

**High QE multialkali photocathode
28 mm (1-1/8 inch) diameter, 9-stage, Side-on type**

FEATURES

- **High sensitivity**
 - Radiant**
 - at 600 nm 97 mA/W (Typ.)
 - at 780 nm 63 mA/W (Typ.)
 - Quantum efficiency**
 - at 600 nm 20 % (Typ.)
 - at 780 nm 10 % (Typ.)
 - Luminous** 650 μ A/lm (Typ.)
- **Wide spectral response** 185 nm to 900 nm
- **High signal to noise ratio**
- **Pin compatible with 1-1/8 side-on PMTs**

APPLICATIONS

- **Biomedical analysis**
Blood analyzer, Flow cytometer, DNA sequencer
- **Environmental monitoring**
NOx analyzer
- **Spectroscopy**
Fluorescence spectrometer, Raman spectrometer,
UV-VIS-NIR spectrometer
- **Microscopy**



Figure 2: Typical spectral response

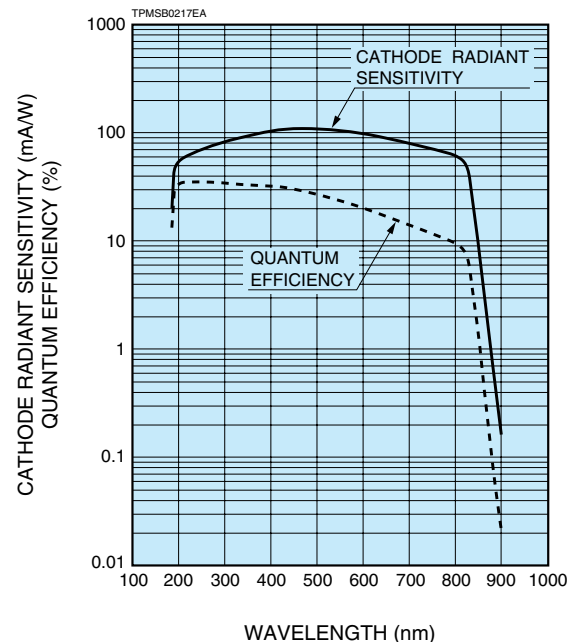
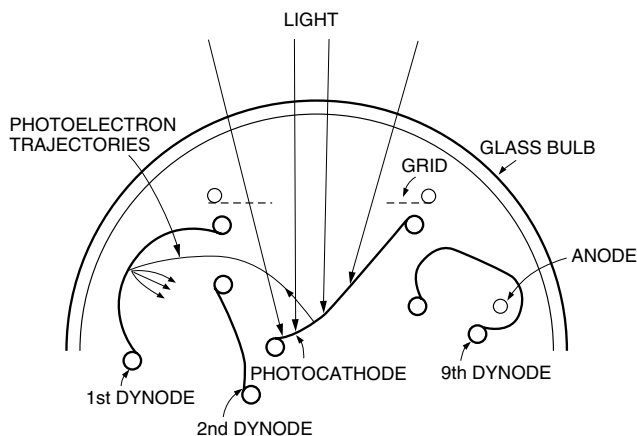


Figure 1: Electro optical structure



TPMSC0024EA

PHOTOMULTIPLIER TUBE R10699

SPECIFICATIONS

GENERAL

Parameter		Description / value	Unit
Spectral response		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	—
	Number of stages	9	—
Direct interelectrode capacitances	Anode to last dynode	4	pF
	Anode to all other electrodes	6	pF
Base		11-pin base JEDEC No. B11-88	—
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)	—

NOTES

- A: 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.
 C: 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

Electrodes	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	P
Ratio	1	1	1	1	1	1	1	1	1	1	1

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

MAXIMUM RATINGS (Absolute maximum values)

Parameter		Value	Unit
Supply voltage	Between anode and cathode	1250	V
	Between anode and last dynode	250	V
Average anode current ^A		0.1	mA

- F: After 30 min Storage in Darkness
 G: 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 amplitude. In measurement, the whole photocathode is illuminated.
 I: Also called transit time jitter. This is the fluctuation in electron transit time between individual pulses in the signal photoelectron mode, and is defined as the FWHM of the frequency distribution of electron transit times

CHARACTERISTICS (at 25 °C)

Parameter		Min.	Typ.	Max.	Unit	
Cathode sensitivity	Quantum efficiency	at 600 nm	—	20	%	
		at 780 nm	—	10	%	
	Luminous ^B	620	650	—	μA/lm	
	Radiant	at 600 nm	—	97	—	mA/W
		at 780 nm	—	63	—	mA/W
Red / white ratio ^C		—	0.43	—	—	
Blue sensitivity index ^D		—	15	—	—	
Anode sensitivity	Luminous ^E	1600	8500	—	A/lm	
Gain ^E		—	1.3 × 10 ⁷	—	—	
Anode dark current ^F (Supply voltage at 1 × 10 ⁶ gain)		—	2.0	10	nA	
Time response	Anode pulse rise time ^G	—	2.2	—	ns	
	Electron transit time ^H	—	22	—	ns	
	Transit time spread (T.T.S.) ^I	—	1.2	—	ns	

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

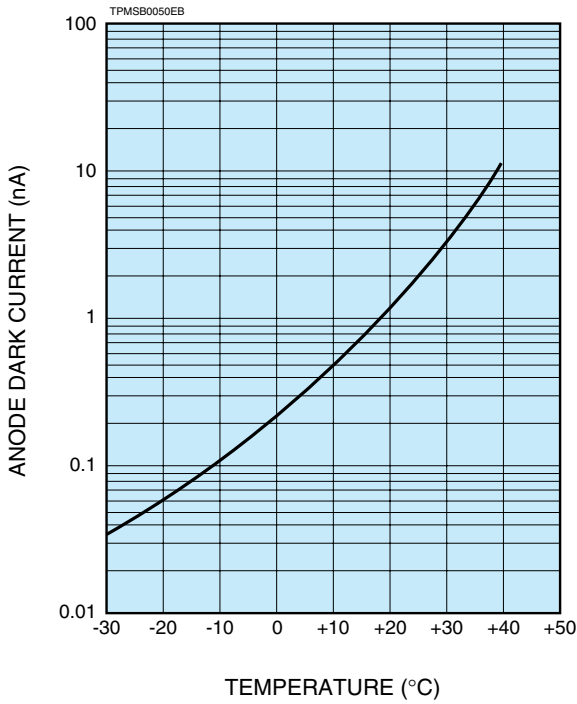


Figure 4: Anode luminous sensitivity and gain characteristics

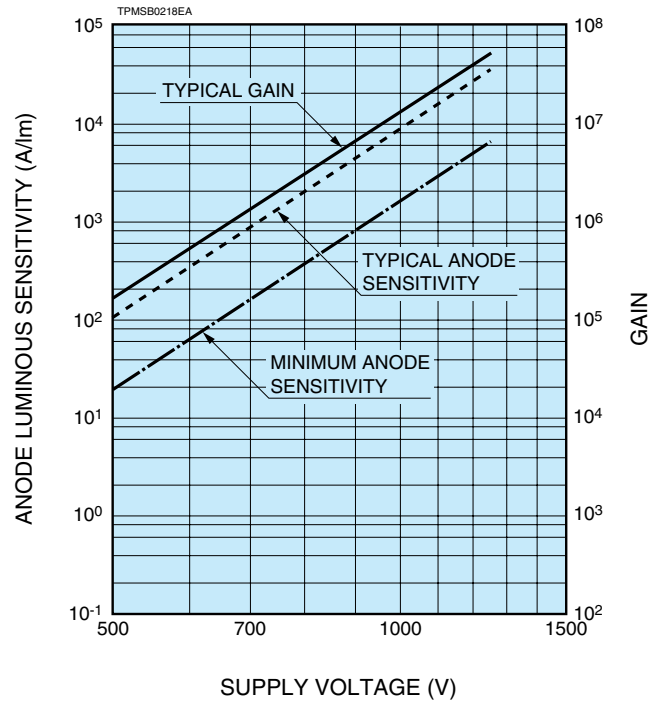


Figure 5: Typical time response

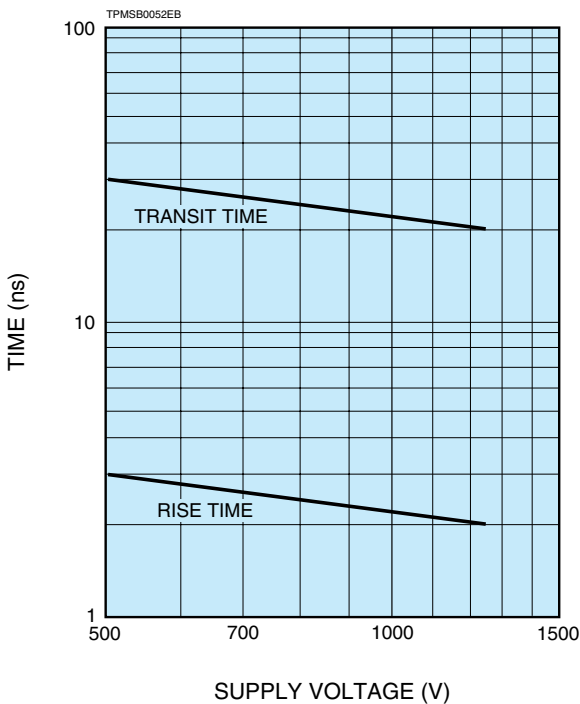
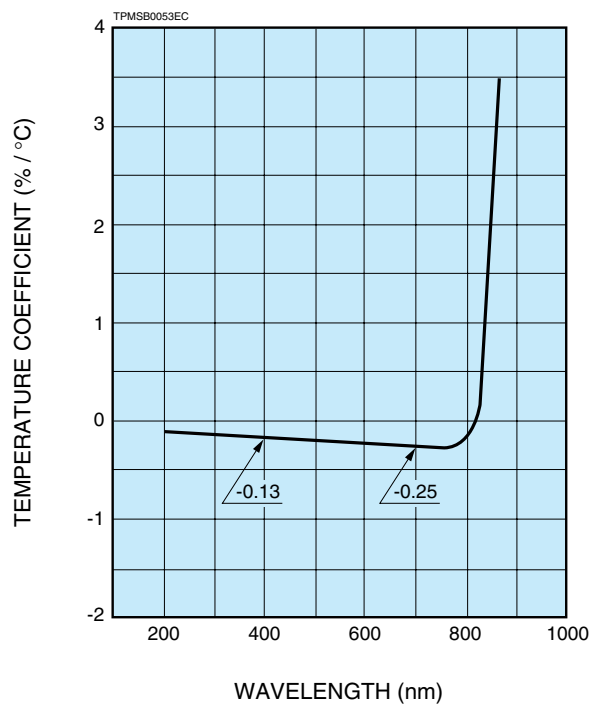
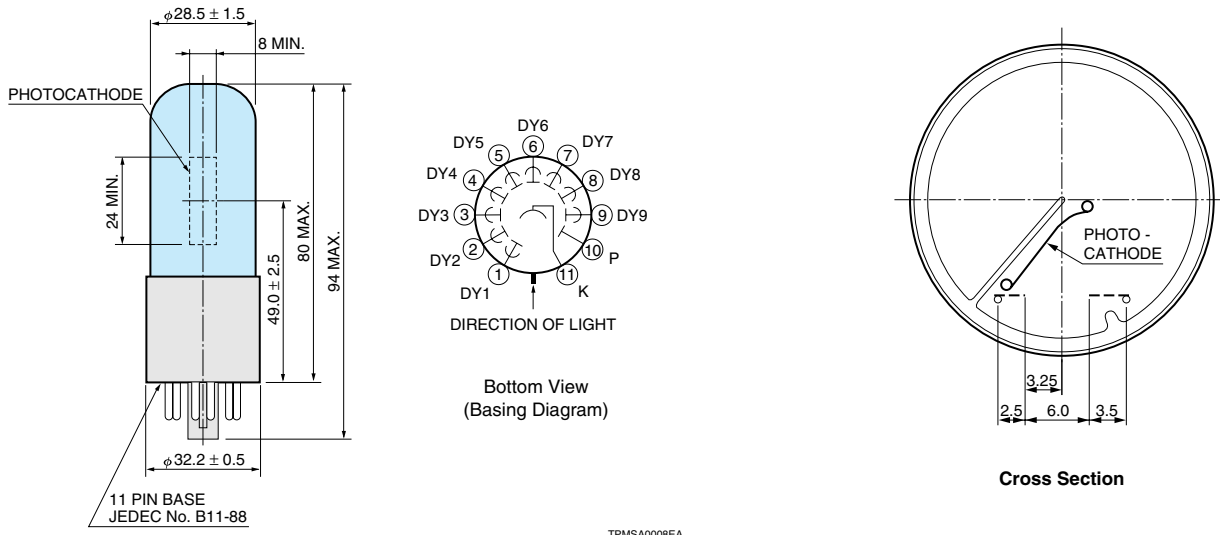


Figure 6: Typical temperature coefficient of anode sensitivity



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

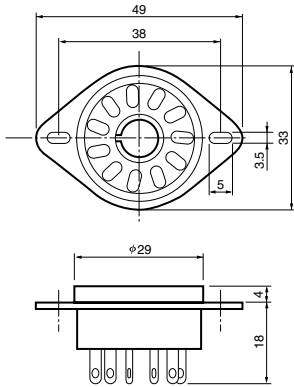


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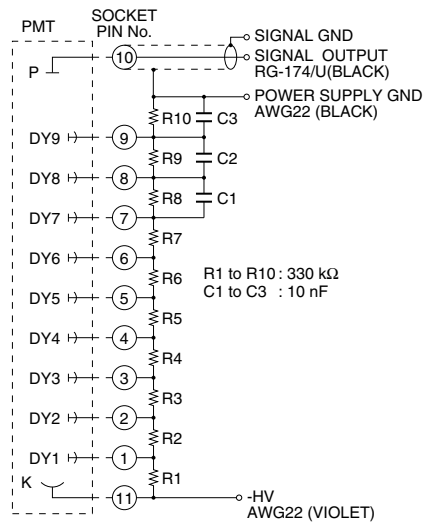
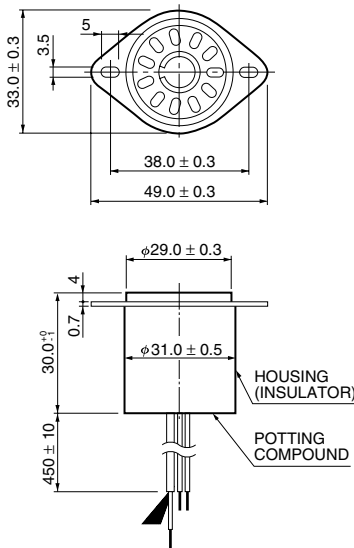
Figure 8: Accessories (Unit: mm) Sold separately

Socket E678-11A



TACCA0064EA

D type socket assembly E717-63



TACCA0002EH

* Hamamatsu also provides C4900 series compact high voltage power supplies and C12597-01 series 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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