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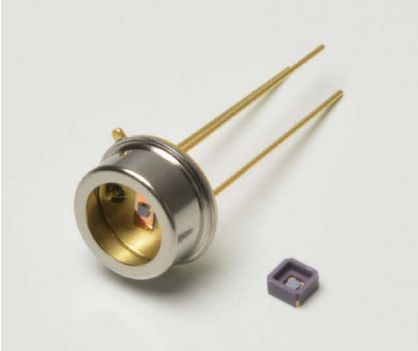
InAsSb photovoltaic detectors



P16114-011MN P16614-011CN

Infrared detector with high photosensitivity (up to 10 µm band)

The P16114-011MN and P16614-011CN are an infrared detector that have high sensitivity in the spectral band up to 10 µm. This high sensitivity has been achieved due to Hamamatsu unique crystal growth technology and process technology. By using a back-illuminated structure, the photosensitivity has been improved compared to the front-illuminated type. These products are an environmentally friendly infrared detector and do not use lead, mercury, or cadmium, which are substances restricted by the RoHS directive. These products replace conventional products containing these substances.

Features

- **High sensitivity**
- **High-speed response**
- **High shunt resistance**
- **Compact, surface mount type ceramic package (P16614-011CN)**
- **Compatible with lead-free solder reflow (P16614-011CN)**
- **RoHS compliant (lead, mercury, cadmium free)**

Applications

- **Gas detection (SOx, NOx, NH_3, O_3, etc.)**
- **Radiation thermometers**
- **CO_2 laser monitor**
- **Mid infrared spectroscopy**

Option (sold separately)

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

Structure

Parameter	P16114-011MN	P16614-011CN	Unit
Window material	None		-
Package	TO-5	Ceramic	-
Photosensitive area	0.7 × 0.7		mm
Field of view	101	86	degrees

Absolute maximum ratings (Ta=25 °C, unless otherwise noted)

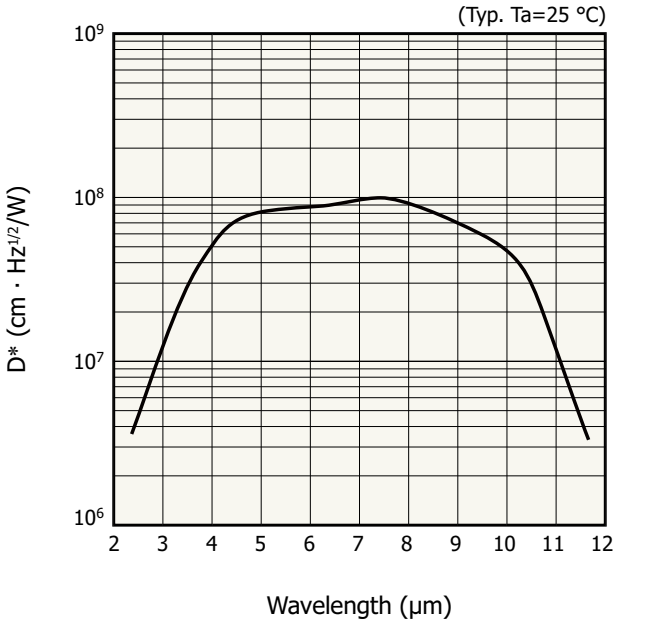
Parameter	Symbol	Value	Unit
Reverse voltage	V_R	1	V
Operating temperature*1	Topr	-40 to +85	°C
Storage temperature*1	Tstg	-40 to +85	°C
Incident light level	Pin	1	W/mm^2
Soldering temperature	Tsol	240 (once)*2	°C

*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.
*2: P16614-011CN Reflow soldering, JEDEC J-STD-020 MLS 2, see P.6
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.

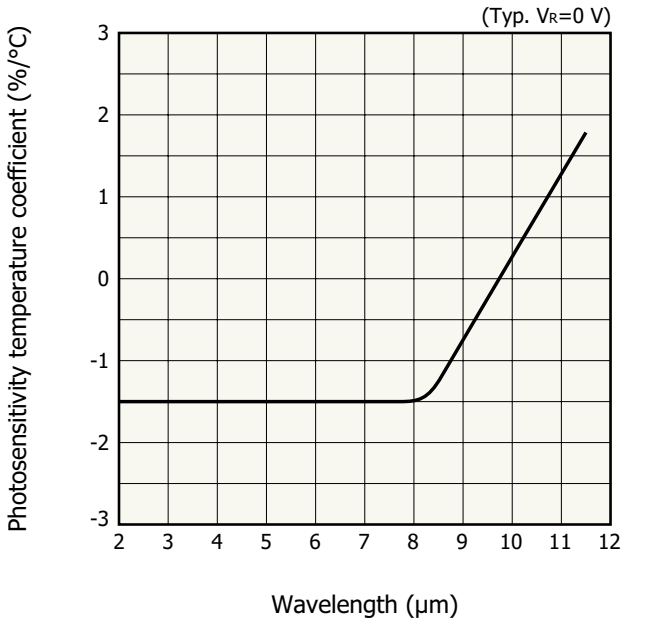
Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Peak sensitivity wavelength	λp		-	7.4	-	μm
Cutoff wavelength	λc		9.7	11.0	-	μm
Photosensitivity	S	λ=λp	3.4	5.0	-	mA/W
Shunt resistance	Rsh	V_R=10 mV	0.65	1.3	-	kΩ
Terminal capacitance	Ct	V_R=0 V, f=1 MHz	-	1.2	-	pF
Detectivity	D*	(λp, 1200, 1)	4.7×10^{7}	1.0×10^{8}	-	cm·Hz$^{1/2}$/W
Noise equivalent power	NEP	λ=λp	-	7.1×10^{-10}	9.0×10^{-10}	W/Hz$^{1/2}$
Rise time	tr	V_R=0 V, R_L=50 Ω, 10 to 90%	-	3	10	ns

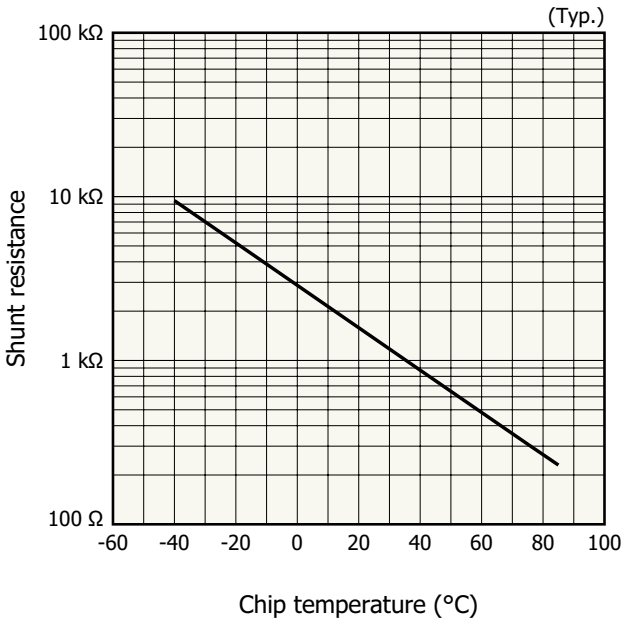
Spectral response (D*)



Photosensitivity temperature characteristics



Shunt resistance vs. chip temperature



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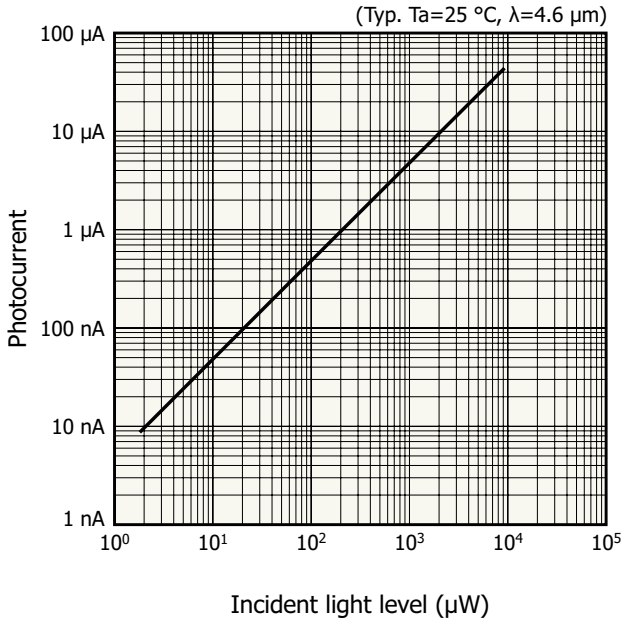
Linearity



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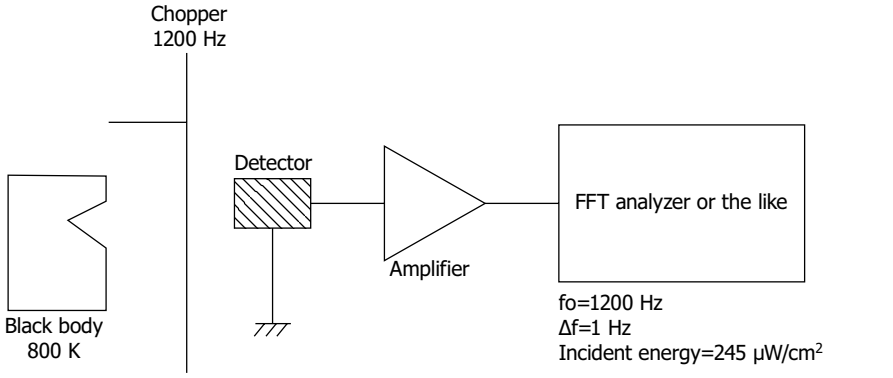
Block diagram for characteristic measurement



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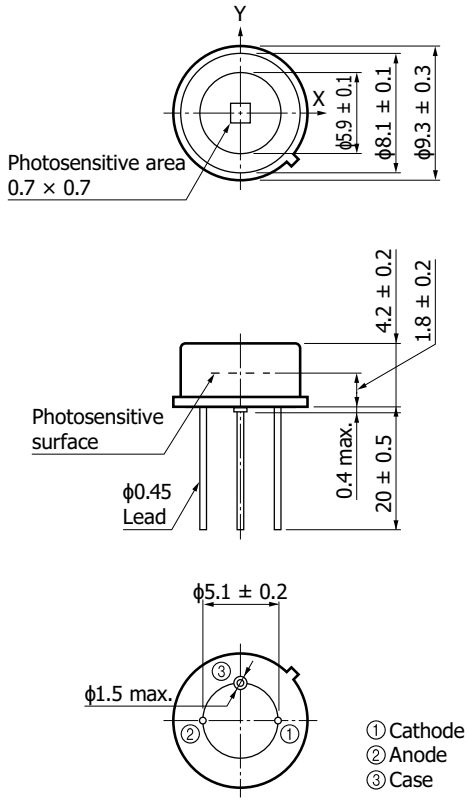
Dimensional outline (unit: mm)

P16114-011MN



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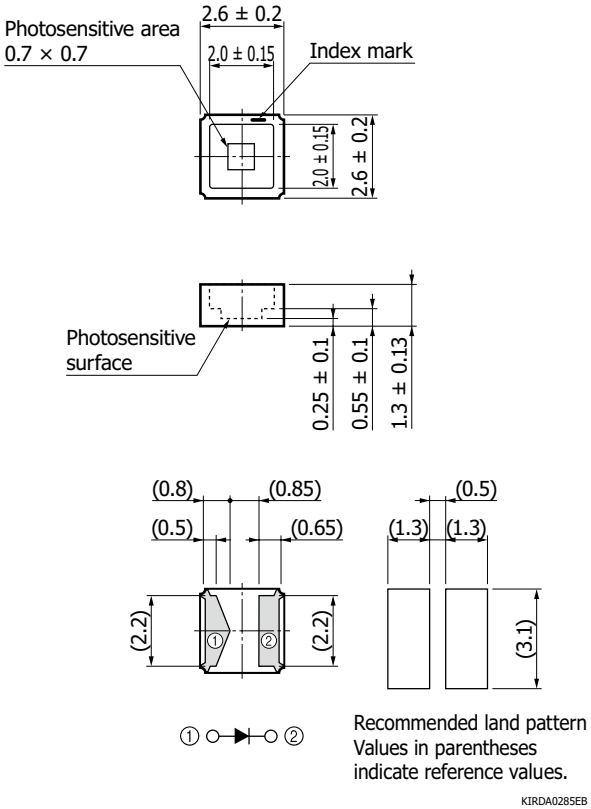

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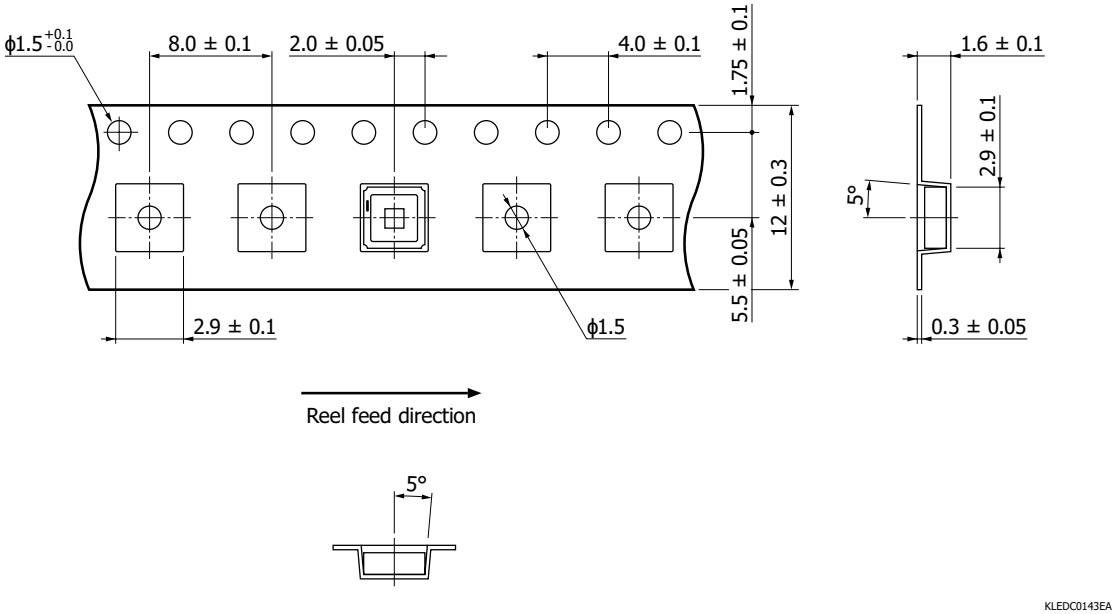
Standard packing specifications (P16614-011CN)

■ Reel (conforms to JEITA ET-7200)

Outer diameter	Hub diameter	Tape width	Material	Electrostatic characteristics
ϕ180 mm	ϕ60 mm	12 mm	PS	Conductive

■ Embossed tape (unit: mm, material: PS, conductive)



■ Packing quantity
100 pcs/reel

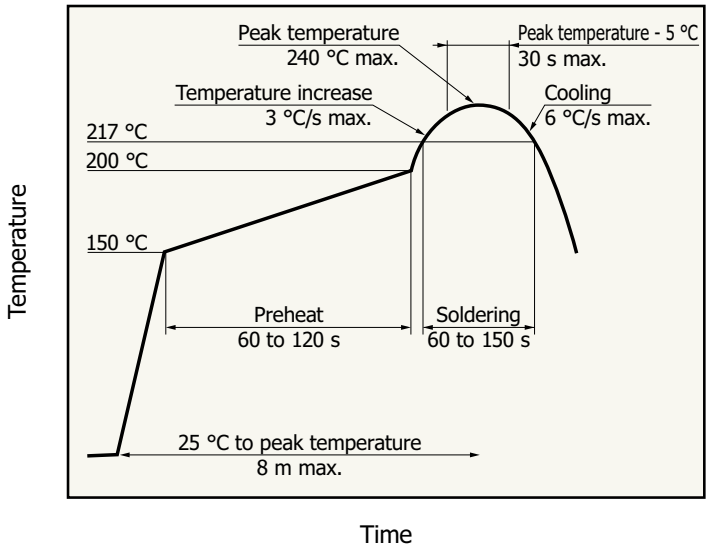
■ Packing state
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

Recommended soldering conditions

P16114-011MN

· 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.

P16614-011CN



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· After unpacking, store it in an environment at a temperature 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.

Related information

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

■ Precautions
· Disclaimer
· Safety consideration
· Surface mount type products
· Unsealed products
· Compound opto-semiconductors (photosensors, light emitters)

■ Technical note
· Compound semiconductor photosensors

HAMAMATSU www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Solid State Division
1126-1 Ichino-cho, Chuo-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, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218
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.: 13F-1, No.101, Section 2, Gongdao 5th Road, East Dist., Hsinchu City, 300046, Taiwan(R.O.C) Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: info@hamamatsu.com.tw

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