

# HAMAMATSU

PRELIMINARY DATA  
OCT. 2001

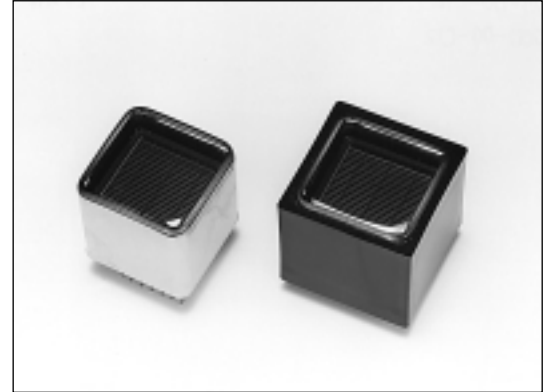
## POSITION SENSITIVE PHOTOMULTIPLIER TUBES R8520-00-C12 R8520U-00-C12

### FEATURES

- 6 (X) + 6 (Y) Cross Plate Anode
- Flangeless Type
- High Speed Response

### APPLICATIONS

- PET (Positron Emission Tomography)
- Compact Gamma Camera
- Scintillation Mammography



### GENERAL

Parameter		Description	Unit
Spectral Response		300 to 650	nm
Wavelength of Maximum Response		420	nm
Photocathode	Material	Bialkali	—
	Minimum Effective Area	22 × 22	mm <sup>2</sup>
Window Material		Borosilicate glass	—
Dynode	Structure	Metal channel dynode	—
	Number of Stages	11	—
Anode		6 (X) + 6 (Y) Cross plate anode	—
Weight		Approx. 28	g
Suitable Socket		E678-32B (sold separately)	—

### MAXIMUM RATINGS (Absolute Maximum Values)

Parameter		Value	Unit
Supply Voltage	Between Anode and Cathode	1000	V dc
Average Anode Current in Total		0.1	mA

### CHARACTERISTICS (at 25 °C)

Parameter		Min.	Typ.	Max.	Unit
Cathode Sensitivity	Luminous (2856 K)	50	70	—	μA/lm
	Blue Sensitivity Index (CS 5-58)	7	8.5	—	—
Anode Sensitivity	Luminous (2856 K)	15	70	—	A/lm
Gain		—	1 × 10 <sup>6</sup>	—	—
Anode Dark Current in Total of Anodes (after 30 min storage in darkness)		—	2	10	nA
Time Response	Anode Pulse Rise Time	—	1.4	—	ns

**NOTE:** Anode characteristics are measured with the voltage distribution ratio shown below.

### VOLTAGE DISTRIBUTION RATIO AND SUPPLY VOLTAGE

Electrodes	K	G	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	Dy11	P
Ratio	0.5	1.5	2	1	1	1	1	1	1	1	1	1	1	0.5

Supply Voltage: 800 V dc, K: Cathode, G: Grid, Dy: Dynode, P: Anode

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# POSITION SENSITIVE PHOTOMULTIPLIER TUBES R8520-00-C12, R8520U-00-C12

Figure 1: Typical Spectral Response

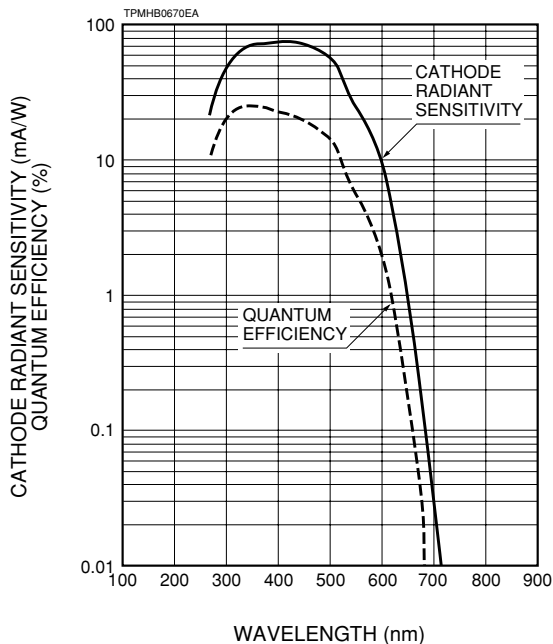


Figure 2: Typical Gain and Anode Dark Current

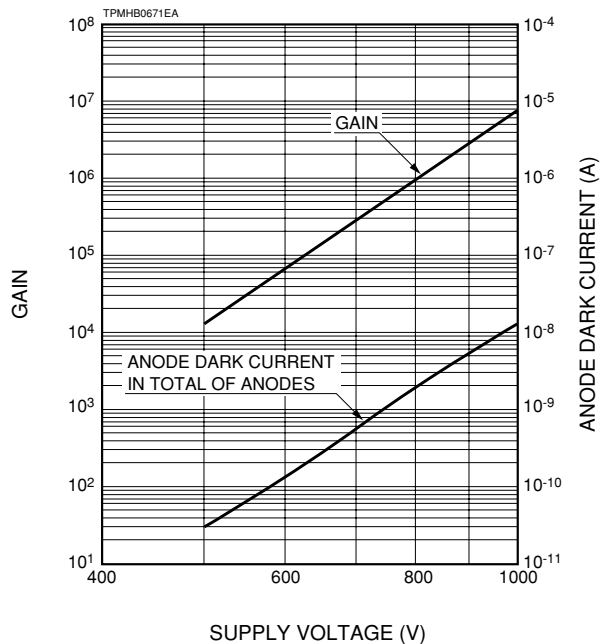
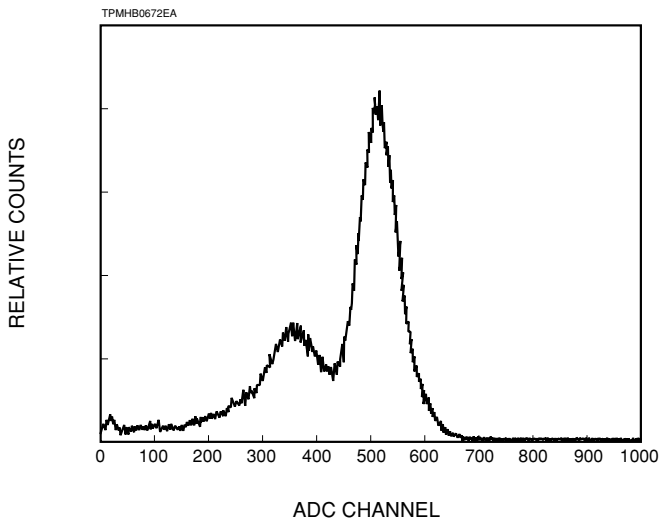
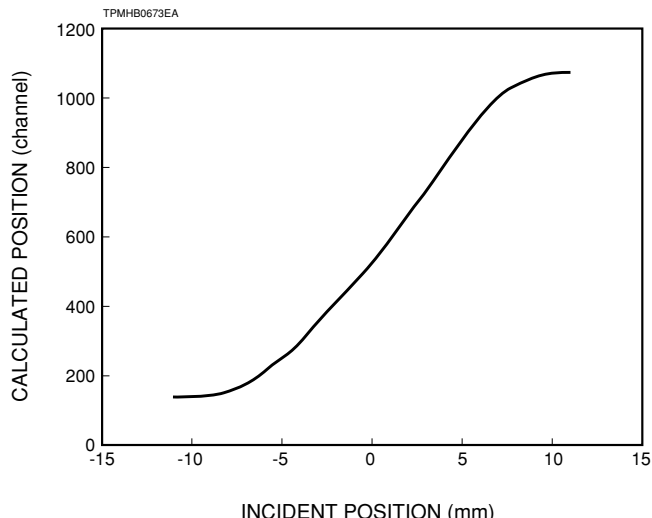


Figure 3: Pulse Height Distribution



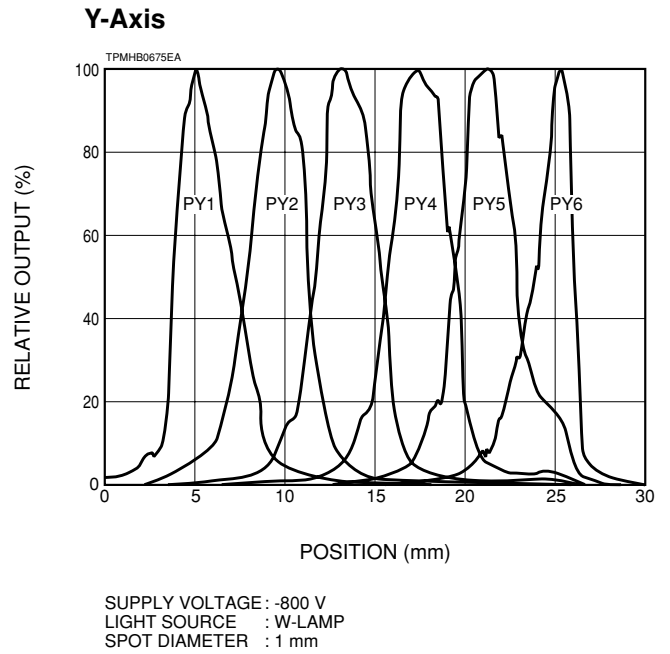
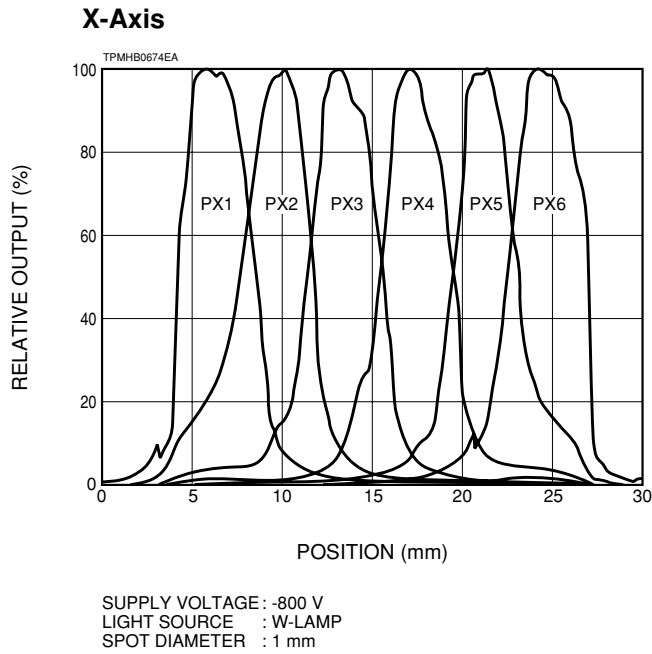
SUPPLY VOLTAGE : -800 V  
 CRYSTAL : 1" CUBE NaI (TI)  
 SOURCE :  $^{57}\text{Co}$  (122 keV)  
 P.H.R. : 16.9 %

Figure 4: Position Response Using PX-anodes



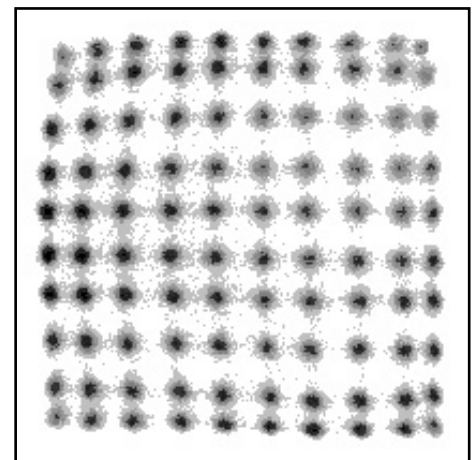
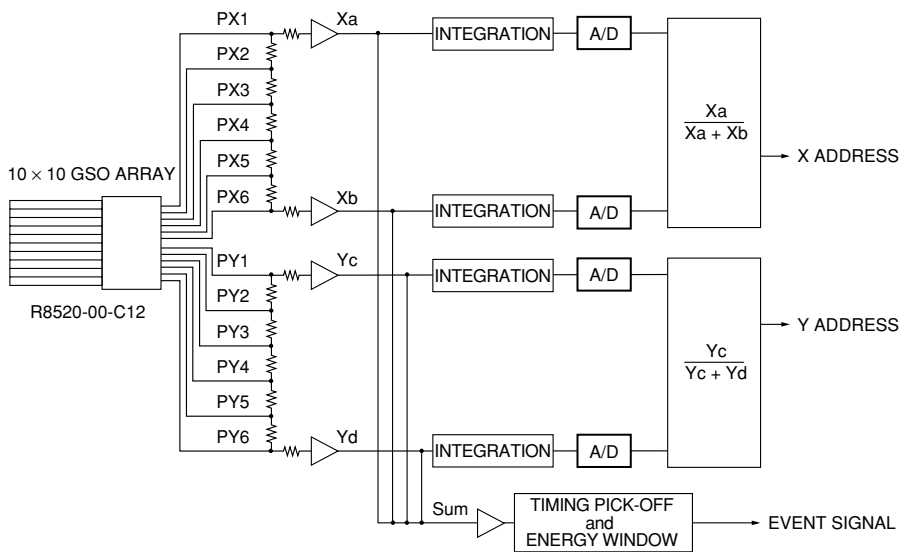
SUPPLY VOLTAGE : -800 V  
 LIGHT SOURCE : 2 mm × 2 mm × 20 mm BGO CRYSTAL  
 (irradiated by  $^{137}\text{Cs}$ )  
 A STEP OF SCANNING : 0.5 mm

Figure 5: Spatial Resolution



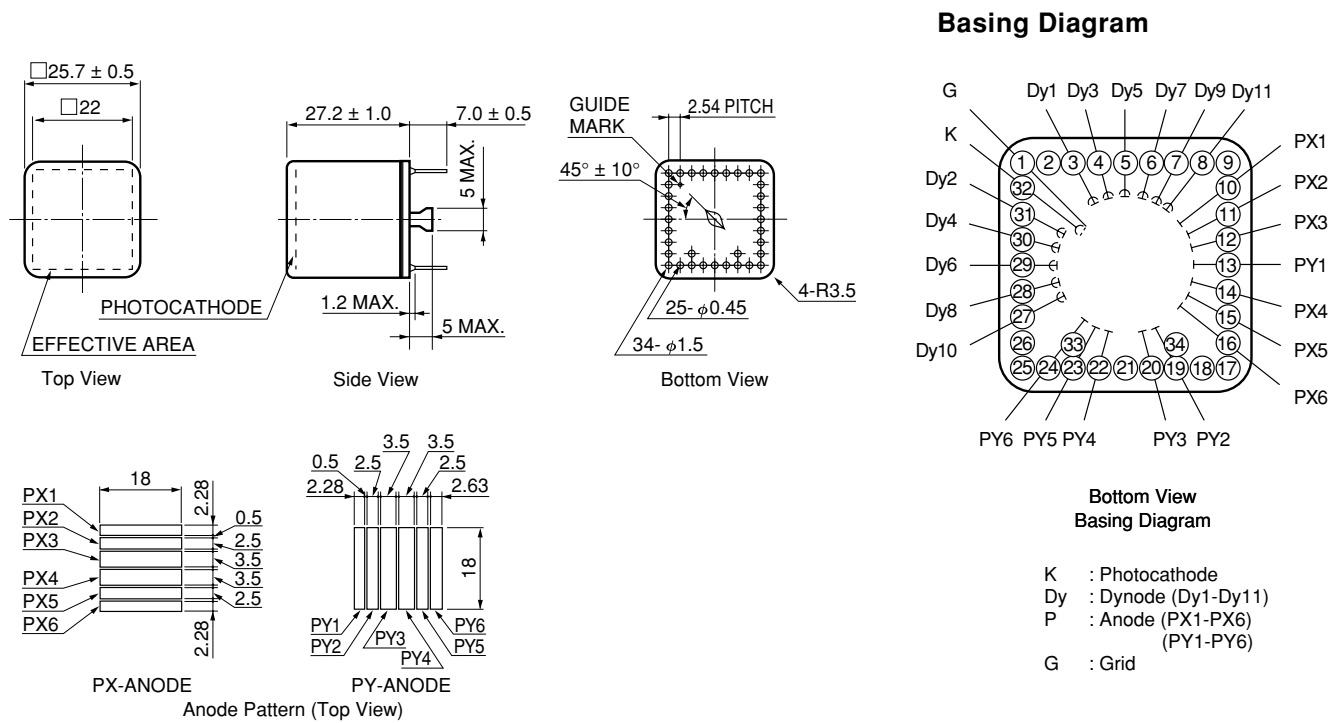
\* Output of each anode under a light spot scanning at a center.

Figure 6: Circuit Diagram Example and Positioning Histogram



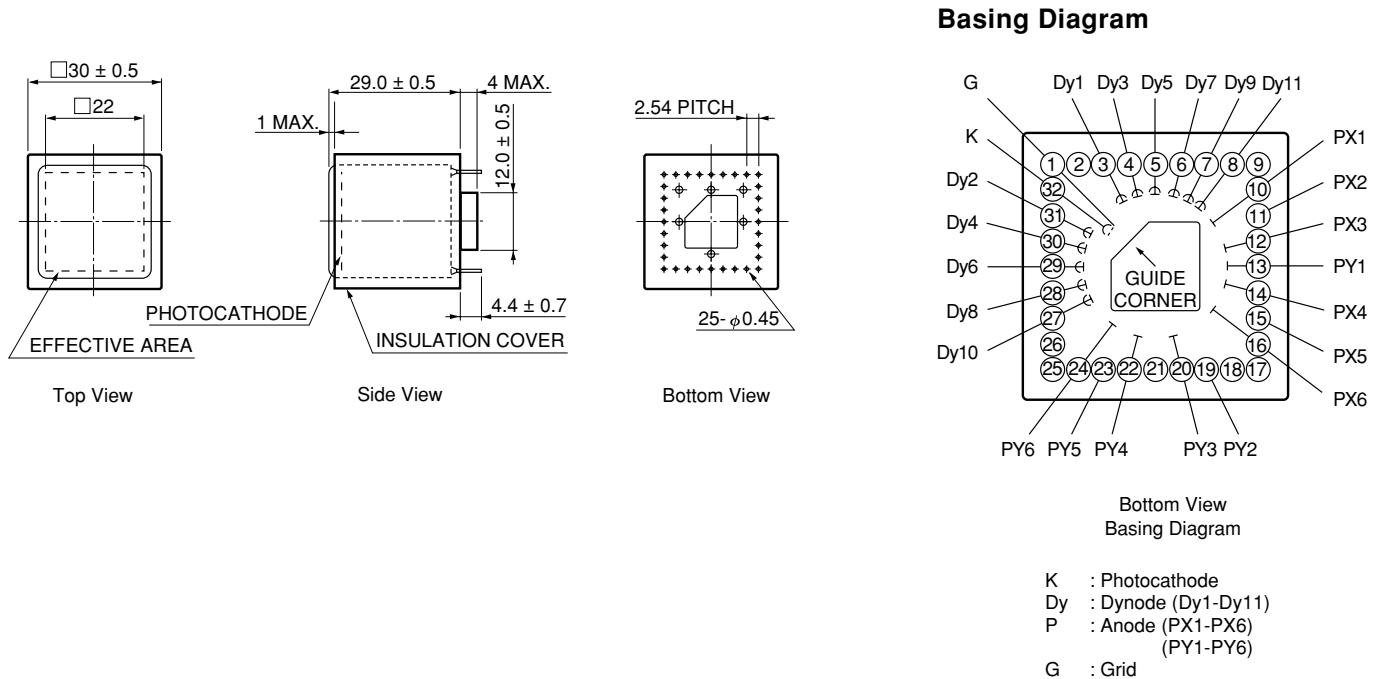
Positioning histogram of a 10 × 10 array of 2.0 mm × 2.0 mm × 20 mm GSO elements for 511 keV  $\gamma$ -rays. (crystal pitch is 2.2 mm)

Figure 7: R8520-00-C12 Dimensional Outline and Basing Diagram (Unit: mm)



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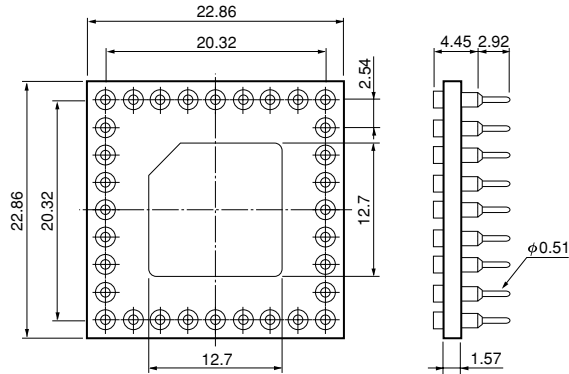
Figure 8: R8520U-00-C12 Dimensional Outline and Basing Diagram (Unit: mm)  
 (R8520-00-C12 with an Insulation Cover)



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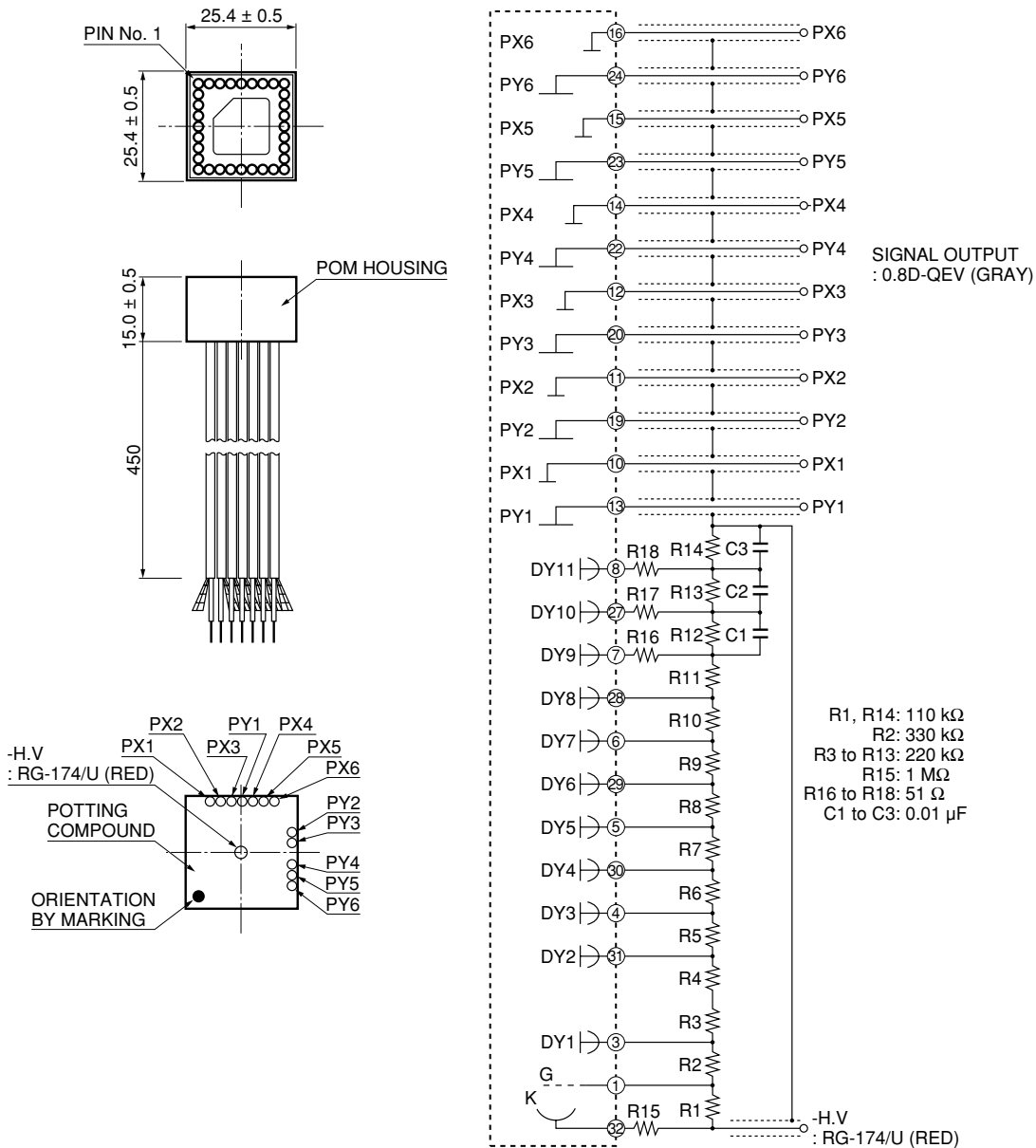
[ACCESSORIES] (Unit: mm)

● Socket E678-32B **SOLD SEPARATELY**



TACCA0094ED

● D Type Socket Assembly E7514 **SOLD SEPARATELY**



TACCA0236EB

# POSITION SENSITIVE PHOTOMULTIPLIER TUBES R8520-00-C12, R8520U-00-C12

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 **WARNING** ~High Voltage~

The product is operated at high voltage potential. Further, the metal housing of the product is connected to the photocathode (potential) so that it becomes a high voltage potential when the product is operated at a negative high voltage (anode grounded).

Accordingly, extreme safety care must be taken for the electrical shock hazard to the operator or the damage to the other instruments.

\* PATENT: USA Pat. No. 5410211      PATENT PENDING: JAPAN 12, USA 8, EUROPE 9

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## **HAMAMATSU**

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TPMH1276E01  
OCT. 2001 IP  
Printed in Japan (1000)