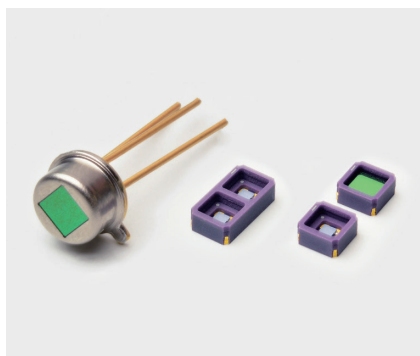


# InAsSb photovoltaic detector

P16112-011MA

P16612-011CA/CN

P16849-013CN



## Infrared detectors with improved photosensitivity temperature coefficient (up to 5 μm band)

These are infrared detectors that have high sensitivity in the spectral band up to 5 μm. This high sensitivity has been achieved due to Hamamatsu's unique crystal growth technology and process technology. By using a back-illuminated structure, we greatly improved the sensitivity temperature coefficient compared to the front-illuminated type. Windowless types that customers can attach a filter on are also available. These products are environmentally friendly infrared detectors 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
- Compatible with lead-free solder reflow
- RoHS compliant (lead, mercury, cadmium free)

### Applications

- Gas detection (CH<sub>4</sub>, CO<sub>2</sub>, CO, etc.)
- Radiation thermometers
- Flame detection (CO<sub>2</sub> resonance radiation)

### Option (sold separately)

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

### Structure

Type no.	Number of elements	Photosensitive area (mm)	Window material	Package	Cooling	Field of view FOV (degrees)
P16112-011MA	1	0.7 × 0.7	Si with AR coating	TO-46	Non-cooled	87
P16612-011CA			None	Ceramic		86
P16612-011CN						86
P16849-013CN	2					86

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

Type no.	Reverse voltage V <sub>R</sub> (V)	Operating temperature* <sup>1</sup> T <sub>opr</sub> (°C)	Storage temperature* <sup>1</sup> T <sub>stg</sub> (°C)	Incident light level (W/mm <sup>2</sup> )	Soldering temperature T <sub>sol</sub> (°C)
P16112-011MA	1	-40 to +85	-40 to +85	1	-
P16612-011CA					240 (once)* <sup>2</sup>
P16612-011CN					
P16849-013CN					

\*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.

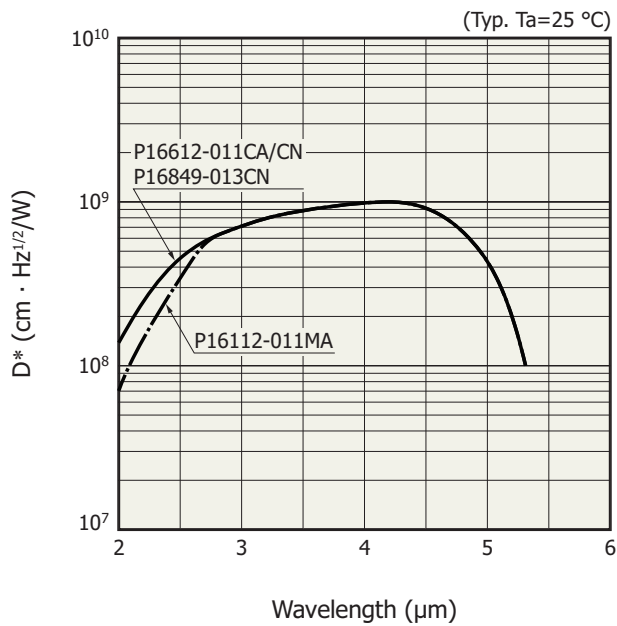
\*2: Reflow soldering, JEDEC J-STD-020 MLS 2, see P.7

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)**

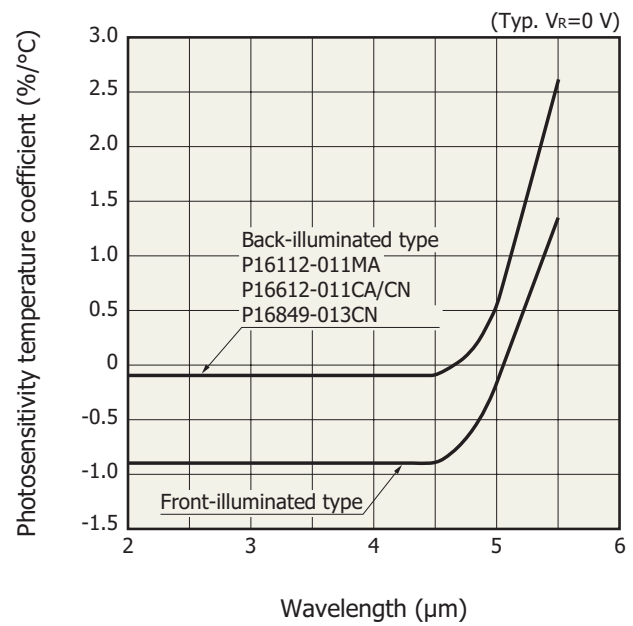
Type no.	Peak sensitivity wavelength $\lambda_p$ ( $\mu\text{m}$ )	Cutoff wavelength $\lambda_c$ ( $\mu\text{m}$ )	Photosensitivity S $\lambda=\lambda_p$ (mA/W)	Shunt resistance Rsh $V_R=10$ mV (k $\Omega$ )	Detectivity D* ( $\lambda_p, 1200, 1$ )		Noise equivalent power NEP $\lambda=\lambda_p$		Rise time tr $V_R=0$ V $R_L=50$ $\Omega$ 10 to 90% (ns)	Terminal capacitance Ct $V_R=0$ V $f=1$ MHz (pF)
					Min. (cm $\cdot$ Hz <sup>1/2</sup> /W)	Typ. (cm $\cdot$ Hz <sup>1/2</sup> /W)	Typ. (W/Hz <sup>1/2</sup> )	Max. (W/Hz <sup>1/2</sup> )		
P16112-011MA	4.1	5.3	4.5	180	$7.4 \times 10^8$	$1.0 \times 10^9$	$4.3 \times 10^{-11}$	$6.5 \times 10^{-11}$	15	0.5
P16612-011CA										
P16612-011CN										
P16849-013CN										

**Spectral response (D\*)**



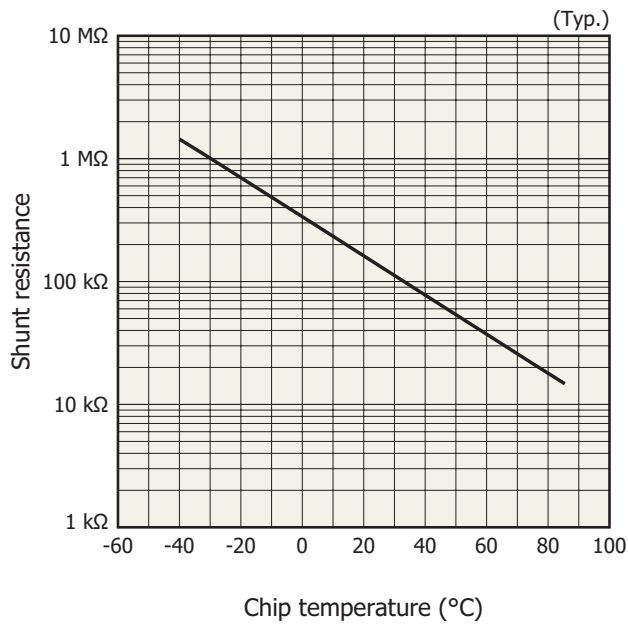
KIRD80715EC

**Photosensitivity temperature characteristics**



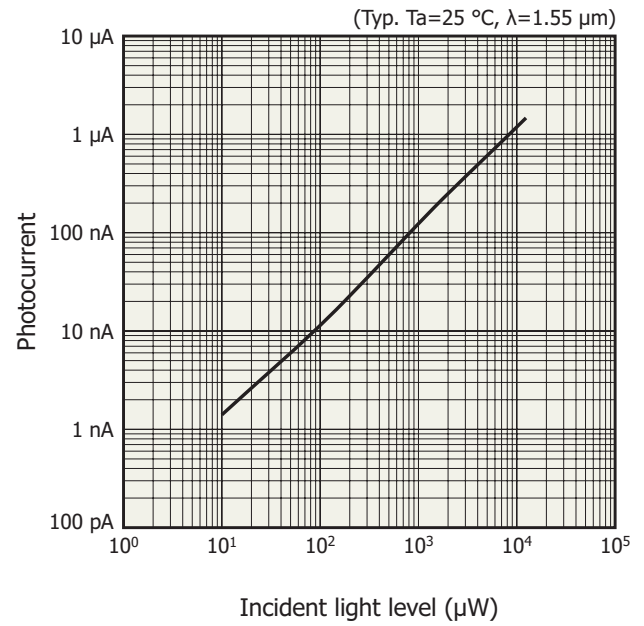
KIRD80716EB

**Shunt resistance vs. chip temperature**



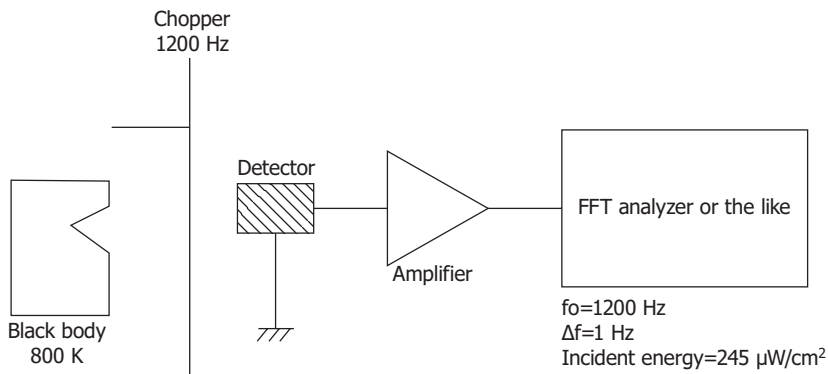
KIRD80717EA

**Linearity**



KIRD80718EA

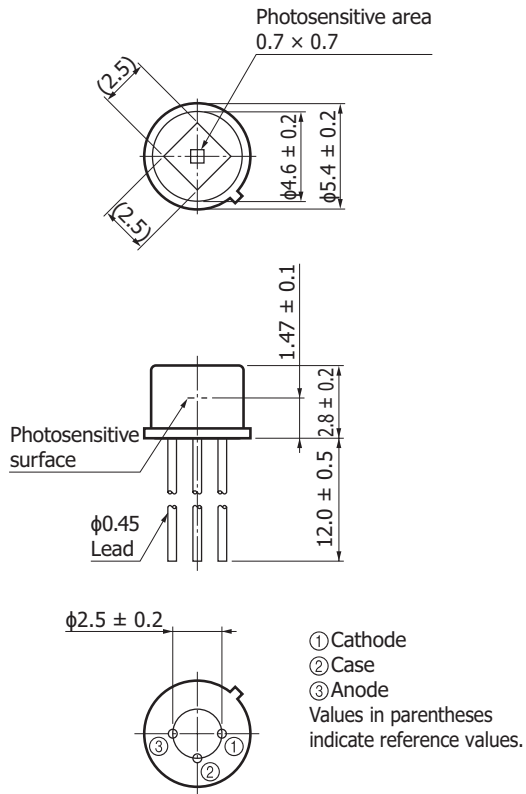
**Block diagram for characteristic measurement**



KIRD0127EA

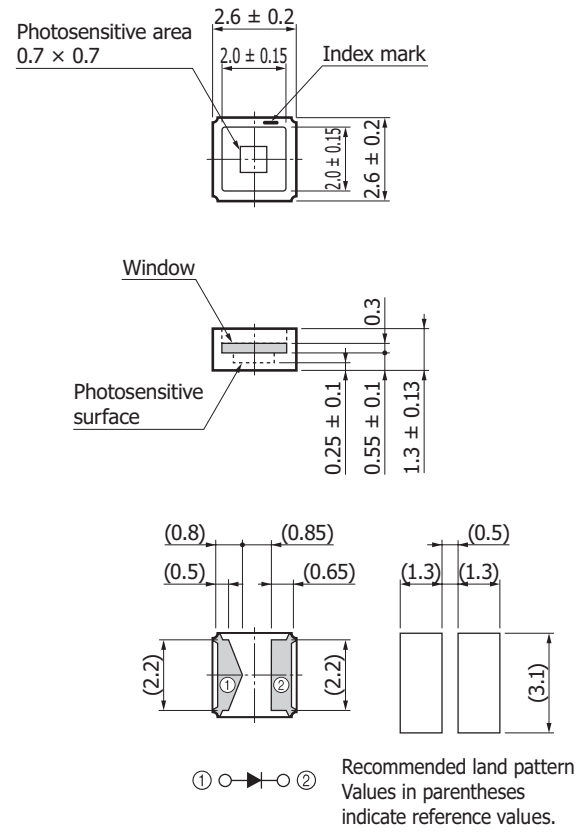
**Dimensional outline (unit: mm)**

P16112-011MA



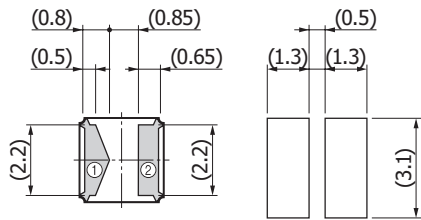
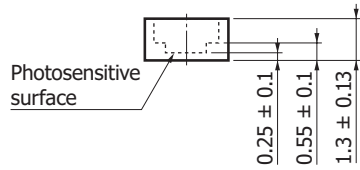
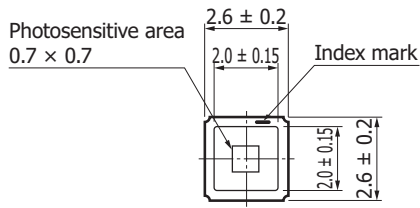
KIRDA0284EA

P16612-011CA



KIRDA0281EA

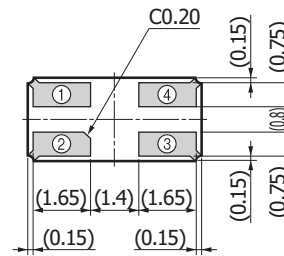
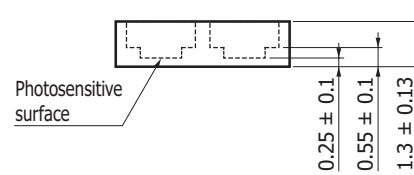
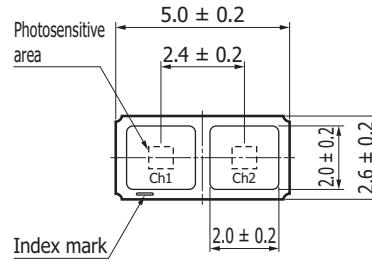
P16612-011CN



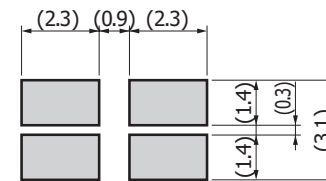
Recommended land pattern  
Values in parentheses  
indicate reference values.

KIRDA0285EB

P16849-013CN



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



Recommended land pattern

KIRDA0286EA

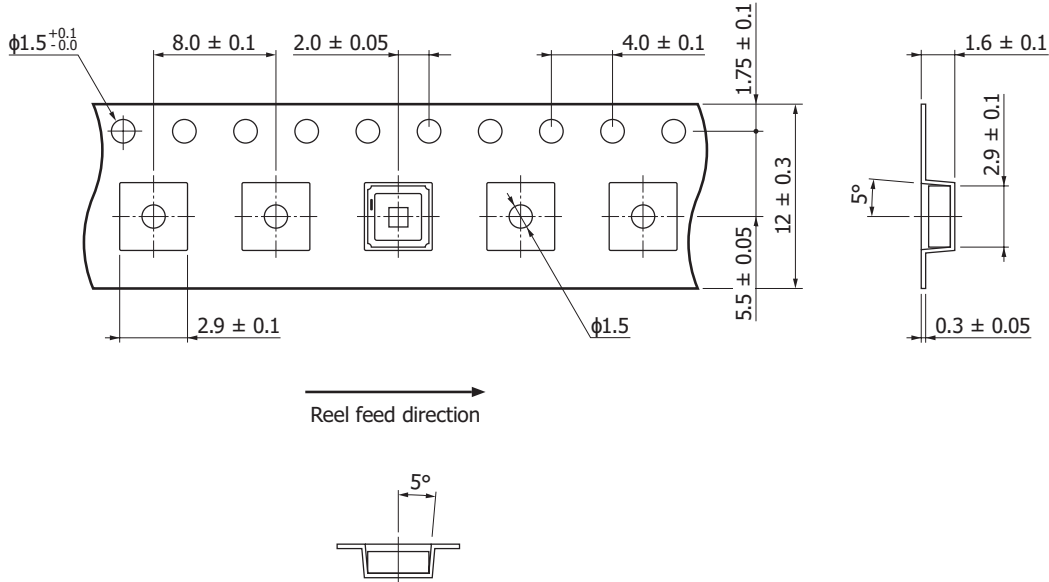
**Standard packing specifications**

P16612-011CA/CN

■ 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)



KLED0143EA

■ Packing quantity

500 pcs/reel

■ Packing state

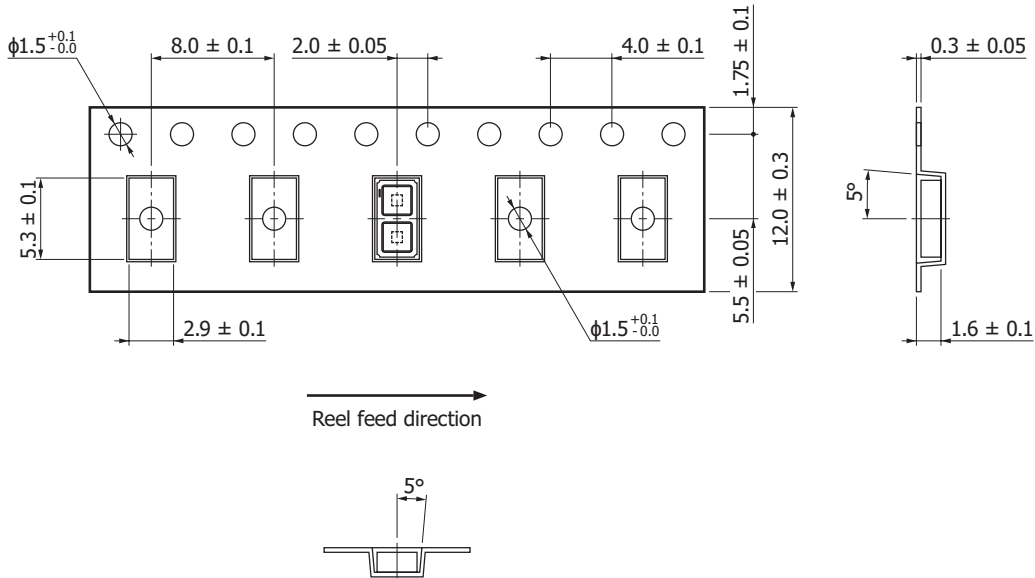
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

P16849-013CN

■ 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)



KIRDC0146EA

■ Packing quantity

100 pcs/reel

■ Packing state

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

## Recommended soldering conditions

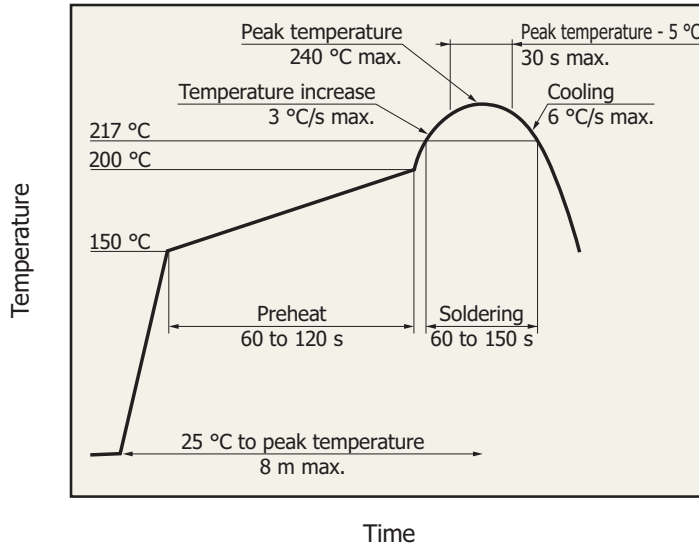
### P16112-011MA

Solder temperature: 260 °C (5 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 conditions in advance.

### P16612-011CA/CN, P16849-013CN



- After unpacking, keep it in an environment at a temperature of 5 to 30 °C and a humidity of 60% or less, and perform 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](http://www.hamamatsu.com/sp/ssd/doc_en.html)

### ■ Precautions

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

### ■ Technical note

- Compound semiconductor photosensors

The content of this document is current as of January 2024.

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