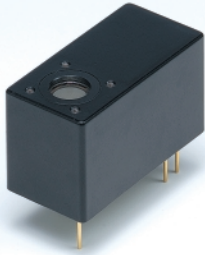


# Metal Package PMT with Gate Function

## Photosensor Modules H12056 Series



The H12056 series is a photosensor module containing a metal package PMT, shutter circuit and a high-voltage power supply circuit. This module has shutter function to avert the PMT from excessive light without switching OFF the PMT voltage completely like the case of opening / closing machine to change the measurement samples. Three types of photocathodes are available, including a super bialkali photocathode that has higher sensitivity than conventional bialkali photocathodes, a multialkali photocathode with sensitivity extending to the near infrared region, and a red sensitivity enhanced multi-alkali photocathode. Hamamatsu also provides "P" type with gain and low dark count selected for photon counting measurement.

### Product Variations

Type No.	Spectral Response	Features
H12056-110	230 nm to 700 nm	Super bialkali photocathode, high sensitivity in visible range
H12056-01	230 nm to 870 nm	For UV to near IR range
H12056-20	230 nm to 920 nm	Infrared-extended multialkali photocathode with enhanced sensitivity
H12056P-110	230 nm to 700 nm	For photon counting

This product can't be used at vacuum environment or reduced pressure environment.

### Specifications

(at +25 °C)

Parameter		H12056 Series			Unit		
Suffix		-110 / P-110	-01	-20	—		
Input Voltage		+4.5 to +5.5			V		
Max. Input Voltage		+6			V		
Max. Average Input Current *1		10			mA		
Max. Output Signal Current *2		100			μA		
Max. Control Voltage		+1.1 (Input Impedance 1 MΩ)			V		
Recommended Control Voltage Adjustment Range		+0.5 to +1.1 (Input Impedance 1 MΩ)			V		
Effective Area		φ8			mm		
Peak Sensitivity Wavelength		400	400	630	nm		
Cathode	Luminous Sensitivity	Min.	80	100	350	μA/lm	
		Typ.	105	200	500		
	Blue Sensitivity Index (CS 5-58)	Typ.	13.5	—	—	—	
	Red / White Ratio	Typ.	—	0.2	0.45	—	
Radiant Sensitivity *3		Typ.	110	77	78	mA/W	
Anode	Standard Type	Luminous Sensitivity *2	Min.	80	100	350	A/lm
			Typ.	210	400	1000	
	Radiant Sensitivity *2 *3	Typ.	$2.2 \times 10^5$	$1.5 \times 10^5$	$1.5 \times 10^5$	A/W	
		Dark Current *2 *4	Typ.	1	1	10	nA
	Max.		10	10	100		
	Dark Count (P Type) *2 *4	Typ.	50	—	—	s <sup>-1</sup>	
Max.		100	—	—			
Rise Time *2		0.57			ns		
Ripple Noise *2 *5 (peak to peak)		Max.	0.6		mV		
Settling Time *6		Max.	10		s		
Operating Ambient Temperature *7		+5 to +50			°C		
Storage Temperature *7		-20 to +50			°C		
Weight		Typ.	70		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

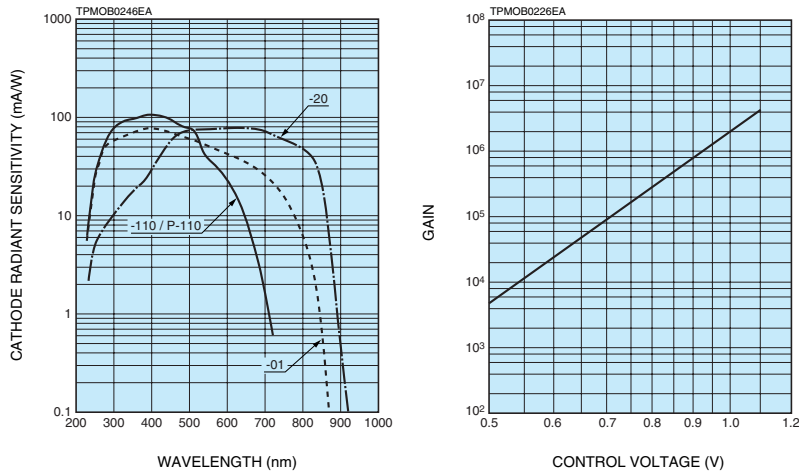
\*4: After 30 minutes storage in darkness.

\*5: Cable RG-174/U, Cable length 450 mm, Load resistance = 1 MΩ, Load capacitance = 22 pF

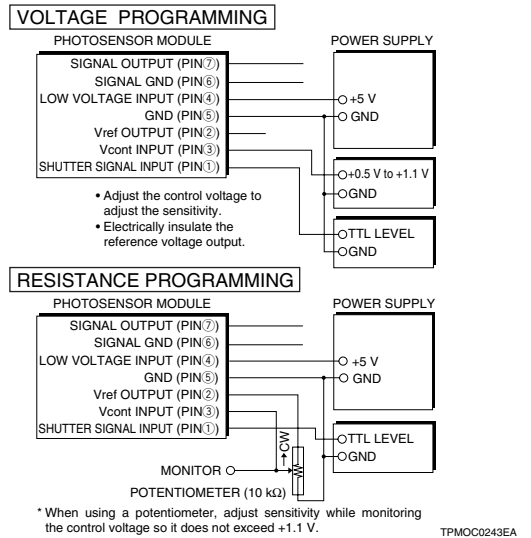
\*6: The time required for the output to reach a stable level following a change in the control voltage from +1.0 V to +0.5 V.

\*7: No condensation

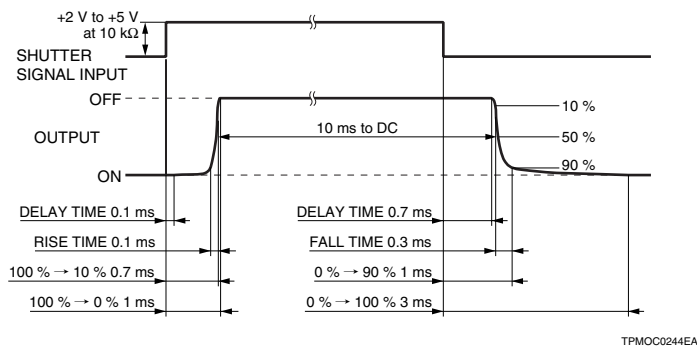
### Characteristics (Cathode radiant sensitivity, Gain)



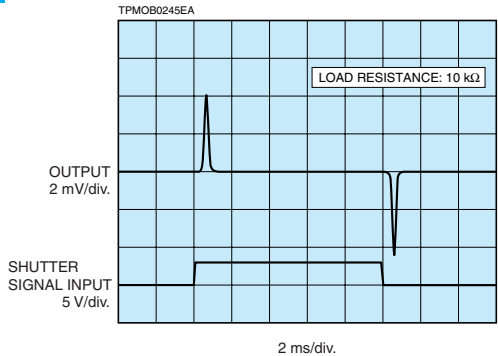
### Sensitivity Adjustment Method



### Shutter Characteristic



### Switching Noise Characteristic



### Shutter Specifications

Parameter	Description / Value	Unit
Mode	Normally ON	—
Shutter Width (FWHM)	10 ms to DC	—
Rise Time	Typ. 0.1	ms
Fall Time	Typ. 0.3	ms
Repetition Rate	Max. 70 Hz (Shutter Width 10 ms)	—
Switching Ratio	9 Hz (Shutter Width 100 ms)	—
Delay Time	Typ. 10 <sup>3</sup>	—
Delay Time	Typ. 0.1 (At Rise), 0.7 (At Fall)	ms
Shutter Signal Level	TTL Level	—
Shutter Signal Input Impedance	(High Level: +2 V to +5 V)	10 kΩ

### Dimensional Outlines (Unit: mm)

