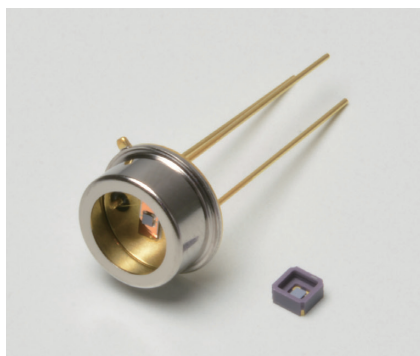


InAsSb photovoltaic detectors



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 (SO_x, NO_x, NH₃, O₃, etc.)
- Radiation thermometers
- CO₂ 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	VR	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.

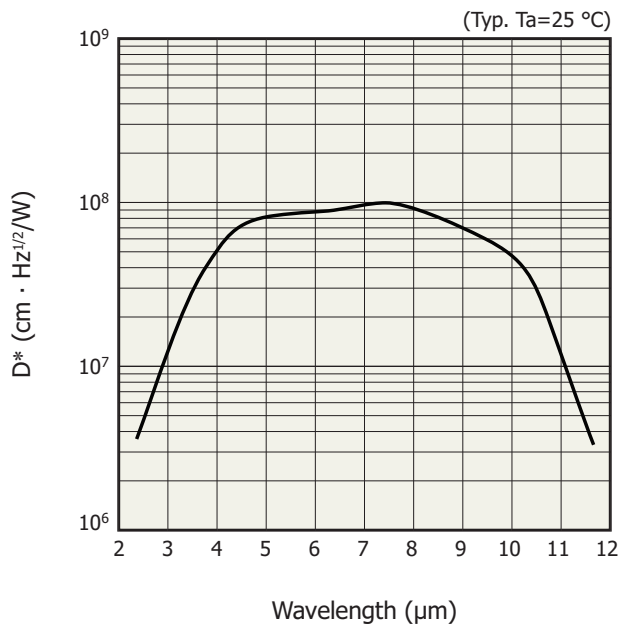
*2: P16614-011CN Reflow soldering, JEDEC J-STD-020 MLS 2, see P.6

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.

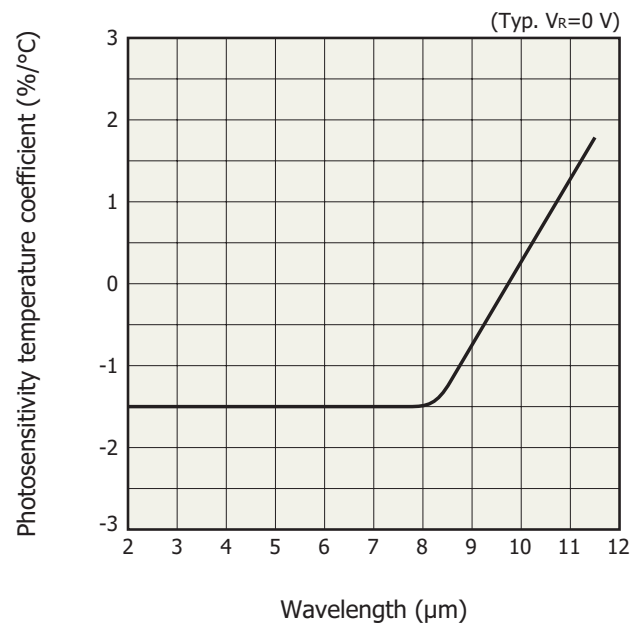
Electrical and optical characteristics (Ta=25 °C)

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

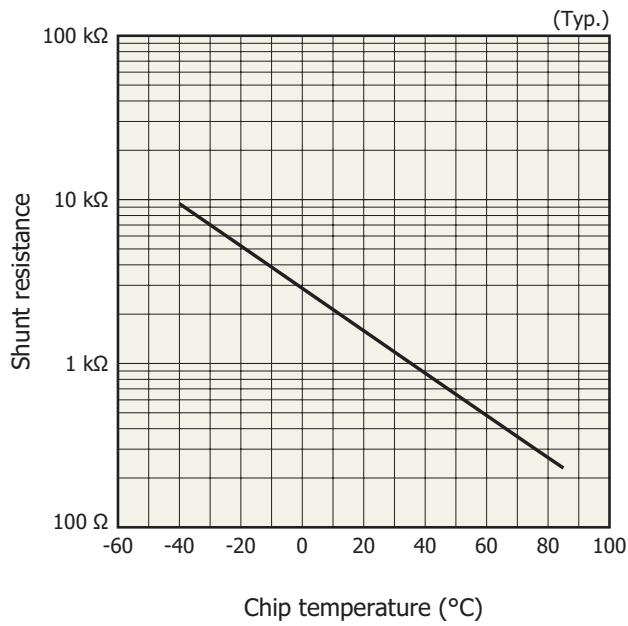
Spectral response (D^*)



Photosensitivity temperature characteristics

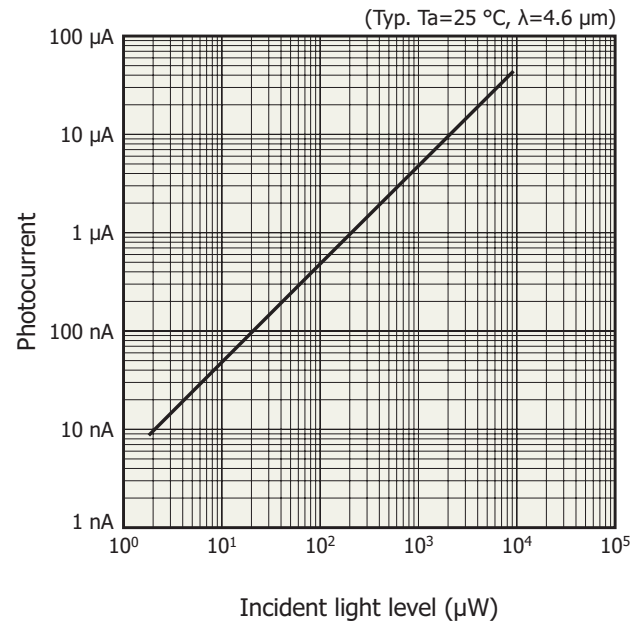


Shunt resistance vs. chip temperature



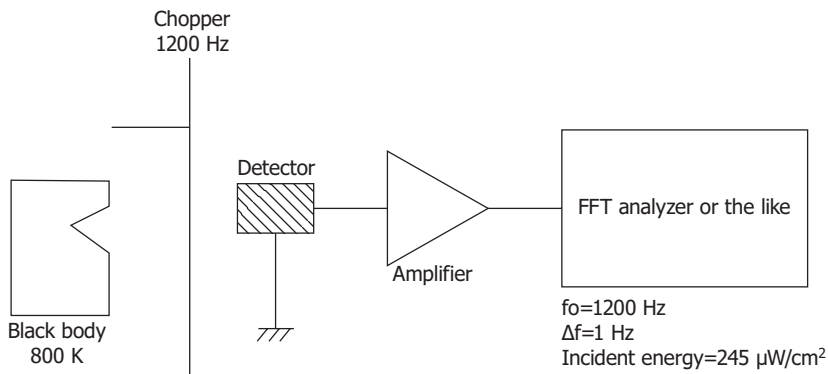
KIRD80726EA

Linearity



KIRD80727EA

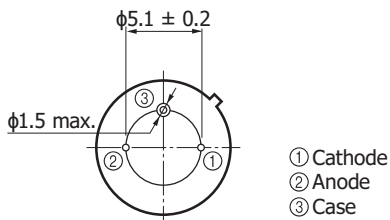
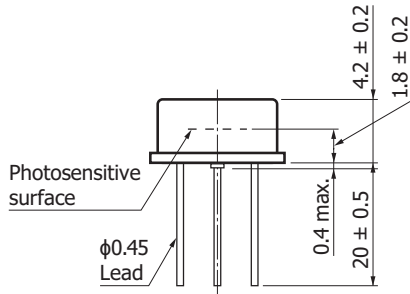
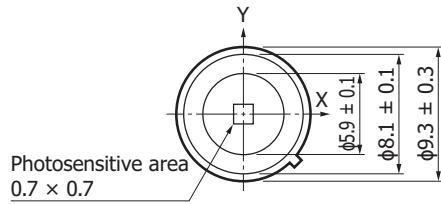
Block diagram for characteristic measurement



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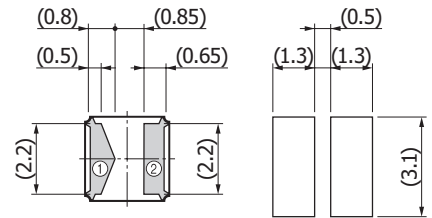
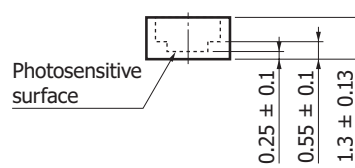
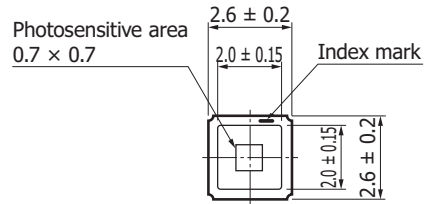
Dimensional outline (unit: mm)

P16114-011MN



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P16614-011CN



Recommended land pattern
Values in parentheses
indicate reference values.

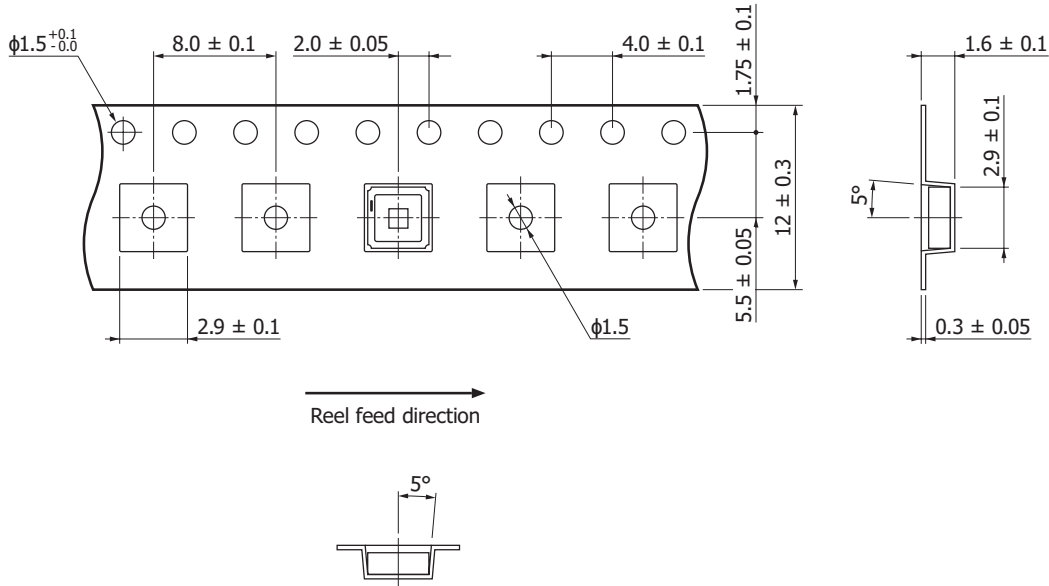
KIRDA0285EB

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)



KLEDC0143EA

■ Packing quantity

100 pcs/reel

■ Packing state

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

Recommended soldering conditions

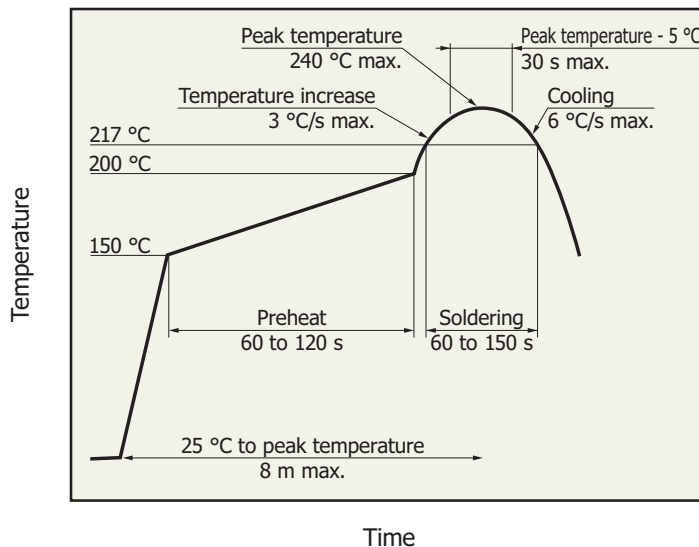
P16114-011MN

· 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



· 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.

KSPD80418EA

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

The content of this document is current as of May 2023.

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