

Infrared detector modules with preamp

Non-cooled and thermoelectrically cooled types



Easy-to-use detector modules with built-in preamps

Infrared detector modules operate just by connecting to DC power supplies. Low noise thermoelectric cooled types using InGaAs, InAs, InSb or InAsSb elements are available. We welcome requests for custom devices that suit your application.

Features

- High S/N
- Compact size
- Easy to use
Operates just by connecting to DC power supply
- Circuit design optimized for detector characteristics
- Built-in temperature control circuit (TE-cooled type)

Applications

- Infrared detection

Accessories

- 4-conductor cable for non-cooled type (for DC power supply):
2 m (with one side connector)
A4372-02: C12494-011LH
- 6-conductor cable for TE-cooled type (for DC power supply):
2 m (with one side connector)
A4372-07: C12485-210, C12486-210, C12483-250,
C12492-210, C12494-210S/-210M/-211L
- Instruction manual

Structure

Type no.	Detector element	Cooling	Window material	Photosensitive area (mm)	Supply voltage	
					V _{CC} *1 (V)	V _P *1 (V)
C12483-250	InGaAs (G12180-250A)	Two-stage TE-cooled	AR coated (1.55 μm peak) borosilicate glass	φ5	±15 ± 0.5	+2.5 ^{+0.5} _{-0.1}
C12485-210	InGaAs (G12182-210K)	Two-stage TE-cooled	Borosilicate glass	φ1		+2.5 ^{+0.5} _{-0.1}
C12486-210	InGaAs (G12183-210K)			φ1		+2.5 ^{+0.5} _{-0.1}
C12492-210	InAs (P10090-21)	Two-stage TE-cooled	Sapphire glass	φ1		+2.5 ^{+0.5} _{-0.1}
C12494-210S	InAsSb (P11120-201)	Two-stage TE-cooled	Sapphire glass	φ1		+2.5 ^{+0.5} _{-0.1}
C12494-210M	InAsSb (P12691-201G)		AR coated Ge		+2.5 ^{+0.5} _{-0.1}	
C12494-011LH	InAsSb (P13894-011NA)	Non-cooled	None	1 × 1	±2.5 ± 0.2	-
C12494-211L	InAsSb (P13894-211MA)	Two-stage TE-cooled	AR coated Ge		±15 ± 0.5	+2.5 ^{+0.5} _{-0.1}

*1: V_{CC}=power supply for circuit, V_P=power supply for cooling

▣ Absolute maximum ratings

Type no.	Incident light level (μW)	Supply voltage		Operating temperature* ² Topr (°C)	Storage temperature* ² Tstg (°C)
		Vcc (V)	Vp (V)		
C12483-250	0.2	±18	+5	0 to +40	-20 to +50
C12485-210	0.06				
C12486-210	0.07				
C12492-210	2.6				
C12494-210S	26				
C12494-210M					
C12494-011LH	50 mW	±2.7	-		
C12494-211L	28 mW	±18	+5		

*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 on the product may cause deterioration in characteristics and reliability.

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.

▣ Optical characteristics (Typ. Ta=25 °C, unless otherwise noted)

Type no.	Chip temperature at rated supply voltage Tchip (°C)	Peak sensitivity wavelength λ_p (μm)	Cutoff wavelength λ_c (μm)	Photosensitivity* ³ S $\lambda=\lambda_p$		Noise equivalent power NEP $\lambda=\lambda_p$	
				Min. (V/W)	Typ. (V/W)	Typ. (W/Hz ^{1/2})	Max. (W/Hz ^{1/2})
C12483-250	-15	1.55	1.66	3.3×10^7	5×10^7	7×10^{-14}	7×10^{-13}
C12485-210		1.95	2.05	1.1×10^8	1.8×10^8	1×10^{-13}	3×10^{-12}
C12486-210		2.3	2.56	1×10^8	2×10^8	4×10^{-13}	6×10^{-12}
C12492-210	-28	3.25	3.45	0.8×10^7	1×10^7	6×10^{-12}	1×10^{-11}
C12494-210S	-28	4.9	5.9	5×10^5	7.5×10^5	1×10^{-10}	3×10^{-10}
C12494-210M		6.7	8.3				
C12494-011LH	25	5.6	11	24* ⁴	40* ⁴	5×10^{-9}	9×10^{-9}
C12494-211L	-28		10.2	$2.5 \times 10^{2*4}$	$3.5 \times 10^{2*4}$	1.5×10^{-9}	4.5×10^{-9}

*3: f=100 Hz (C12485-210, C12486-210, C12483-250), f=1.2 kHz (C12492-210, C12494-210S/-210M/-011LH/-211L)

*4: Uniform irradiation on the entire photosensitive area.

▣ Electrical characteristics (Typ. Ta=25 °C, unless otherwise noted)

Type no.	Frequency response -3 dB (Hz)			Output impedance (Ω)	Maximum output voltage RL=1 k Ω (V)	Current consumption* ⁵				
	F _{cL} Typ.	F _{cH}				Vcc		Vp		
		Min.	Typ.			Typ. (mA)	Max. (mA)	Typ. (mA)	Max. (mA)	
C12483-250	DC	900	1.1 k	50	+10	+30, -22	+50, -30	+500	+1100	
C12485-210	DC	1.5 k	2.2 k			+30, -13	+60, -30			
C12486-210	DC	2.1 k	3 k			+30, -14	+60, -30			
C12492-210	5	40 k	50 k		±13	+30, -20	+80, -30	+600		
C12494-210S	5	80 k	100 k		±13	+30, -20	+80, -30	+600		
C12494-210M										
C12494-011LH	DC	40 M	50 M		±2	±35	±45	-		-
C12494-211L		750 k	1 M		+10	+30, -20	+80, -30	+500		+1100

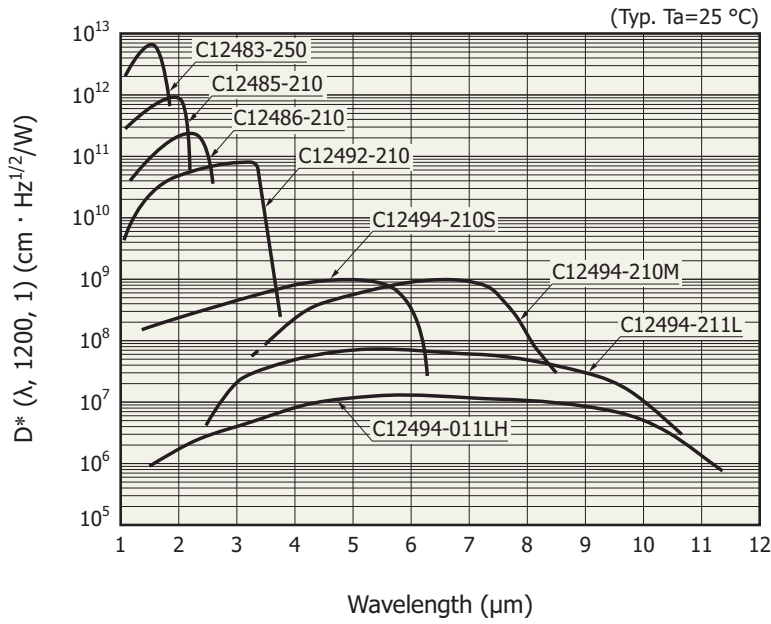
*5: Vcc=±15 V, Vp=2.5 V (C12485-210, C12486-210, C12483-250, C12492-210, C12494-210S/-210M/-211L), Vcc=±2.5 V (C12494-011LH)

Recommended DC power supply (analog power supply): PW18-1.3ATS (TEXIO Technology), E3630A (Keysight Technologies)

Current capacity: More than 1.5 times the maximum current consumption

Ripple noise: 5 mVp-p or less (±15 V, +2.5 V, +4.5 V power supply)

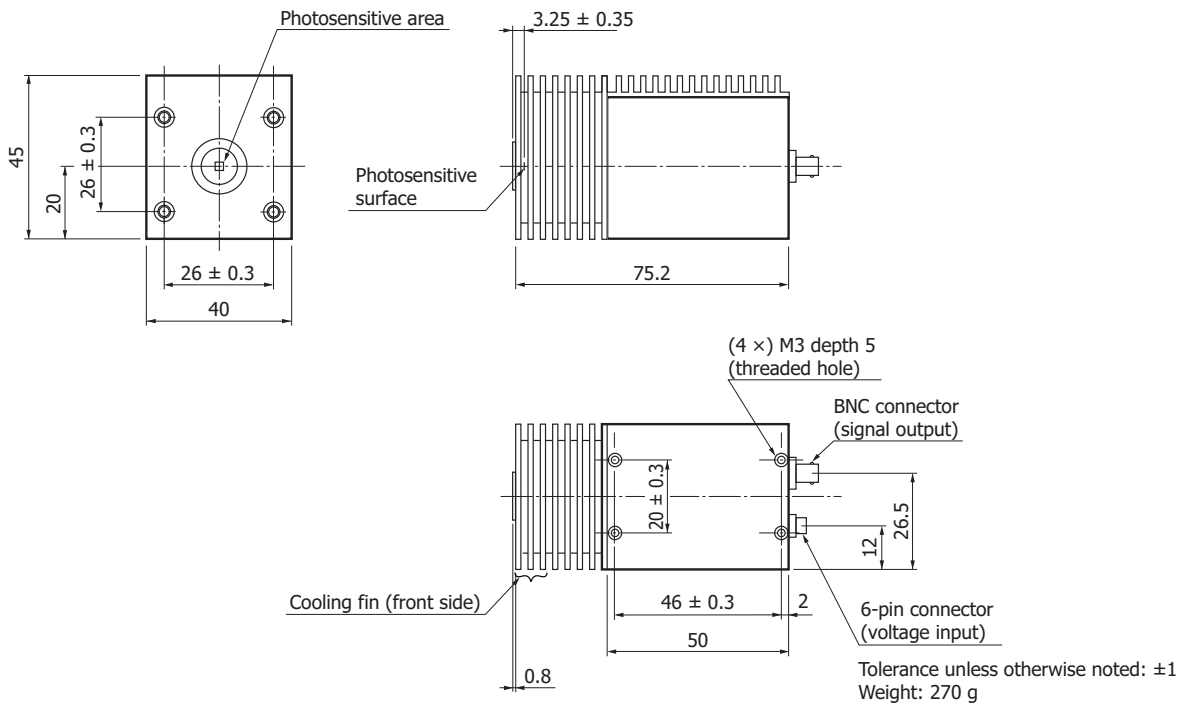
Spectral response



KIRD0188EP

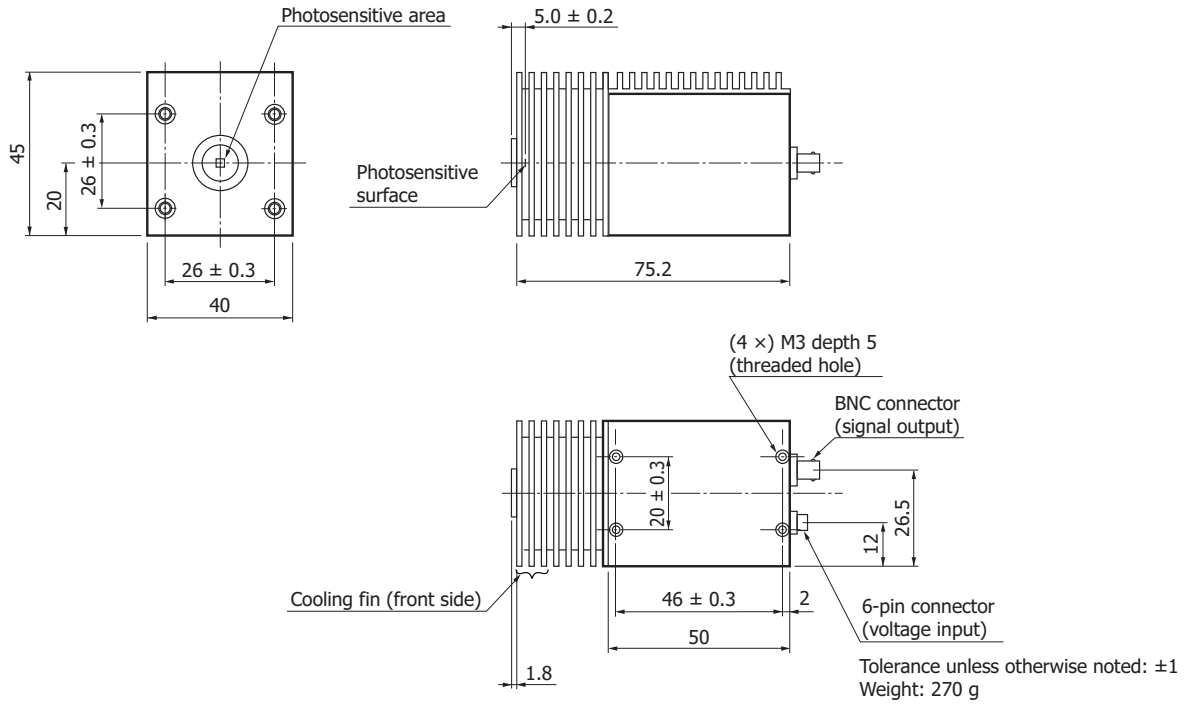
Dimensional outlines (unit: mm)

C12485-210, C12486-210, C12483-250, C12492-210, C12494-210S/-211L



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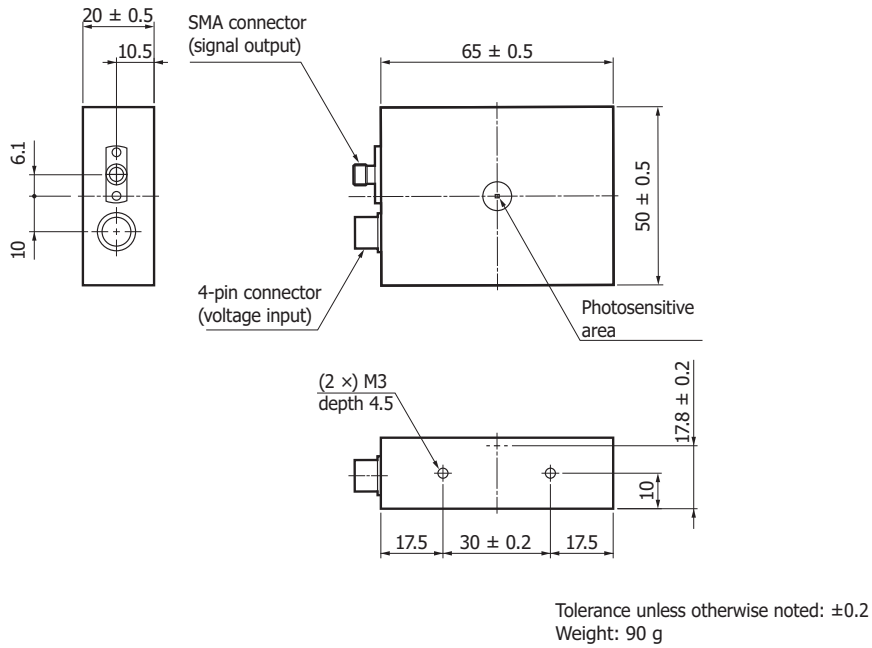
C12494-210M



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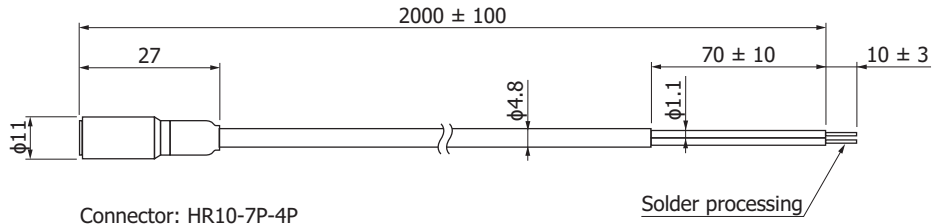
Note: The cooling fin (front side) is removable.

C12494-011LH

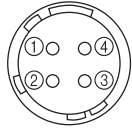


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4-conductor cable (for DC power supply) A4372-02



Connector: HR10-7P-4P
(made by Hirose Electric)



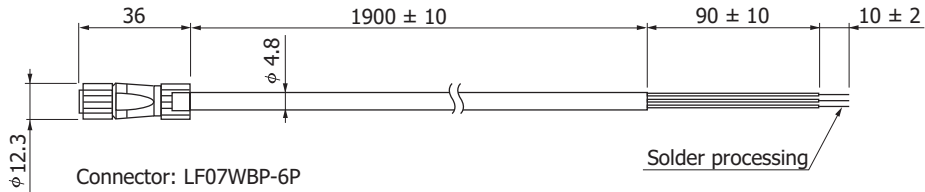
Connector end

Pin no.	Pin connection	Lead color
①	+15 V or +2.5 V	White
②	GND	Black/white/blue stranded wire
③	GND	
④	-15 V or -2.5 V	Blue

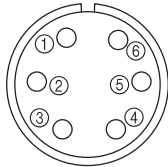
Tolerance unless
otherwise noted: ±1

KIRDA0196EF

6-conductor cable (for DC power supply) A4372-07



Connector: LF07WBP-6P
(made by Hirose Electric)



Connector

Pin no.	Pin connection	Lead color
①	+2.5 V or +4.5 V Power supply for cooling controller	Red
②	GND Power supply for cooling controller	Blue
③	Output for temperature monitor	Light green
④	+15 V	Yellow
⑤	-15 V	White
⑥	GND	Black

Tolerance unless
otherwise noted: ±1

Note: The bare wire is for GND of the case.

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Precautions

- Always use a dual-polarity ± 15 V or ± 2.5 V power supply to operate this detector. Never use a single-polarity power supply. Using a single-polarity power supply may cause the amplifier in the detector module to break down.
- Regarding TE-cooled type, always supply +2.5 V or +4.5 V to cool the detector element.
- Be careful not to apply excessive force to the detector surface. Applying excessive force may damage the light input window. Do not directly touch the light input window with bare hands. If dust or dirt gets on the window, wipe it gently using ethyl alcohol.
- The C12494-011LH has an unsealed detector. Be sure to see the "Unsealed products / Precautions" the related information before use.
- Do not drop this product or do not apply excessive shock to it.

Related information

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

Precautions

- Disclaimer
- Safety consideration
- Unsealed products
- Compound opto-semiconductors (photosensors, light emitters)

Technical information

- Compound semiconductor photosensors / Technical note

Information described in this material is current as of February 2022.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

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