HAMAMATSU

PHOTON IS OUR BUSINESS

PHOTOMULTIPLIER TUBE R10699

FEATURES

High cathode sensitivity	
Quantum efficiency	
at 600 nm	20 % (Typ.)
at 780 nm	10 % (Typ.)
Luminous	650 µA/Im (Typ.)
Radiant	
at 600 nm	97 mA/W (Typ.)
at 780 nm	63 mA/W (Typ.)
•Wide spectral response	185 nm to 900 nm
High signal to noise ratio	





Biomedical analysis

- Blood analyzer, Flow cytometer, DNA sequencer •Environmental monitoring
- NOx analyzer

Spectroscopy

Fluorescence spectrometer, Raman spectrometer, UV–VIS spectrometer

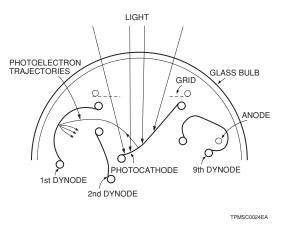
Microscopy



GENERAL

F	Parameter	Description / Value	Unit
Spectral respon	nse	185 to 900	nm
Wavelength of maximum response		450	nm
Photocathode	Material	Multialkali	
	Minimum effective area	8 × 24	mm
Window material		UV glass	—
Dynode	Structure	Circular-cage	_
Dynode	Number of stages	9	_
Direct	Anode to last dynode	4	pF
interelectrode	Anode to all other	6	pF
capacitances	electrodes	8	ρг
Base		11-pin base	—
Weight		Approx. 45	g
Operating ambient temperature		-30 to +50	°C
Storage temperature		-30 to +50	°C
Suitable socket		E678-11A (sold separately)	_
Suitable socket assembly		E717-63 (sold separately)	—

Figure 1: Electro optical structure



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MAXIMUM RATINGS (Absolute maximum values)

	Parameter	Value	Unit
Supply voltage	Between anode and cathode	1250	V
Supply voltage	Between anode and last dynode	250	V
Average anode of	current [®]	0.1	mA

CHARACTERISTICS (at 25 °C)

Parameter			Min.	Тур.	Max.	Unit
	Quantum efficiency	at 600 nm	—	20		%
		at 780 nm	—	10	—	%
	Luminous [®]		620	650	_	µA/Im
Cathode sensitivity	Radiant	at 600 nm	—	97		mA/W
		at 780 nm	—	63	—	mA/W
	Red / White ratio ©		—	0.43		—
	Blue sensitivity index ^D		—	15	_	—
Anode sensitivity	Luminous [®]		1600	8500	—	A/Im
Gain (E)		_	1.3 × 10 ⁷	—	_	
Anode dark current ^(f) (After 30 min storage in darkness, Supply voltage at 1 × 10 ⁶ gain)		rkness, Supply voltage at 1 × 10 ⁶ gain)		2.0	10	nA
·	Anode pulse rise time [©]		—	2.2	—	ns
Time response [©]	Electron transit time ®		—	22	_	ns
	Transit time spread (T.T.S.) ⁽¹⁾			1.2		ns

NOTES

- Averaged over any interval of 30 seconds maximum.
- B The light source is a tungsten filament lamp operated at a distribution temperature of 2856 K. Supply voltage is 100 V between the cathode and all other electrodes connected together as anode.
- © Red / White ratio is the quotient of the cathode current measured using a red filter (Toshiba R-68) interposed between the light source and the tube by the cathode current measured with the filter removed under the same conditions as Note (B).
- D The value is cathode output current when a blue filter (Corning CS 5-58 polished to 1/2 stock thickness) is interposed between the light source and the tube under the same condition as Note ^(B).
- (E) Measured with the same light source as Note (B) and with the voltage distribution ratio shown in Table 1 below.

Table 1: Voltage distribution ratio

	K D	ניין יע	20	y3 D	y4 D	y5 D)y6 D	y7 Dy	/8 Dy	/9 F	>
Distribution ratio	1	1	1	1	1	1	1	1	1	1	

Supply voltage: 1000 V, K: Cathode, Dy: Dynode, P: Anode

- $\ensuremath{\mathbb{F}}$ Measured with the same supply voltage and voltage distribution ratio shown in Table 1.
- © The rise time is the time for the output pulse to rise from 10 % to 90 % of the peak amplitude when the entire photocathode is illuminated by a delta function light pulse.
- H The electron transit time is the interval between the arrival of delta function light pulse at the entrance window of the tube and the time when the anode output reaches the peak amplitube. In measurement, the whole photocathode is illuminated.
- ①Also called transit time jitter. This is the fluctuation in electron transit time between individual pulses in the signal photoelectron mode, and may be defined as the FWHM of the frequency distribution of electron transit times.



Figure 2: Typical spectral response

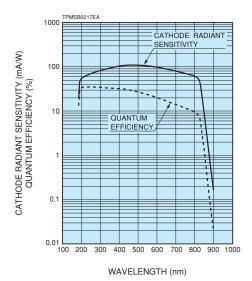
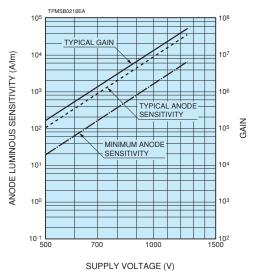
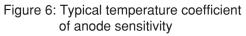


Figure 4: Anode luminous sensitivity and gain characteristics





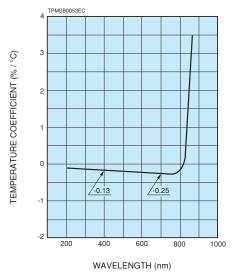
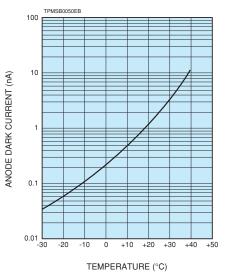
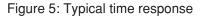
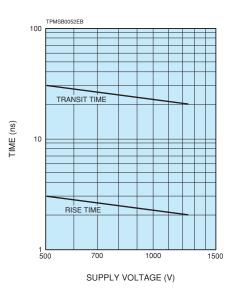


Figure 3: Typical temperature characteristics of dark current (at 1×10^6 gain, after 30 min storage in darkness)





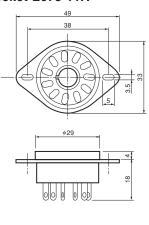


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φ28.5 ± 1.5 8 MIN PHOTOCATHODE DY6 DY5 DY7 6 3 DY8 DY4 24 MIN. DY3 (3 (9) DY9 **80 MAX** рното MAX. CATHODE 10) 5.5 DY2 94 49.0 ± DY DIRECTION OF LIGHT Bottom View (Basing Diagram) 6.0 2.5 $\phi 32.2 \pm 0.5$ **Cross Section** 1 PIN BASE JEDEC No. B11-88 TPMSA0008EA TPMSA0009EB Figure 8: Accessories (Unit: mm) Sold separately

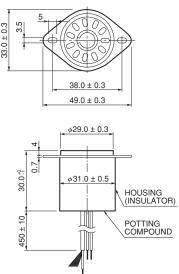
Figure 7: Dimensional outline and basing diagram (Unit: mm)

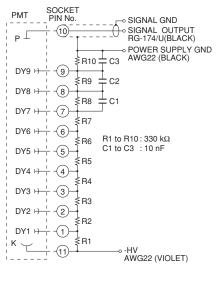




TACCA0064EA

D type socket assembly E717-63





TACCA0002EH

Hamamatsu also provides C13890 series compact high voltage power supplies and C12597-01, C8991 DP type socket assemblies which incorporate a DC to DC converter type high voltage power supply.

Warning–Personal Safety Hazards

Electrical Shock-Operating voltages applied to this device present a shock hazard.

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