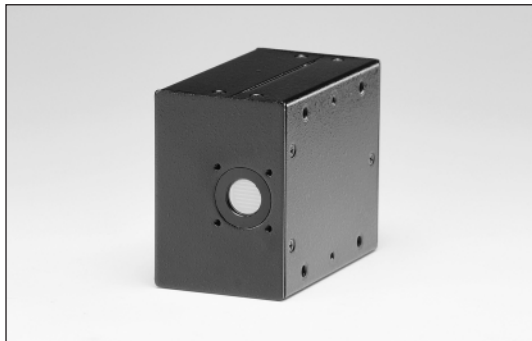


PMT Module with Gate Function **HAMAMATSU**

H10304 Series



The H10304 series is a PMT module that allows high-speed gate operation at a high repetition rate. The combination of built-in metal package PMT and gate circuit makes this module compact yet still provides excellent characteristics: 100 ns minimum gate width, 100 kHz repetition rate. This module also contains a high-voltage power supply so that PMT gain can be varied by simply adjusting the control voltage. The internal protection monitor issues an error signal if high-intensity light enters the module.

A pulse generator C10149 (option) is also provided for gating the H10304.

Product Variations

H10304-A-B

A	Suffix	Spectral Response
	-00	300 nm to 650 nm
	-01	300 nm to 850 nm
	-02	300 nm to 880 nm
	-03	185 nm to 650 nm
	-04	185 nm to 850 nm
	-06	185 nm to 650 nm
	-20	300 nm to 920 nm

B	Suffix	Spectral Response
	NN	Normally ON Type
	NF	Normally OFF Type

The suffix -06 type (synthetic silica window) has higher sensitivity than the -03 type below 300 nm wavelength range.

Specifications

Parameter	H10304 Series	Unit
Input Voltage	+14.5 to +15.5	V
Max. Input Voltage	+16	V
Max. Input Current	100	mA
Max. Surge Current	300	mA
Max. Control Voltage	+1.0 (Input impedance: 10 kΩ)	V
Recommended Control Voltage Adjustment Range	+0.25 to +0.9	V
Effective Area	φ8	mm
Pulse Linearity *1	30	mA
Max. Output Signal Current	100	μA
Operating Ambient Temperature *2	+5 to +45	°C
Storage Temperature *2	-20 to +50	°C
Weight	Approx. 120	g

Parameter			H10304 Series					Unit
Suffix			-00	-03, -06	-01, -04	-02	-20	—
Cathode	Luminous Sensitivity	Min.	40	40	80	200	350	μA/lm
		Typ.	70	70	150	250	500	
	Radiant Sensitivity *3	Typ.	62	62	60	58	78	mA/W
Anode	Luminous Sensitivity	Min.	10	10	15	25	35	A/lm
		Typ.	50	50	75	125	250	
	Dark Current *4	Typ.	0.2	0.2	0.4	2	2	nA
Max.		2	2	4	20	20		
Time *1 Response	Rise Time	Typ.	0.78					ns
	Transit Time	Typ.	5.4					ns
	TTS	Typ.	230					ps

*1: Control voltage = +0.8 V

*2: No condensation

*3: Measured at the peak sensitivity wavelength

*4: Measured when photomultiplier tube operation is ON. After 30 minutes storage in darkness

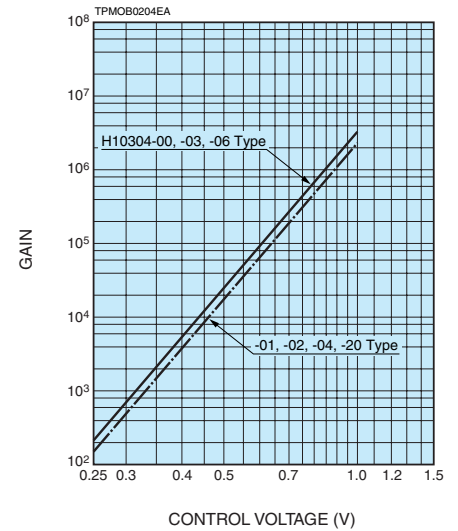
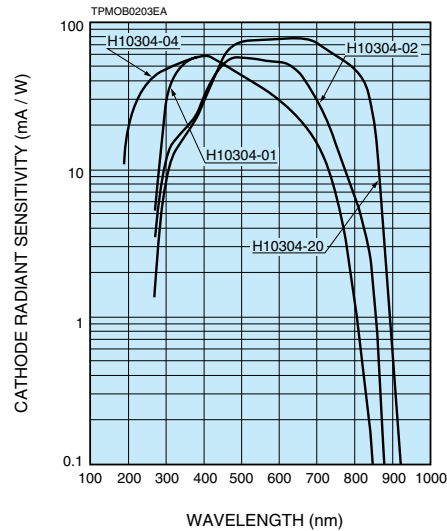
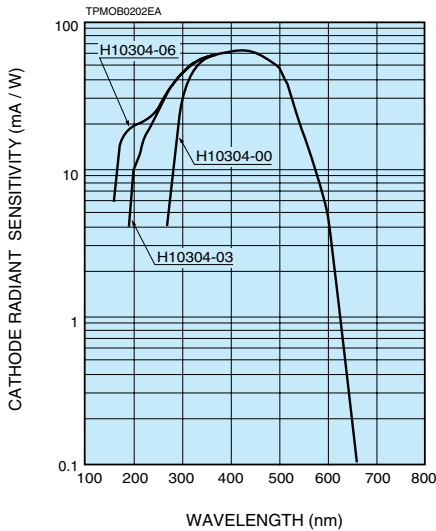
Parameter		H10304-A-NN	H10304-A-NF	Unit
Gate Mode	Mode	Normally ON	Normally OFF	—
	Gate Width (FWHM)	100 ns to ∞		—
	Rise Time	8	70	ns
	Fall Time	70	8	ns
	Repetition Rate	Max.	10	kHz
	Switching Ratio	10 ⁷		—
	Switching Noise *5	Max.	15	mV
	Delay Time	Max.	80	ns
Gate Signal Input	Level	C-MOS (High level: +3.5 V to +5 V)		—
	Pulse Width	20 ns to ∞	200 ns to ∞	—
Sensitivity Adjustment Range		1: 10 ⁴		—
Ripple Noise *1 *6 (peak to peak)		3		mV
Settling Time *7		0.1		s

*5: Load resistance 50 Ω , peak to peak

*6: Cable RG-174/U, Cable length 450 mm, Load resistance = 1 M Ω , Load capacitance = 22 pF

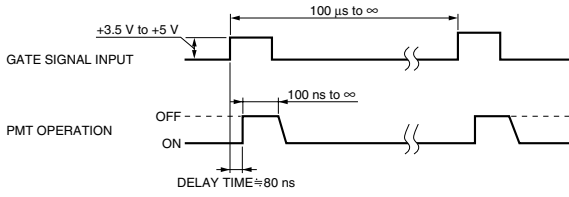
*7: The time required for the output to reach a stable level following a change in the control voltage from +1.0 V to +0.5 V.

Characteristics (Cathode radiant sensitivity, Gain)

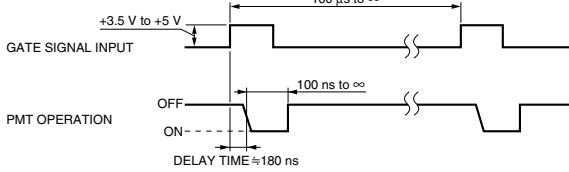


Gate Timing Chart

Normally ON Type



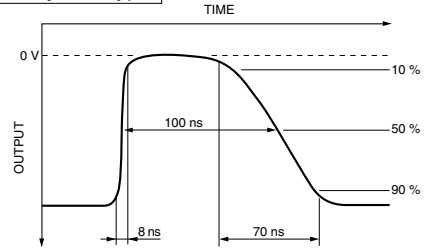
Normally OFF Type



TPMOC0200EA

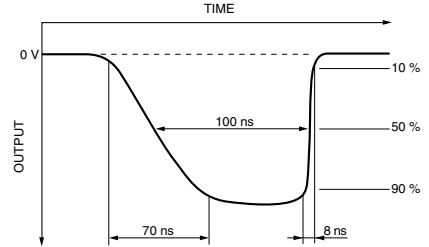
Output Examples

Normally ON Type



TPMOC0205EA

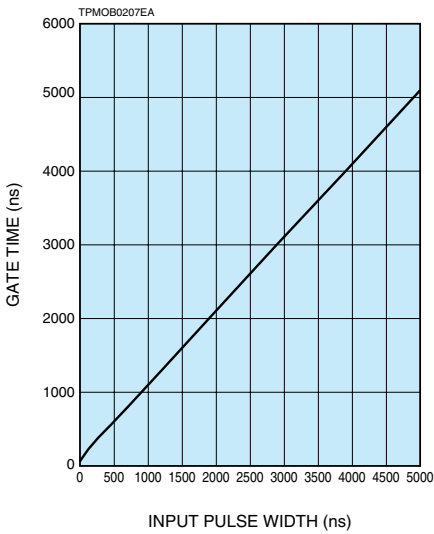
Normally OFF Type



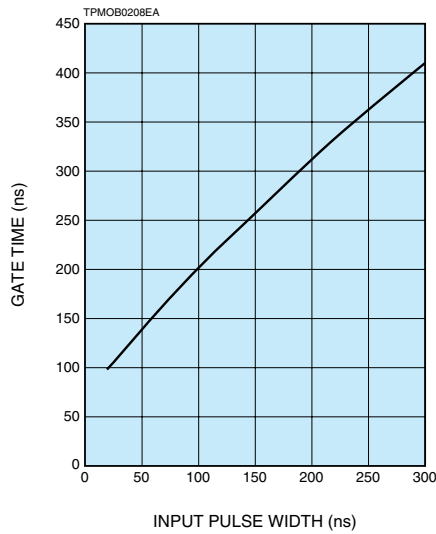
TPMOC0206EA

Gate Time Characteristics

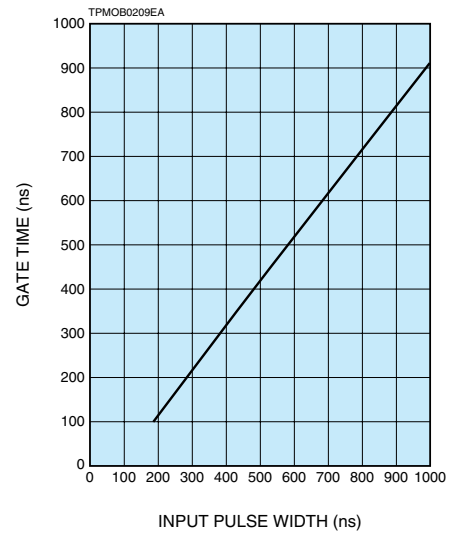
Normally ON Type



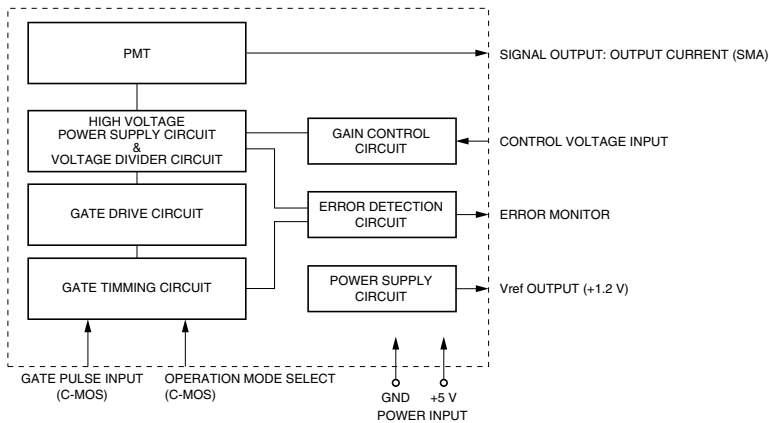
Normally ON Type closeup



Normally OFF Type



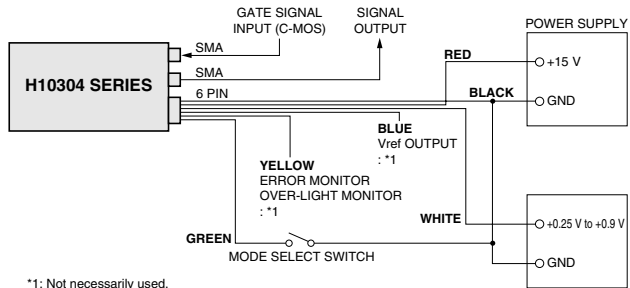
Block Diagram



TPMOC0201EA

Sensitivity Adjustment Method

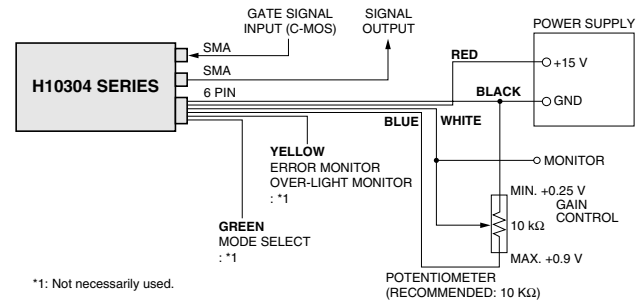
Voltage Programming



*1: Not necessarily used.

TPMOC0202EA

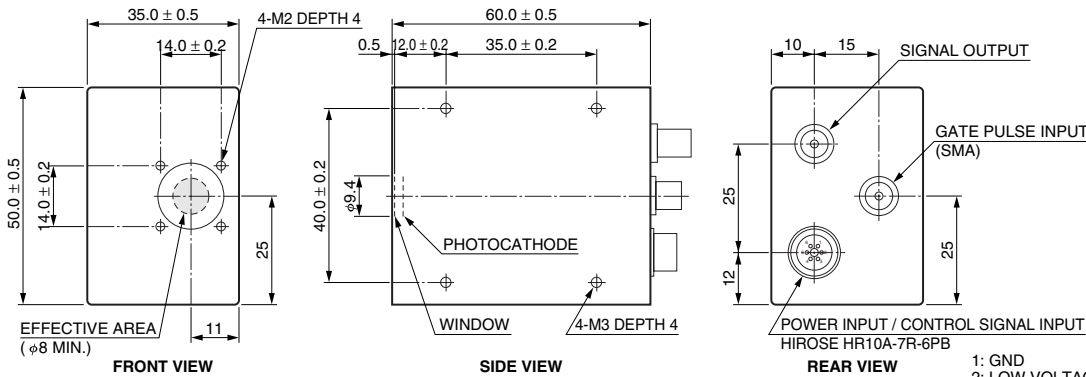
Resistance Programming



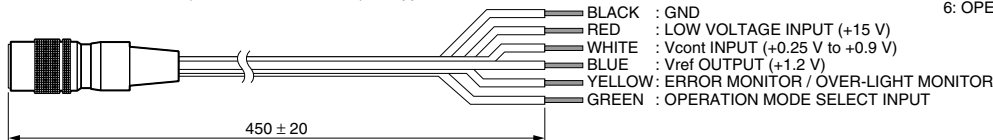
*1: Not necessarily used.

TPMOC0203EA

Dimensional Outlines (Unit: mm)



Power cable with connector (HIROSE HR10A-7P-6S) is supplied with H10304



- 1: GND
- 2: LOW VOLTAGE INPUT (+15 V)
- 3: Vcont INPUT (+0.25 V to +0.9 V)
- 4: Vref OUTPUT (+1.2 V)
- 5: ERROR MONITOR / OVER-LIGHT MONITOR
- 6: OPERATION MODE SELECT INPUT

TPMOA0042EA

Option

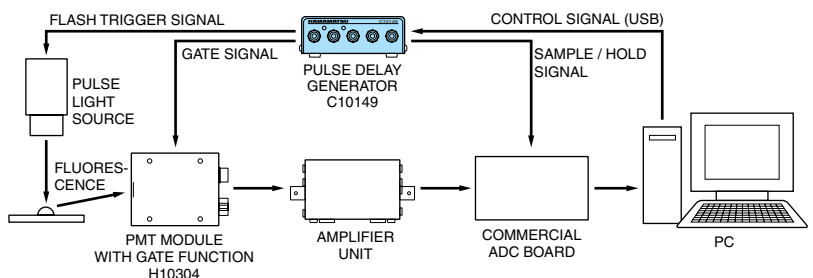
PULSE DELAY GENERATOR C10149



The C10149 can provide the gate (shutter) timing required to operate the H10304. Up to 3 independent channels are available for pulsed output. One channel can be output in burst mode.

The C10149 connects to a PC (personal computer) through a USB port, PC is used to control, set and supply power to the C10149.

Connecting Example



TAPPC0162EA