HAMAMATSU
PHOTON IS OUR BUSINESS

InAsSb photovoltaic detectors

[With band-pass filter] | P13243 series

Infrared detectors with band-pass filter (3.3 µm, 3.9 µm, 4.26 µm, 4.45 µm)

These are InAsSb photovoltaic detectors that use a band-pass filter for the window. Types using a band-pass filter with a center wavelength of 3.3 µm, 3.9 µm, or 4.26 µm are suitable for gas measurement, and a type using a band-pass filter of 4.45 µm is suitable for flame monitoring. These are environmentally friendly infrared detectors and do not use lead, mercury, or cadmium, which are substances restricted by the RoHS Directive. They are replacements for conventional products containing these substances. A two-element type that can detect two wavelength is also available.

Features

- **High sensitivity**
- **High-speed response**
- **High shunt resistance**
- **Compact, surface mount ceramic package**
- **Compatible with lead-free solder reflow (ceramic package)**

Applications

- **Gas measurement (CH_4, CO_2)**
- **Flame monitors (CO_2 resonance radiation)**

Option (sold separately)

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

Structure

Type no.	Window material*1	Package	Cooling	Photosensitive area (mm)	Field of view FOV (degrees)
P13243-033CF	BPF (3.3 µm)	Ceramic	Non-cooled	0.7 × 0.7	90
P13243-033MF	BPF (3.3 µm)	TO-46			82
P13243-039CF	BPF (3.9 µm)	Ceramic			90
P13243-039MF	BPF (3.9 µm)	TO-46			82
P13243-043CF	BPF (4.26 µm)	Ceramic			90
P13243-043MF	BPF (4.26 µm)	TO-46			82
P13243-045CF	BPF (4.45 µm)	Ceramic			90
P13243-045MF	BPF (4.45 µm)	TO-46			82
P13243-015CF	BPF (3.3 µm)	Ceramic			90
	BPF (3.9 µm)				
P13243-016CF	BPF (4.26 µm)				
	BPF (3.9 µm)				

*1: BPF: Band-pass filter

Absolute maximum ratings

Type no.	Reverse voltage V_R (V)	Operating temperature Topr*2 (°C)	Storage temperature Tstg*2 (°C)	Incident light level (W/cm²)	Soldering temperature Tsol (°C)
P13243-033CF	1	-40 to +85	-40 to +85	1	240 (once)*3
P13243-033MF					-
P13243-039CF					240 (once)*3
P13243-039MF					-
P13243-043CF					240 (once)*3
P13243-043MF					-
P13243-045CF					240 (once)*3
P13243-045MF					-
P13243-015CF					240 (once)*3
P13243-016CF					

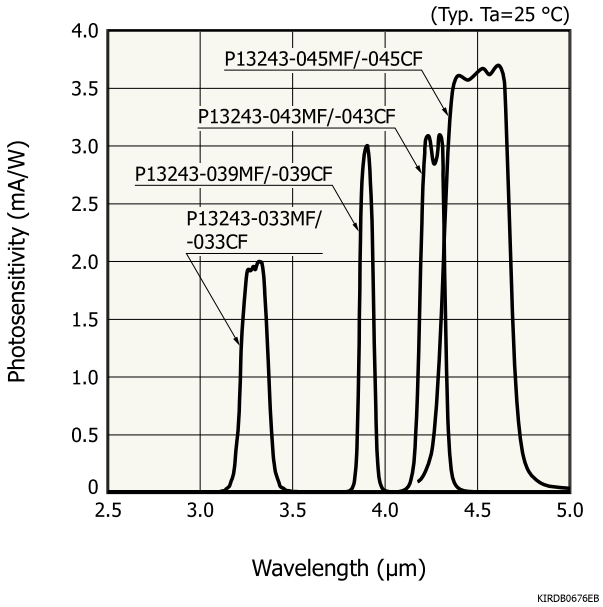
*2: No dew condensation
When there is a temperature difference between a product and the surrounding area in high humidity environments, dew condensation may occur on the product surface. Dew condensation may cause deterioration in characteristics and reliability.
*3: Reflow soldering, JEDEC J-STD-020 MSL 2, see P.5
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)

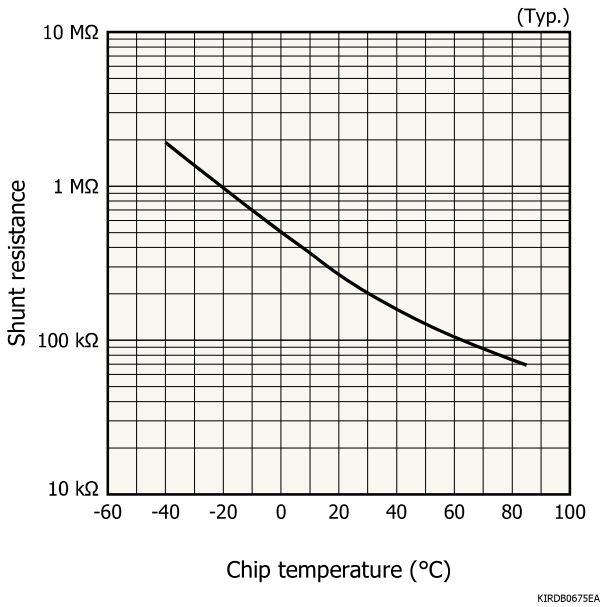
Type no.	Center wavelength CWL			Spectral response half width FWHM		Photosensitivity S*4 λ=CWL	Shunt resistance Rsh V_R=10 mV	Detectivity D* (CWL, 1200, 1)		Noise equivalent power NEP λ=CWL		Rise time tr*5	Terminal capacitance Ct*6
	Min. (nm)	Typ. (nm)	Max. (nm)	Typ. (nm)	Max. (nm)	(mA/W)	(kΩ)	Min. (cm·Hz$^{1/2}$/W)	Typ. (cm·Hz$^{1/2}$/W)	Typ. (W/Hz$^{1/2}$)	Max. (W/Hz$^{1/2}$)	(ns)	(pF)
P13243-033CF	3270	3300	3330	160	180	2.3	300	4.1×10^8	5.1×10^8	1.4×10^{-10}	1.7×10^{-10}	15	0.7
P13243-033MF													
P13243-039CF	3820	3900	3980	90	110	3.0		5.2×10^8	6.5×10^8	1.1×10^{-10}	1.3×10^{-10}		
P13243-039MF													
P13243-043CF	4217	4260	4303	140	160	3.1		5.5×10^8	6.9×10^8	1.0×10^{-10}	1.3×10^{-10}		
P13243-043MF													
P13243-045CF	4400	4450	4500	350	400	3.7		6.5×10^8	8.2×10^8	8.5×10^{-11}	1.1×10^{-10}		
P13243-045MF													
P13243-015CF	3270	3300	3330	160	180	2.3		4.1×10^8	5.1×10^8	1.4×10^{-10}	1.7×10^{-10}		
	3820	3900	3980	90	110	3.0		5.2×10^8	6.5×10^8	1.1×10^{-10}	1.3×10^{-10}		
P13243-016CF	4217	4260	4303	140	160	3.1		5.5×10^8	6.9×10^8	1.0×10^{-10}	1.3×10^{-10}		
	3820	3900	3980	90	110	3.0		5.2×10^8	6.5×10^8	1.1×10^{-10}	1.3×10^{-10}		

*4: Uniform irradiation on the entire photosensitive area
*5: V=0 V, R_L=50 Ω, 10 to 90%, λ=1.55 μm
*6: V_R=0 V, f=1 MHz
Note: Uniform irradiation must be applied to the entire photosensitive area during use.

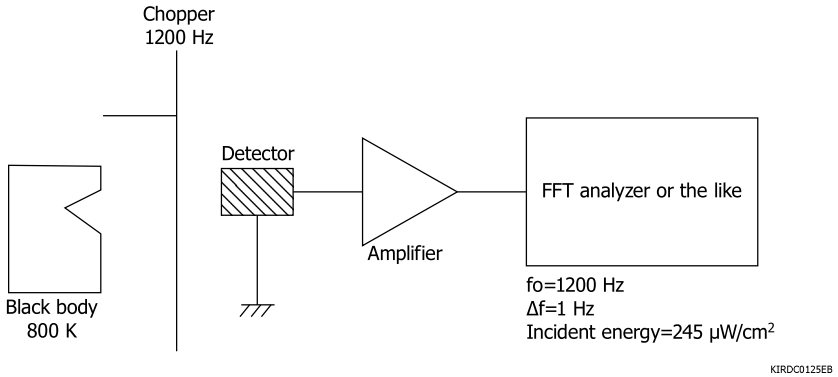
Spectral response



Shunt resistance vs. chip temperature

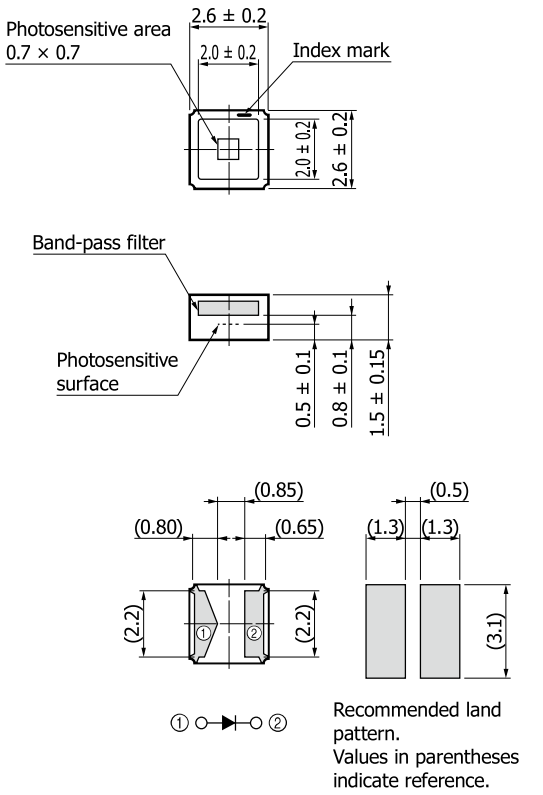


Measurement circuit example



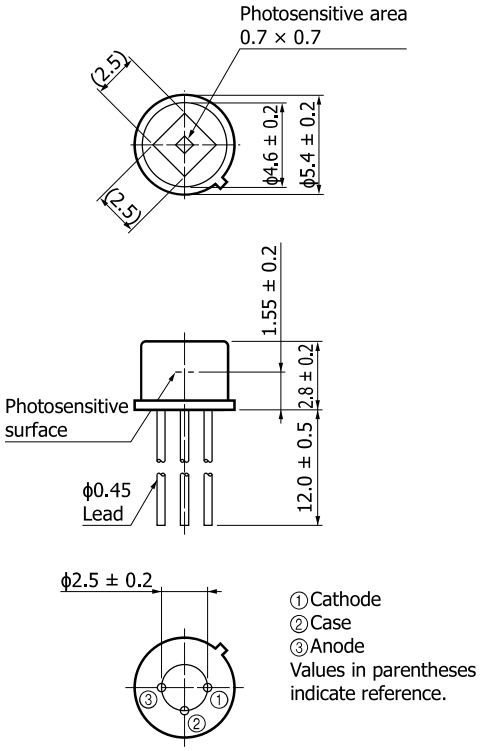
Dimensional outlines (unit: mm)

P13243-033CF/-039CF/-043CF/-045CF



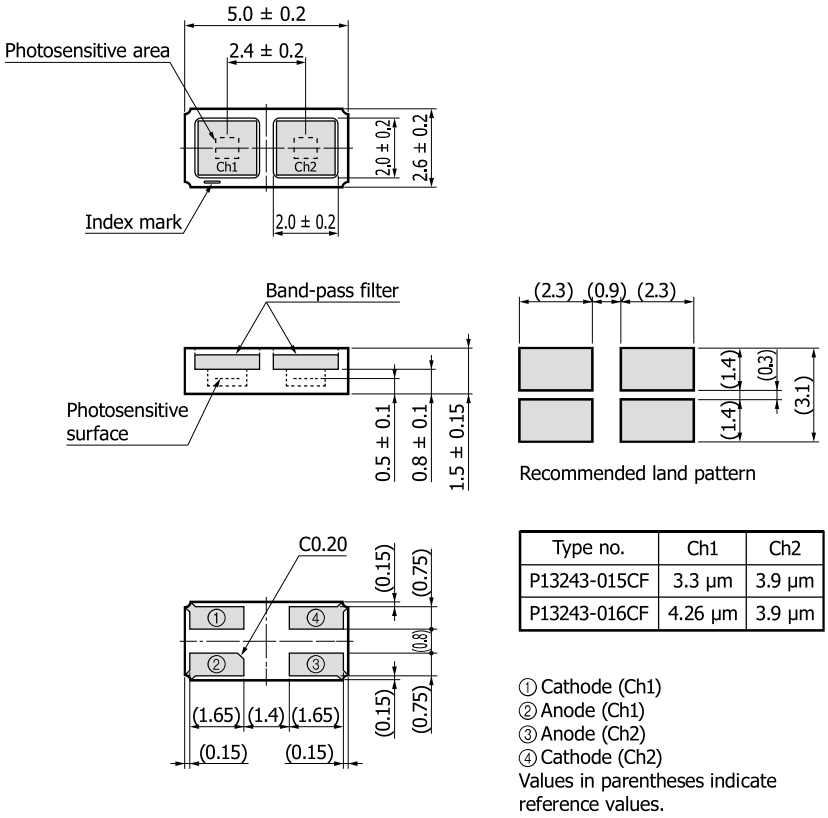
KIRDA0266EC

P13243-033MF/-039MF/-043MF/-045MF



KIRDA0249EF

P13243-015CF/-016CF



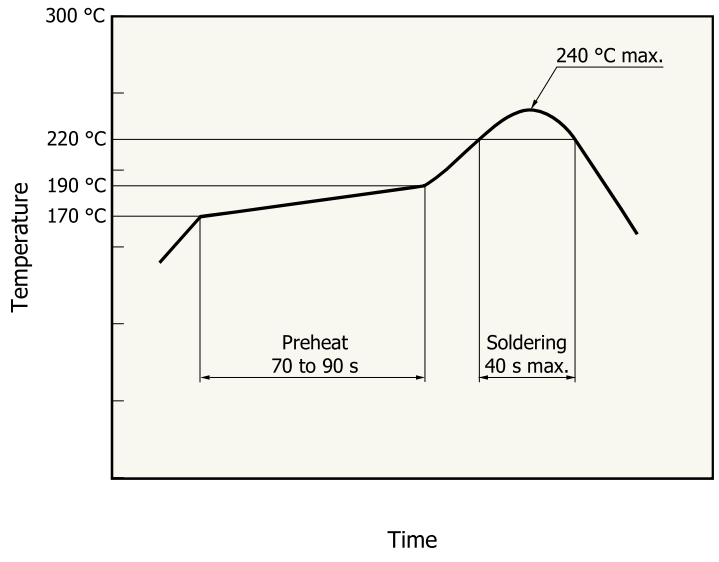
Type no.	Ch1	Ch2
P13243-015CF	3.3 µm	3.9 µm
P13243-016CF	4.26 µm	3.9 µm

① Cathode (Ch1)
② Anode (Ch1)
③ Anode (Ch2)
④ Cathode (Ch2)
Values in parentheses indicate reference values.

KIRDA0267ED

Recommended soldering conditions

P13243-033CF/-039CF/-043CF/-045CF/-015CF/-016CF



KIRDB0648EB

- 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 within 1 year.
- The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used. When you set reflow soldering conditions, check that problems do not occur in the product by testing out the conditions in advance.

P13243-033MF/-039MF/-043MF/-045MF

· Solder temperature: 240 °C max. (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 condition, check that problems do not occur in the product by testing out the condition in advance.

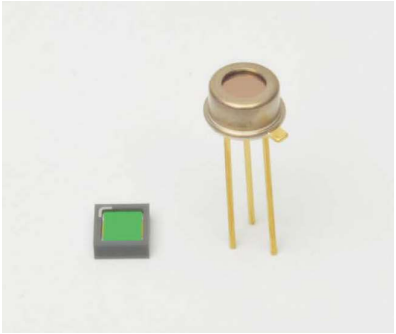
Related information

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

■ Precautions
· Disclaimer
· Metal, ceramic, plastic package products
· Compound opto-semiconductors (photosensors, light emitters)

■ Technical information
· Compound semiconductor photosensors / Technical note

[Related products] Mid infrared LEDs L15893/L15894/L15895 series



The L15893/L15894/L15895 series are mid infrared LEDs with the peak emission wavelength of 3.3 µm, 3.9 µm, and 4.3 µm respectively, manufactured using Hamamatsu unique crystal growth and process technologies.

Type no.	Package
L15893-0330C, L15894-0390C, L15895-0430C	Ceramic
L15893-0330M, L15894-0390M, L15895-0430M	Metal

HAMAMATSU www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Solid State Division
1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81)53-434-3311, Fax: (81)53-434-5184
U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218, E-mail: usa@hamamatsu.com
Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, 82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8, E-mail: info@hamamatsu.de
France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10, E-mail: infos@hamamatsu.fr
United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777, E-mail: info@hamamatsu.co.uk
North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509 031 00, Fax: (46)8-509 031 01, E-mail: info@hamamatsu.se
Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20044 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41, E-mail: info@hamamatsu.it
China: Hamamatsu Photonics (China) Co., Ltd.: 1201 Tower B, Jiaming Center, 27 Dongsanhuan Beilu, Chaoyang District, 100020 Beijing, P.R.China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866, E-mail: hpc@hamamatsu.com.cn
Taiwan: Hamamatsu Photonics Taiwan Co., Ltd.: 8F-3, No. 158, Section2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081, E-mail: info@hamamatsu.com.tw

Cat. No. KIRD1138E06 Dec. 2021 DN