

## OVERVIEW

The H11461 series are photosensor modules containing a 28-mm (1-1/8") diameter side-on PMT and a high-voltage power supply circuit. This PMT delivers high gain, wide dynamic range, and high-speed response. Six types of products are available with different sensitivity characteristics such as spectral response ranges.

Hamamatsu also provides "P" type with low dark count selected for photon counting measurement.

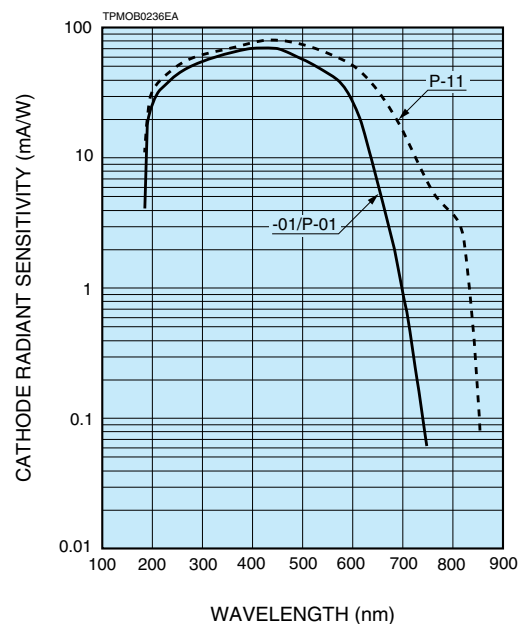
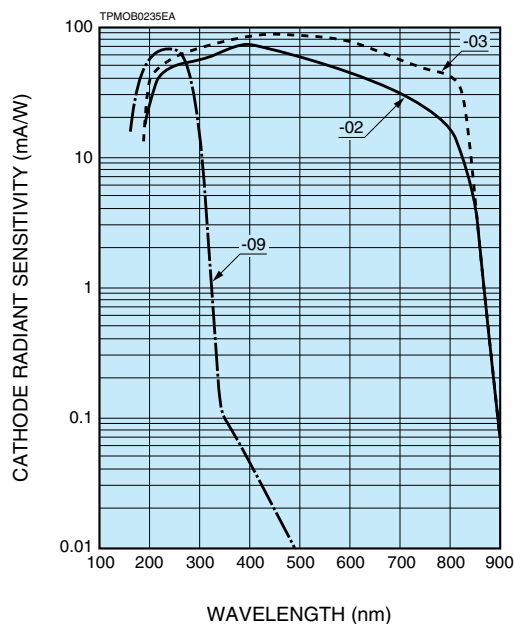


## PRODUCT VARIATIONS

Type No.	Spectral Response	Photocathode	Window material	Features
H11461-01	185 nm to 710 nm	Bialkali	UV glass	Low noise in UV to visible range
H11461-02	185 nm to 900 nm	Multialkali	UV glass	For UV to near IR range
H11461-03	185 nm to 900 nm	Multialkali	UV glass	High sensitivity in UV to near IR range
H11461-09	160 nm to 320 nm	Cs-Te	Quartz	For UV range
H11461P-01	185 nm to 710 nm	Bialkali	UV glass	For photon counting in UV to visible range
H11461P-11	185 nm to 850 nm	Multialkali	UV glass	For photon counting in UV to near IR range

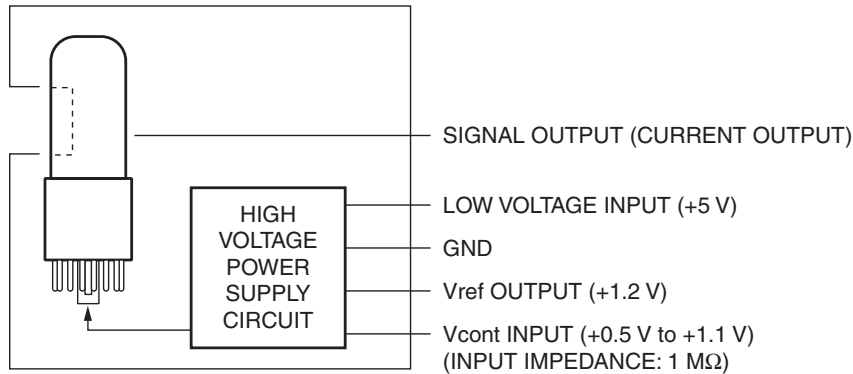
This product can't be used at vacuum environment or reduced pressure environment. Please pay attention when the H11461 series is used for measuring the light below 190 nm.

Figure 1: Typical spectral response



# PHOTOSENSOR MODULES H11461 SERIES

Figure 2: Schematic diagram



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## SPECIFICATIONS

(at +25 °C)

Parameter		H11461 series						Unit	
Suffix		-01	-02	-03	-09	P-01	P-11	—	
Input voltage		+4.5 to +5.5						V	
Max. input voltage		+6.0						V	
Max. input current *1		3.5						mA	
Max. average output signal current *2		100						μA	
Max. control voltage		+1.2 (Input impedance 1 MΩ)						V	
Recommended control voltage adjustment range		+0.5 to +1.1 (Input impedance 1 MΩ)						V	
Effective area		4 × 20						mm	
Peak sensitivity wavelength		410	400	450	230	410	430	nm	
Cathode	Luminous sensitivity	Min.	80	140	475	—	80	140	μA/lm
		Typ.	100	250	525	—	100	200	
	Blue sensitivity index (CS 5-58)	Typ.	8	—	—	—	8	—	—
	Red/White ratio	Typ.	—	0.3	0.4	—	—	0.15	—
	Radiant sensitivity *3	Typ.	70	74	90	62	70	80	mA/W
Anode	Luminous sensitivity *2	Min.	1000	400	3000	—	1000	300	A/lm
		Typ.	1200	2500	5000	—	1200	700	
	Radiant sensitivity *2 *3	Typ.	8.4 × 10 <sup>5</sup>	7.4 × 10 <sup>5</sup>	8.6 × 10 <sup>5</sup>	6.2 × 10 <sup>5</sup>	8.4 × 10 <sup>5</sup>	2.8 × 10 <sup>5</sup>	A/W
	Dark current *2 *4	Typ.	0.2	3	10	1	0.1	0.2	nA
		Max.	2	50	50	10	0.5	1	
Dark count *4 *5	Typ.	—	—	—	—	30	80	s <sup>-1</sup>	
	Max.	—	—	—	—	80	200		
Rise time *2		2.2						ns	
Ripple noise *2 *6 (peak to peak)		Max. 0.3						mV	
Settling time *7		Max. 14						s	
Operating ambient temperature *8		+5 to +50						°C	
Storage temperature *8		-20 to +50						°C	
Weight		225						g	

\*1: At +5 V input voltage, +1.0 V control voltage, and output current equal to dark current.

\*2: Control voltage = +1.0 V

\*3: Measured at the peak sensitivity wavelength (-09: 254 nm)

\*4: After 30 minutes storage in darkness

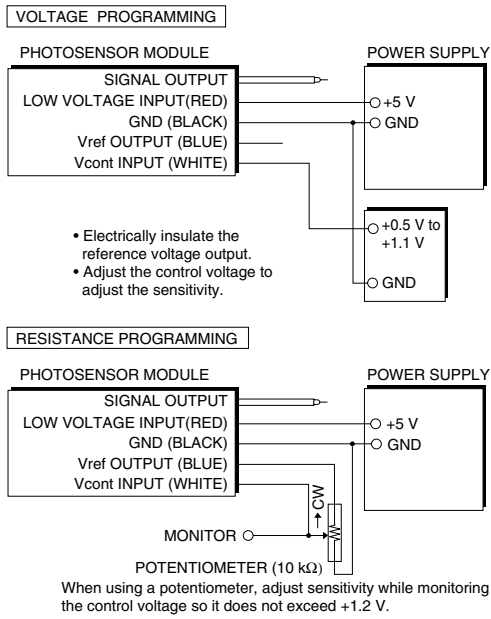
\*5: Control voltage: Plateau voltage

\*6: Cable RG-174/U, Cable length 450 mm, load resistance = 1 MΩ, load capacitance = 22 pF

\*7: The time required for the output to reach a stable level following a change in the control voltage from +1.0 V to +0.5 V.

\*8: No condensation

Figure 3: Sensitivity adjustment method



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Figure 4: Gain

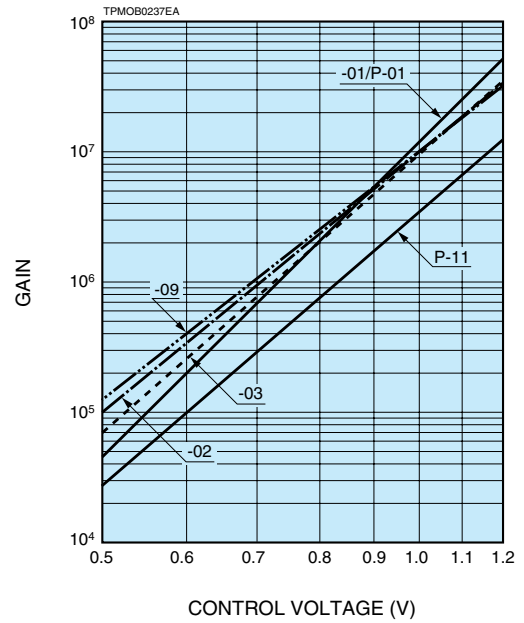


Figure 5: Output signal current vs. input current

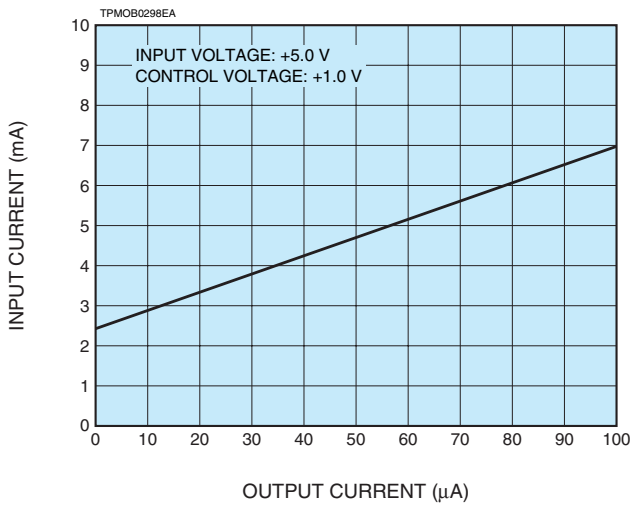


Figure 6: Ripple noise

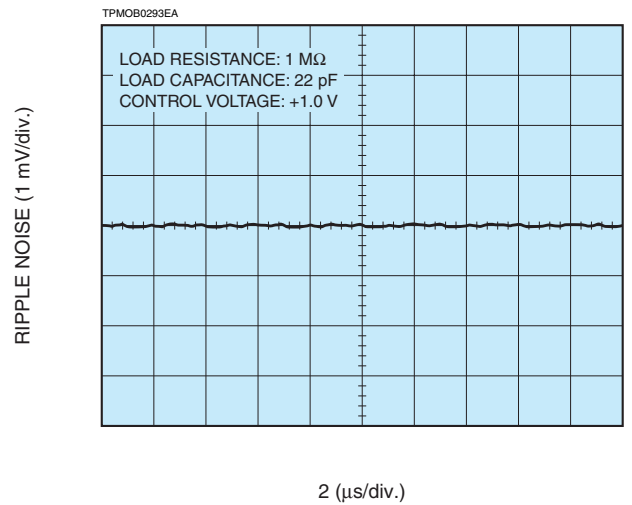


Figure 7: DC linearity

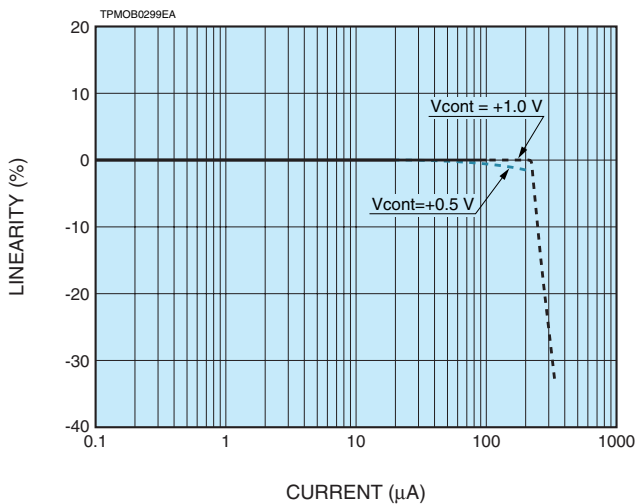
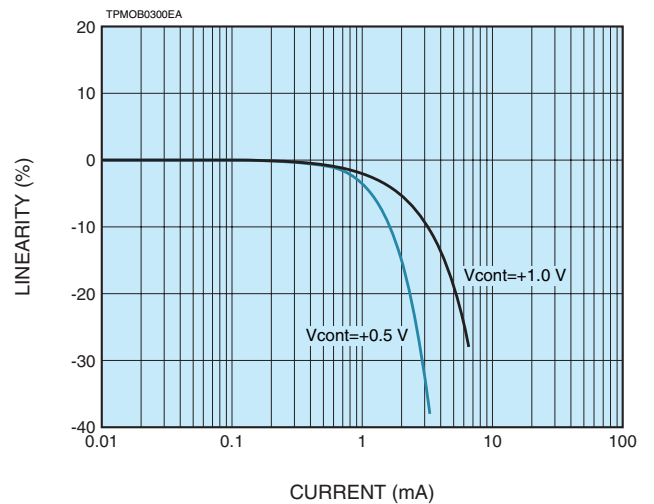
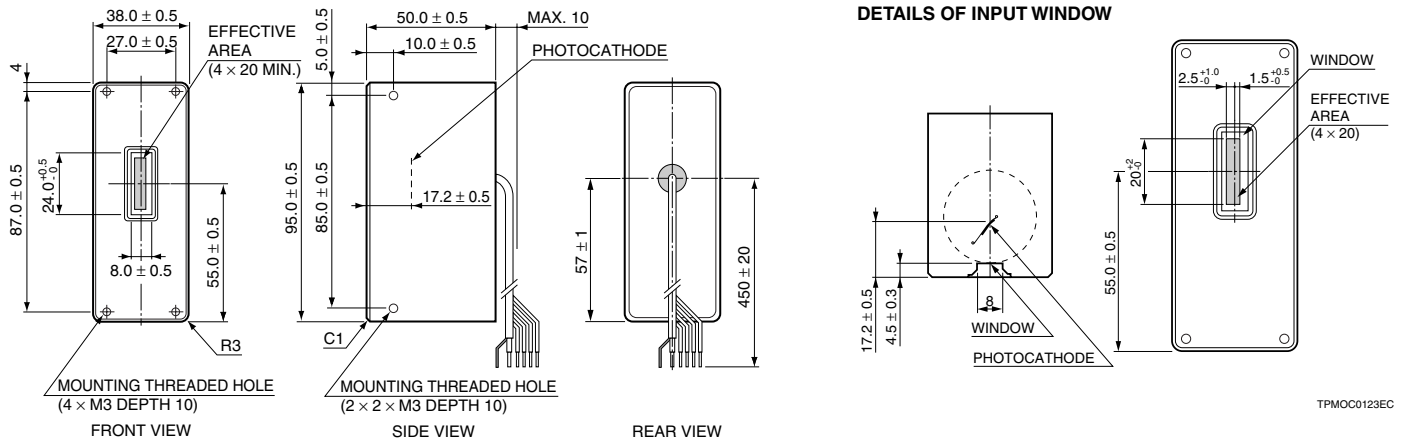


Figure 8: Pulse linearity



# PHOTOSENSOR MODULES H11461 SERIES

Figure 9: Dimensional outlines (Unit: mm)



LOW VOLTAGE INPUT (+5 V) : AWG26 (RED)  
 GND : AWG26 (BLACK)  
 Vref OUTPUT (+1.2 V) : AWG26 (BLUE)  
 Vcont INPUT (+0.5 V to +1.1 V) : AWG26 (WHITE)  
 SIGNAL OUTPUT : RG-174/U \*  
 Weight: 225 g

\* Option: Available with BNC/SMA connector.

If these modules used with optical block, please feel free to consult us.

TPMOA0072EA

## RELATED PRODUCT

### POWER SUPPLY FOR PHOTOMULTIPLIER TUBE MODULES C10709

The C10709 is the power supply for photomultiplier tube modules which has 5 V input voltage.

This unit can provide both the driving voltage and the control voltage. This feature enables users to operate the modules easily.



Parameter	Description / Value	Unit
Output voltage	±5	V
Output current	Max. 2.0 (+5 V), 0.2 (-5 V)	A
Control voltage <sup>(A)</sup> (variable voltage range)	+0.25 to +1.8	V
Terminal connection method	Binding post	—
Input voltage	AC100 to AC240	V
Operating ambient temperature	+5 to +50	°C
Dimensions (W × H × D) <sup>(B)</sup>	147 × 61 × 200	mm
Weight	Approx. 1.2	kg

**NOTE:** <sup>(A)</sup>Adjust within the recommended control voltage range for the photomultiplier tube module being used.

<sup>(B)</sup>Excluding protuberance

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