HAMAMATSU

PHOTON IS OUR BUSINESS

PHOTOMULTIPLIER TUBE
R7154

FEATURES

- **Spectral response ..... 160 nm to 320 nm**
- **Cathode sensitivity**
  - **Radiant at 254 nm ..... 62 mA/W Typ.**
  - **Quantum efficiency at 254 nm ..... 30 % Typ.**
- **Anode sensitivity**
  - **Radiant at 254 nm ..... 6.2×10^5 A/W Typ.**

APPLICATIONS

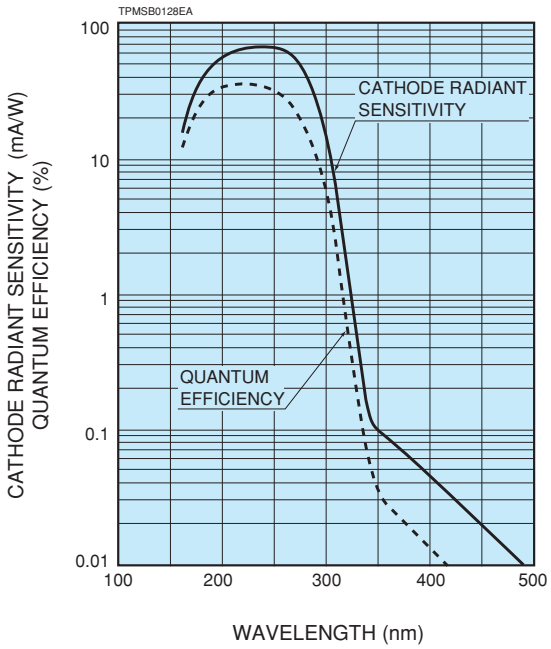
- **Emission spectroscopy**
- **UV spectrophotometers**

SPECIFICATIONS

GENERAL

Parameter		Description / Value	Unit
Spectral response		160 to 320	nm
Wavelength of maximum response		230	nm
Photocathode	Material	Cs-Te	—
	Minimum effective area	8 × 24	mm
Window material		Silica	—
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	—
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)	—
		E717-74 (sold separately)	

Figure 1: Typical spectral response



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 Ⓐ		0.1	mA

CHARACTERISTICS (at 25 °C)

Parameter			Min.	Typ.	Max.	Unit
Cathode sensitivity	Quantum efficiency	at 254 nm	—	30	—	%
	Radiant	at 254 nm	—	62	—	mA/W
Anode sensitivity	Radiant	at 254 nm	1.0×10^5	6.2×10^5	—	A/W
Gain			—	1.0×10^7	—	—
Anode dark current Ⓑ (After 30 min storage in darkness)			—	1	10	nA
ENI (Equivalent Noise Input) Ⓒ			—	9.1×10^{-17}	—	W
Time response Ⓑ	Anode pulse rise time Ⓓ		—	2.2	—	ns
	Electron transit time Ⓔ		—	22	—	ns
	Transit time spread (TTS) Ⓕ		—	1.2	—	ns

NOTES

Ⓐ Averaged over any interval of 30 seconds maximum.

Table 1: Voltage distribution ratio

Electrode	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	P
Distribution ratio	1	1	1	1	1	1	1	1	1	1	

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

Ⓑ Measured with the same supply voltage and voltage distribution ratio shown in Table 1.

Ⓒ ENI is an indication of the photon-limited signal-to-noise ratio. It refers to the amount of light in watts to produce a signal-to-noise ratio of unity in the output of a photomultiplier tube.

$$ENI = \frac{\sqrt{2q \cdot Idb \cdot G \cdot \Delta f}}{S} \quad (W)$$

where q = Electronic charge (1.60×10^{-19} coulomb).
Idb = Anode dark current (after 30 minute storage) in amperes.
G = Gain.
Δf = Bandwidth of the system in hertz. 1 hertz is used.
S = Anode radiant sensitivity in amperes per watt at the wavelength of peak response.

Ⓓ 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.

Ⓔ 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.

Ⓕ Also 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: Anode radiant sensitivity and gain characteristcs

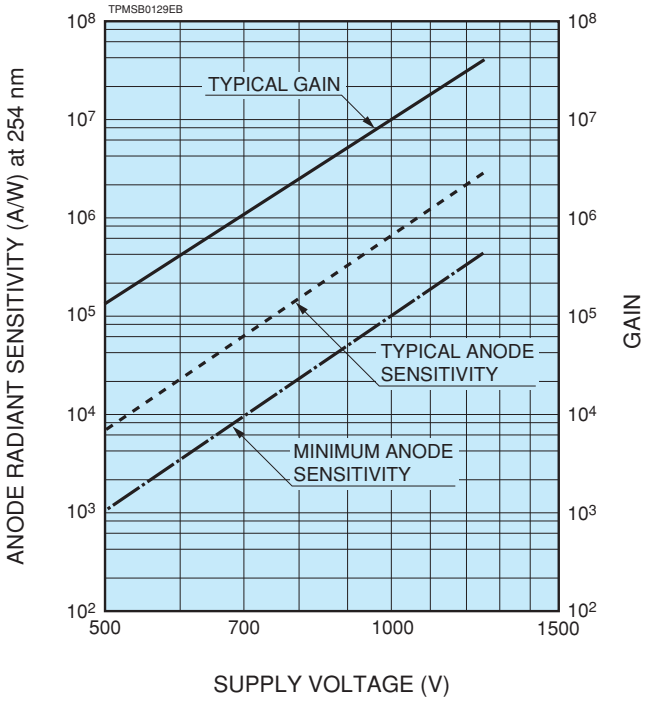


Figure 3: Typical time response

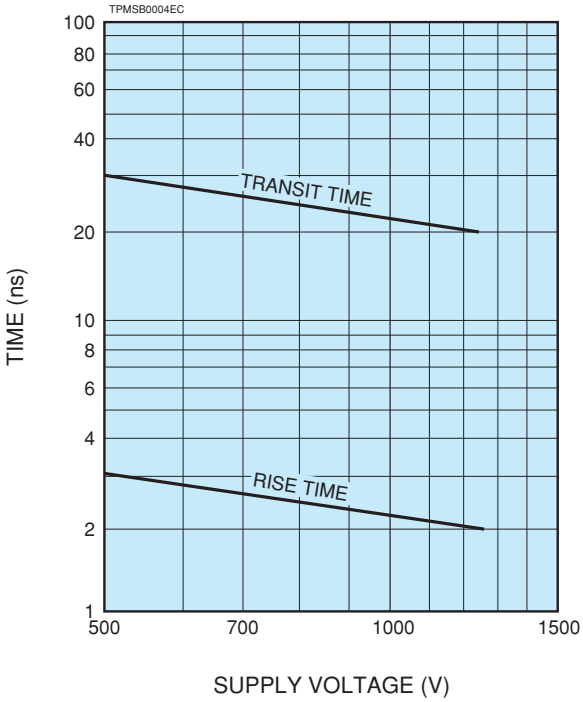


Figure 4: Dimensional outline and basing diagram (Unit: mm)

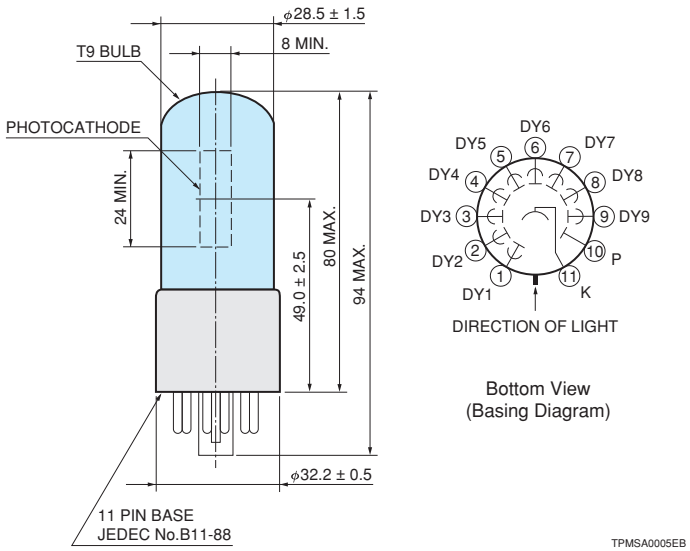


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Figure 5: Socket (Unit: mm) Sold separately

E678-11A

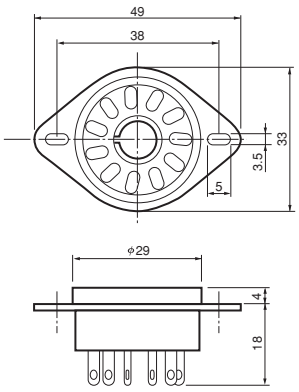

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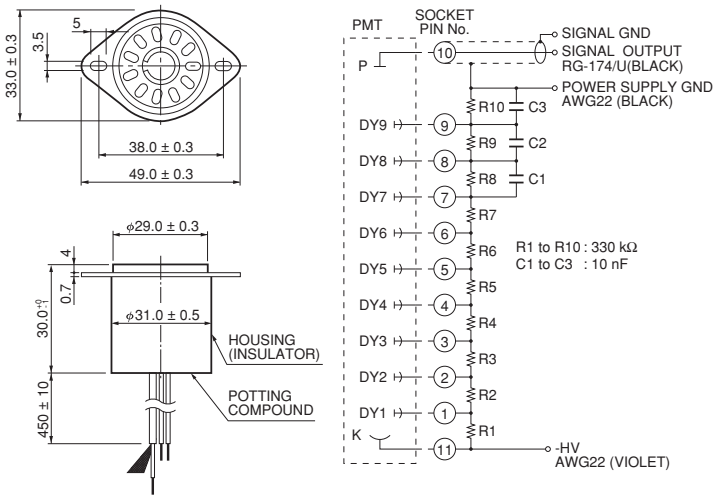
Figure 6: D type socket assembly (Unit: mm) Sold separately

E717-63



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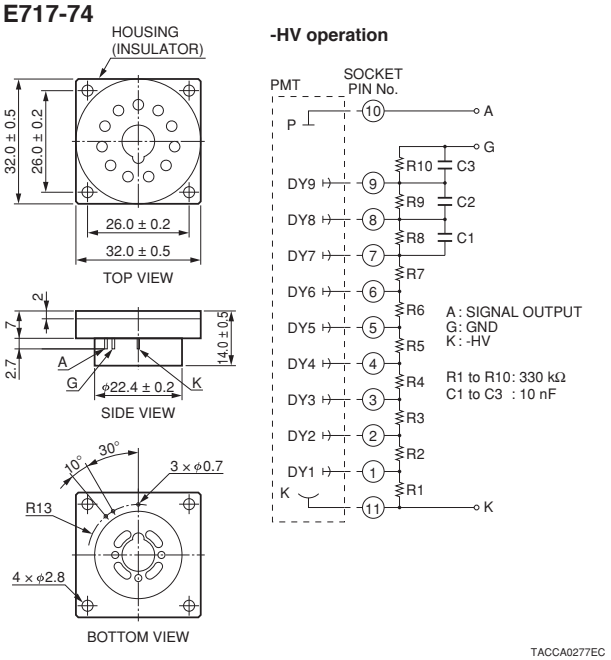
E717-74



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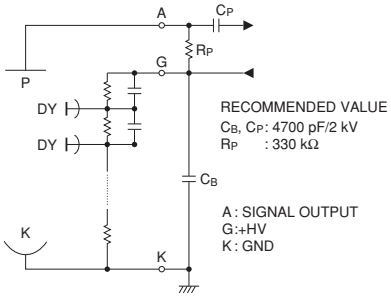
+HV operation

CB, CP and RP must be connected as follows.



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* 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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