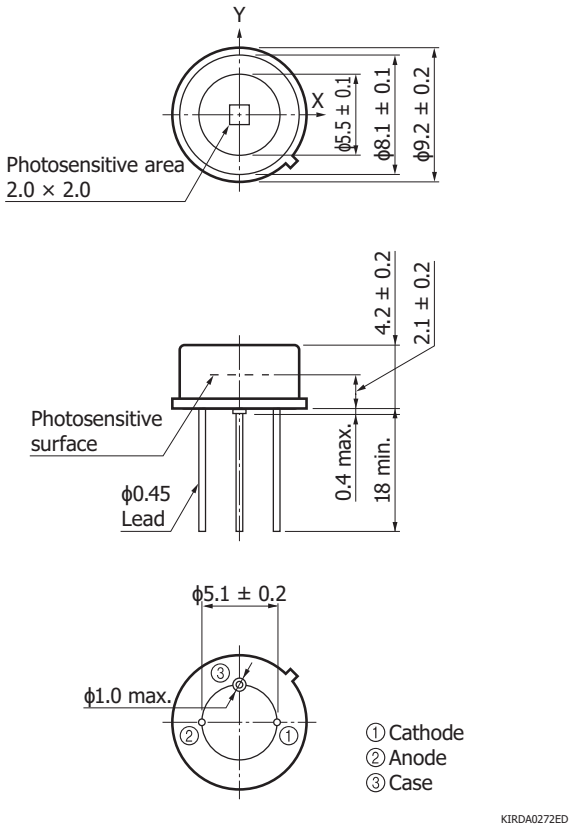


Block diagram for characteristic measurement



Dimensional outlines (unit: mm)

P13243-022MS



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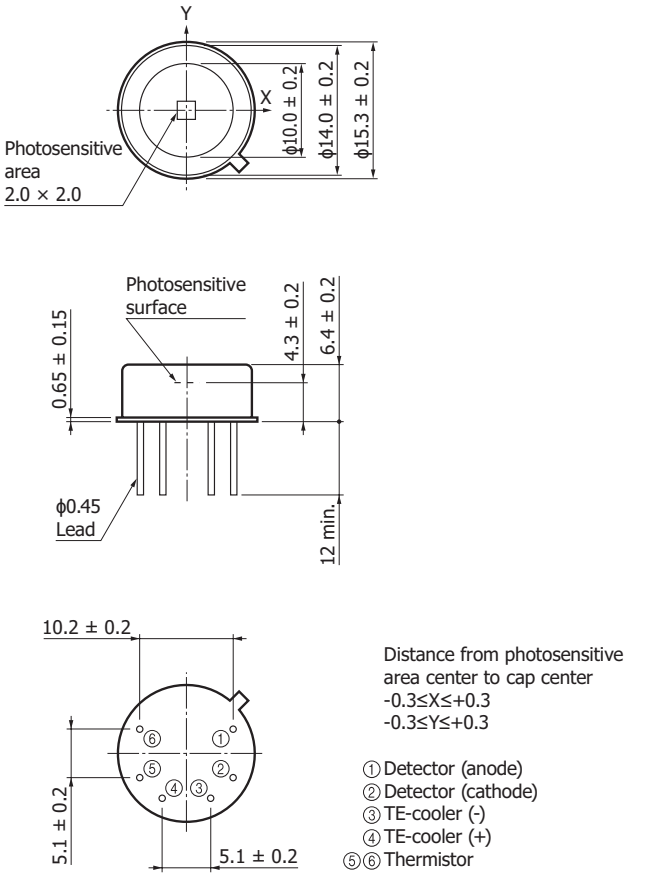
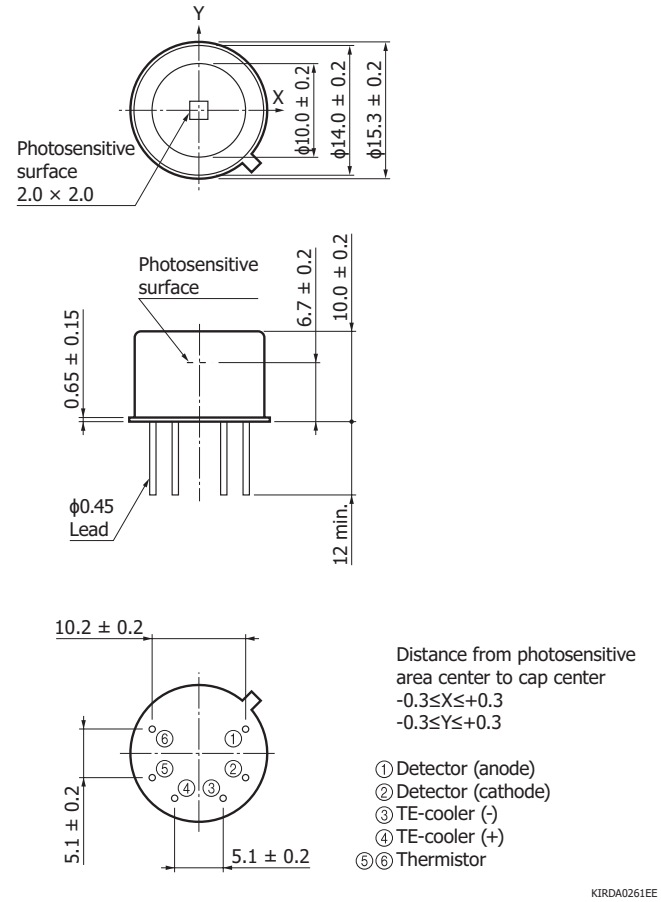
P13243-122MS



KIRDA0260ED

P13243-222MS



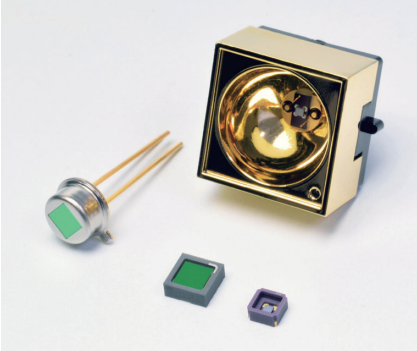
KIRDA0261EE

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

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