HAMAMATSU
PHOTON IS OUR BUSINESS

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_4, CO_2, CO, etc.)**
- **Radiation thermometers**
- **Flame detection (CO_2 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				Ceramic		86
P16612-011CN			None			86
P16849-013CN	2					86

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

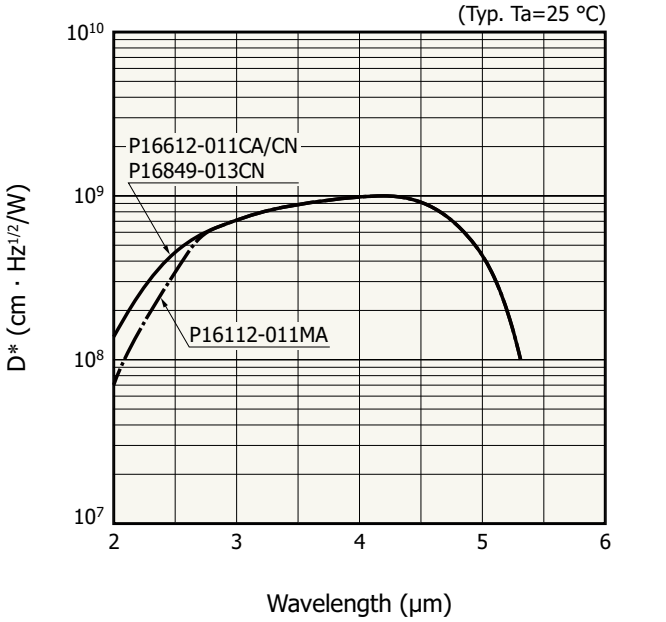
Type no.	Reverse voltage V_R (V)	Operating temperature*1 Topr (°C)	Storage temperature*1 Tstg (°C)	Incident light level (W/mm²)	Soldering temperature Tsol (°C)
P16112-011MA	1	-40 to +85	-40 to +85	1	-
P16612-011CA					240 (twice)*2
P16612-011CN					
P16849-013CN					

*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)

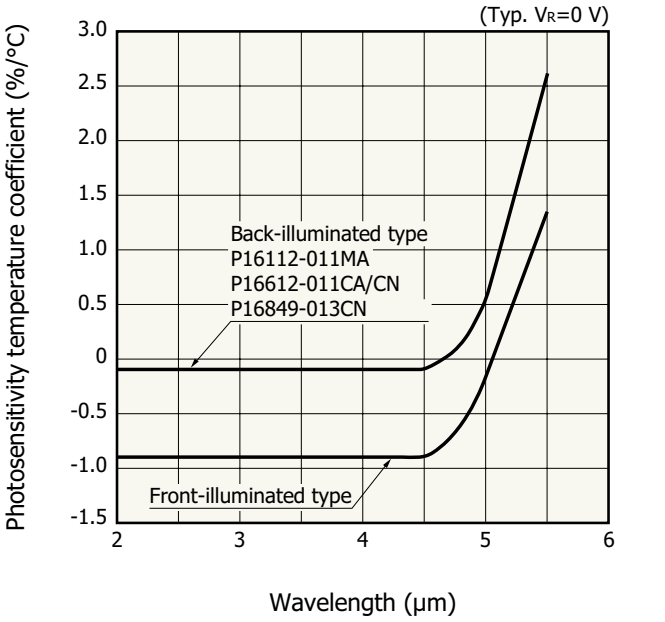
Type no.	Peak sensitivity wavelength λp (μm)	Cutoff wavelength λc (μm)	Photosensitivity S λ=λp (mA/W)	Shunt resistance Rsh VR=10 mV (kΩ)	Detectivity D* (λp, 1200, 1) Min. (cm·Hz$^{1/2}$/W)	Detectivity D* (λp, 1200, 1) Typ. (cm·Hz$^{1/2}$/W)	Noise equivalent power NEP λ=λp Typ. (W/Hz$^{1/2}$)	Noise equivalent power NEP λ=λp Max. (W/Hz$^{1/2}$)	Rise time tr VR=0 V RL=50 Ω 10 to 90% (ns)	Terminal capacitance Ct VR=0 V f=1 MHz (pF)
P16112-011MA	4.1	5.3	4.5	180	7.4 × 10^{8}	1.0 × 10^{9}	4.3 × 10^{-11}	6.5 × 10^{-11}	15	0.5
P16612-011CA										
P16612-011CN										
P16849-013CN										

Spectral response (D*)



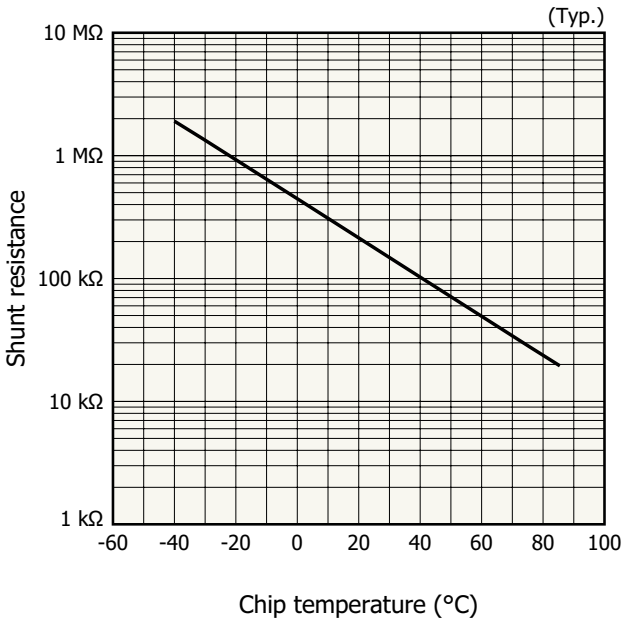
KIRDB0715EC

Photosensitivity temperature characteristics

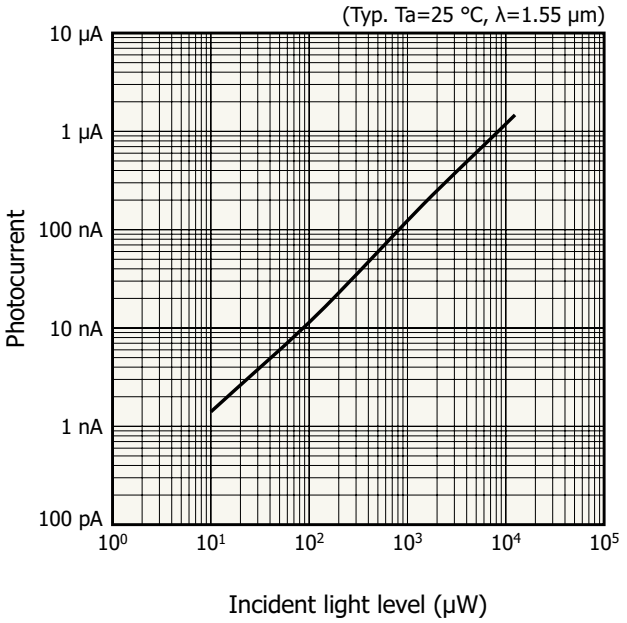


KIRDB0716EB

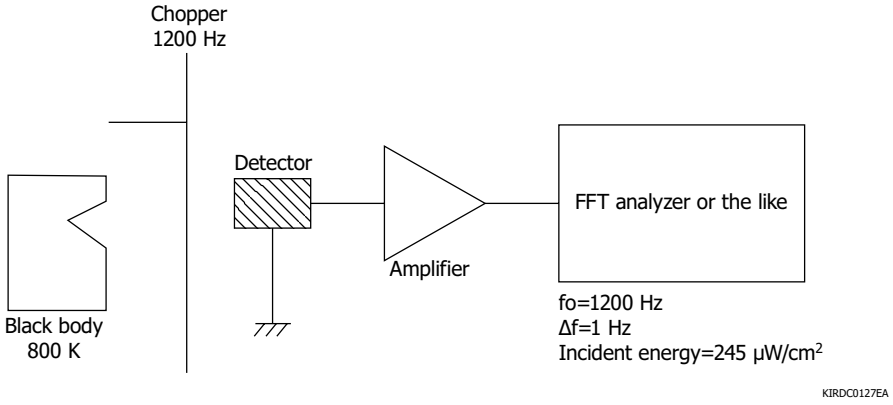
Shunt resistance vs. chip temperature



Linearity

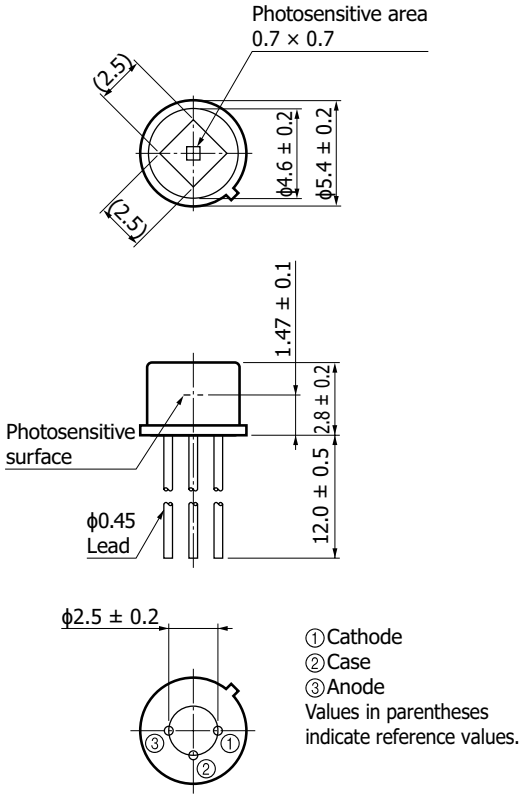


Block diagram for characteristic measurement



Dimensional outline (unit: mm)

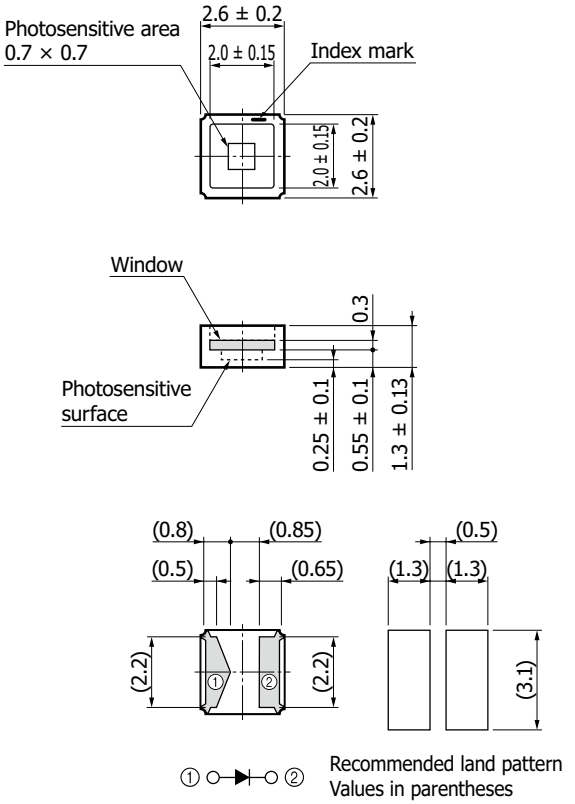
P16112-011MA



①Cathode
②Case
③Anode
Values in parentheses indicate reference values.

KIRDA0284EA

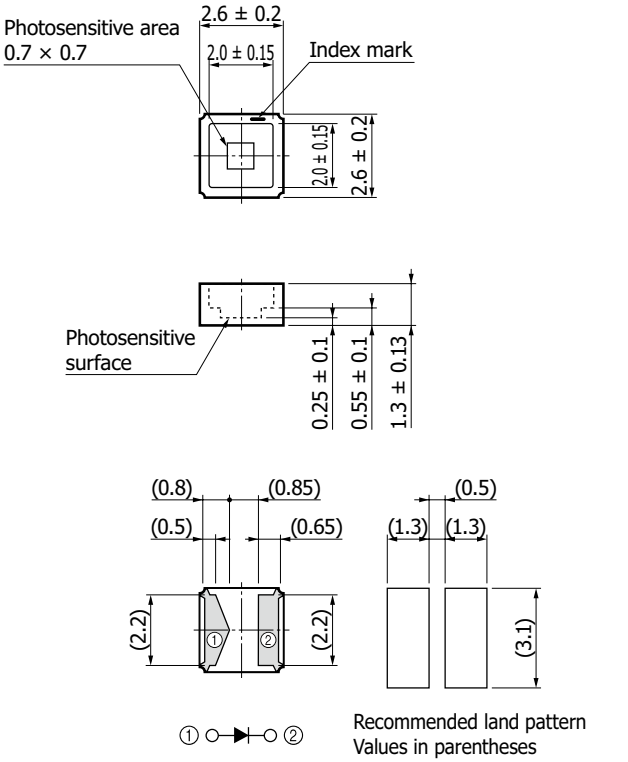
P16612-011CA



Recommended land pattern
Values in parentheses indicate reference values.

KIRDA0281EA

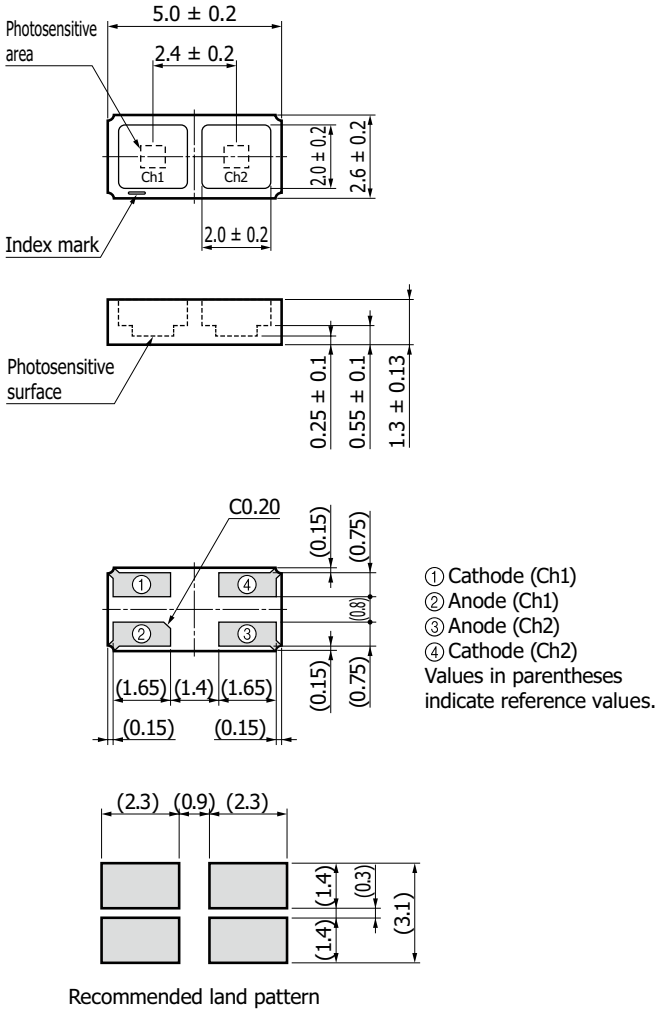
P16612-011CN



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

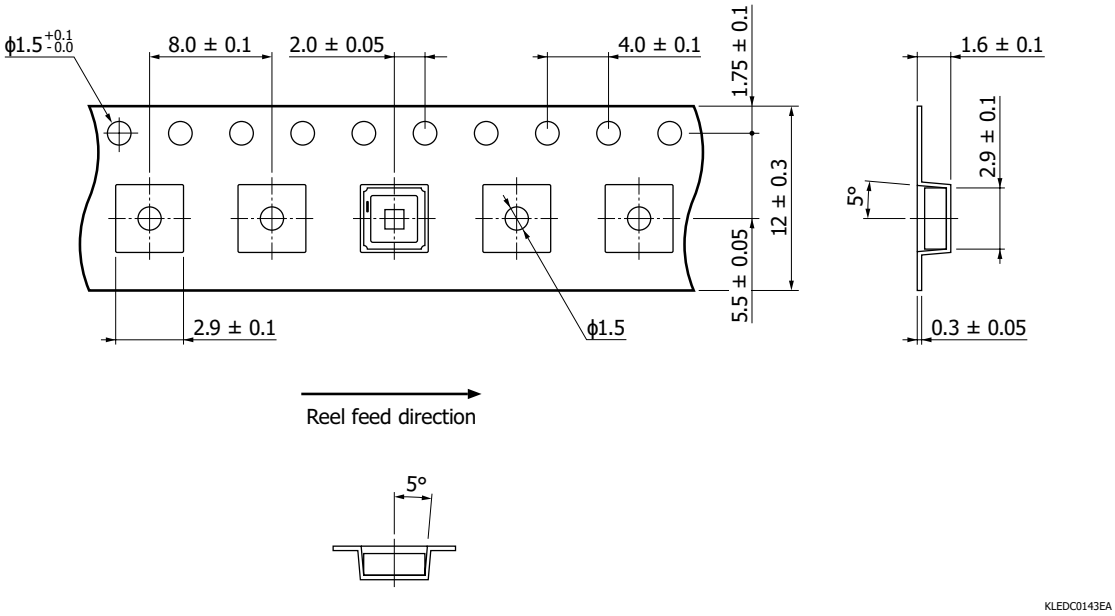
Standard packing specifications

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)



■ Packing quantity
500 pcs/reel

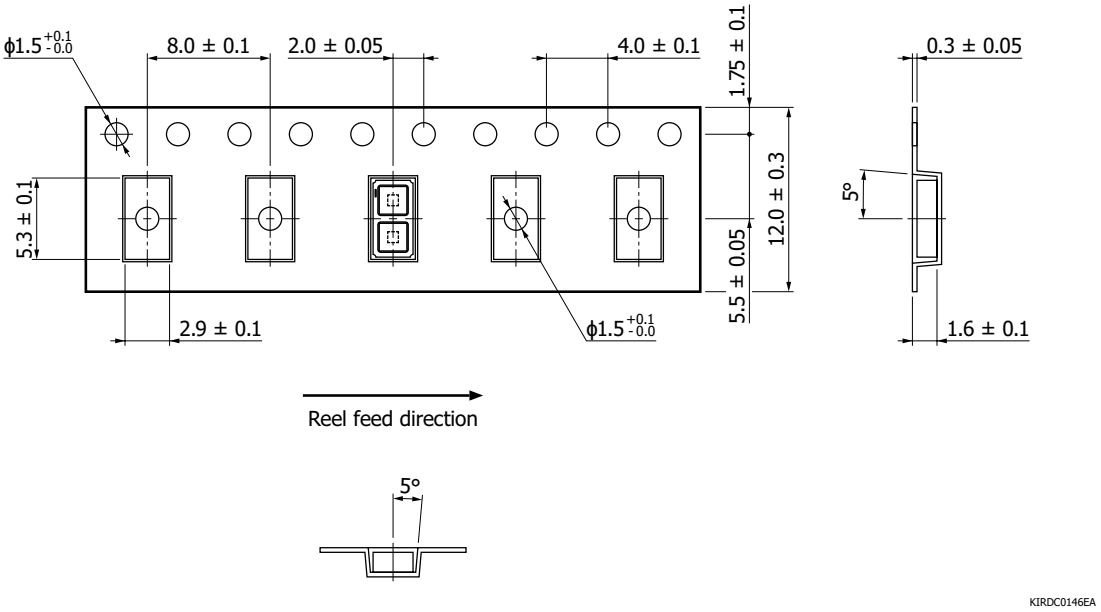
■ Packing state
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

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)



■ Packing quantity
100 pcs/reel

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

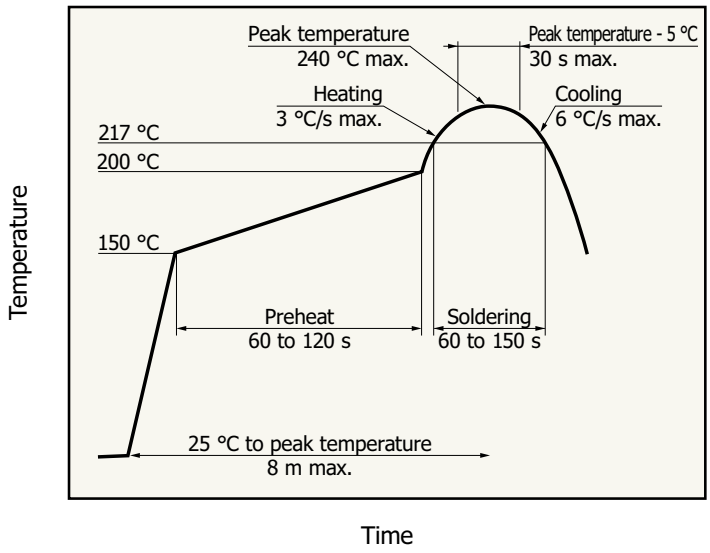
Recommended soldering conditions

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



KSPDB0418EA

- 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.

Related information

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

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

■ Catalogs
· Selection guide / Infrared detectors
· 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

Cat. No. KIRD1145E06 Mar. 2025 DN