

FEATURES

- Fast time response
- Suitable for mass production

APPLICATIONS

- TOF-PET in nuclear medicine
- TOF counter in HEP experiment
- Radiation monitor in security instrument



Back row: R13408, R13089, R15608
Front row: R13478, R13449

Figure 1: Typical spectral response

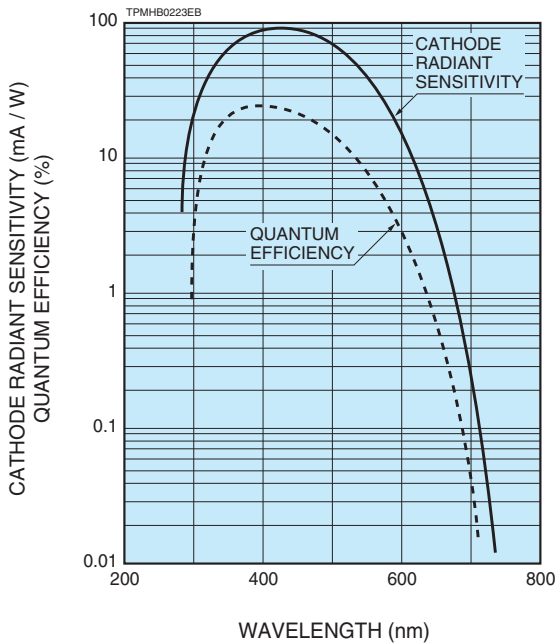
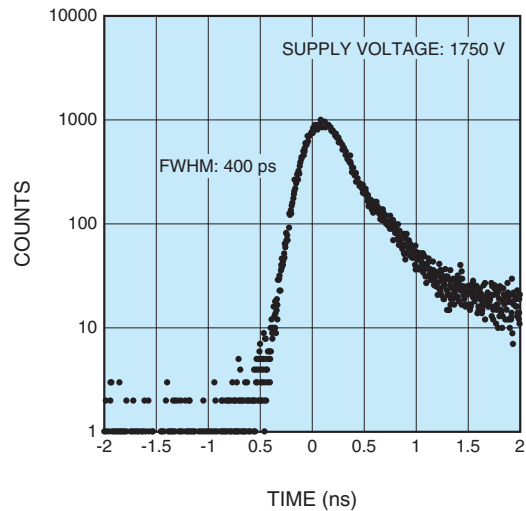


Figure 2: Typical T.T.S. (R15608)



PHOTOMULTIPLIER TUBES

R13478, R13449, R13408, R13089, R15608

Type No.	Spectral response		Photo-cathode material	Window material	Dynode structure / Stages	Maximum ratings		Anode to cathode supply voltage (V)	Cathode characteristics			
	Range (nm)	Peak wavelength (nm)				Supply voltage between anode and cathode (V)	Average anode current (mA)		Luminous		Blue sensitivity index	Radiant
									Min. (μA/lm)	Typ. (μA/lm)		
R13478	300 to 650	420	BA	K	L/8	1750	0.1	1500	70	95	10.0	80
R13449	300 to 650	420	BA	K	L/8	1750	0.1	1500	70	95	10.0	80
R13408	300 to 650	420	BA	K	L/8	1750	0.1	1500	70	95	10.0	80
R13089	300 to 650	420	BA	K	L/8	1750	0.1	1500	70	95	10.0	80
R15608	300 to 650	420	BA	K	L/10	2000	0.2	1750	70	85	9.5	76

NOTE: (A) BA: Bialkali (B) K: Borosilicate glass (C) L: Linear-focused (D) Measured at the peak sensitivity wavelength.

VOLTAGE DISTRIBUTION RATIO AND SUPPLY VOLTAGE (R13478/R13449/R13408/R13089)

Electrodes	K	G	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8(Acc)	P
Ratio		1.3	4.8	1.5	1.5	1	1	1	1	1	1

Supply voltage: 1500 V, K: Cathode, Dy: Dynode, P: Anode, G: Grid, Acc: Accelerating electrode
Acc to be connected to Dy8 with a protection resistor in series. (recommended resistance: 10 MΩ)

VOLTAGE DISTRIBUTION RATIO AND SUPPLY VOLTAGE (R15608)

Electrodes	K	G	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7(Acc)	Dy8	Dy9	Dy10	P
Ratio		4.3	1.8	1.5	1.5	1	1	1	1	1	1	1	1

Supply voltage: 1750 V, K: Cathode, Dy: Dynode, P: Anode, G: Grid, Acc: Accelerating electrode
Acc to be connected to Dy7 with a protection resistor in series. (recommended resistance: 10 MΩ)

Figure 3: Typical gain characteristics

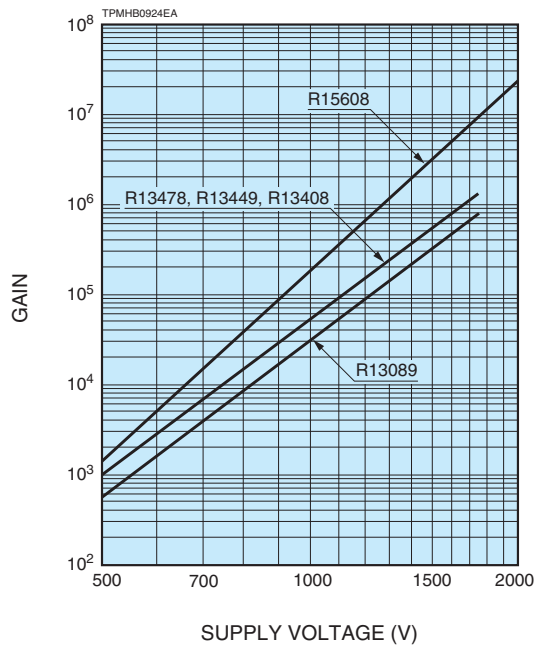
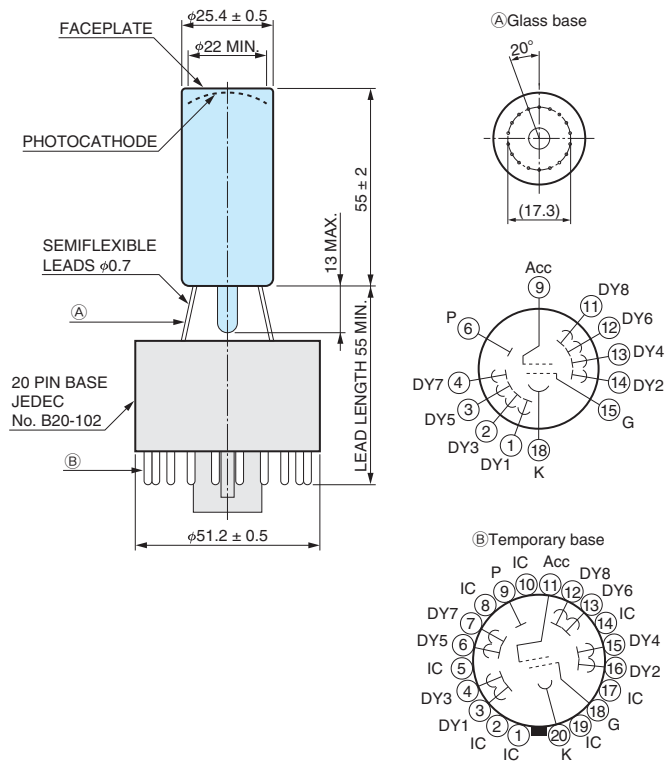


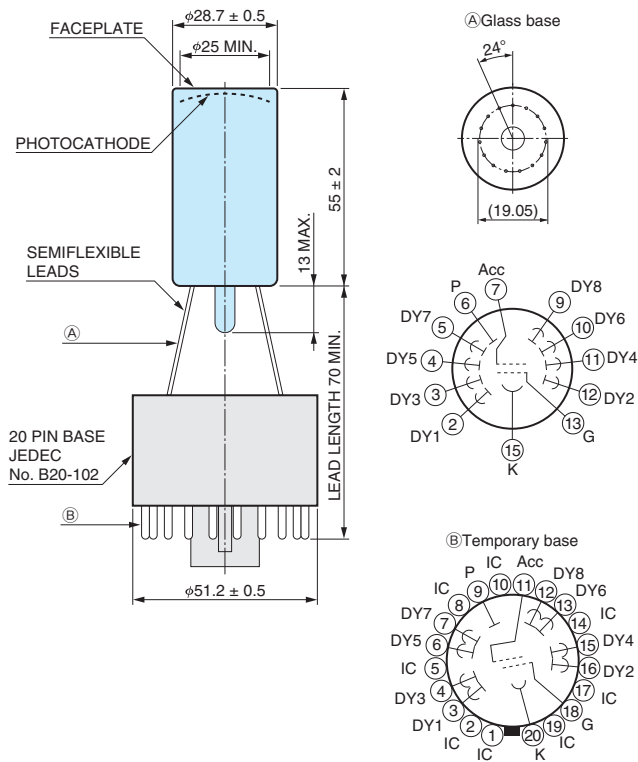
Figure 4: Dimensional outline and basing diagram (Unit: mm)

● R13478

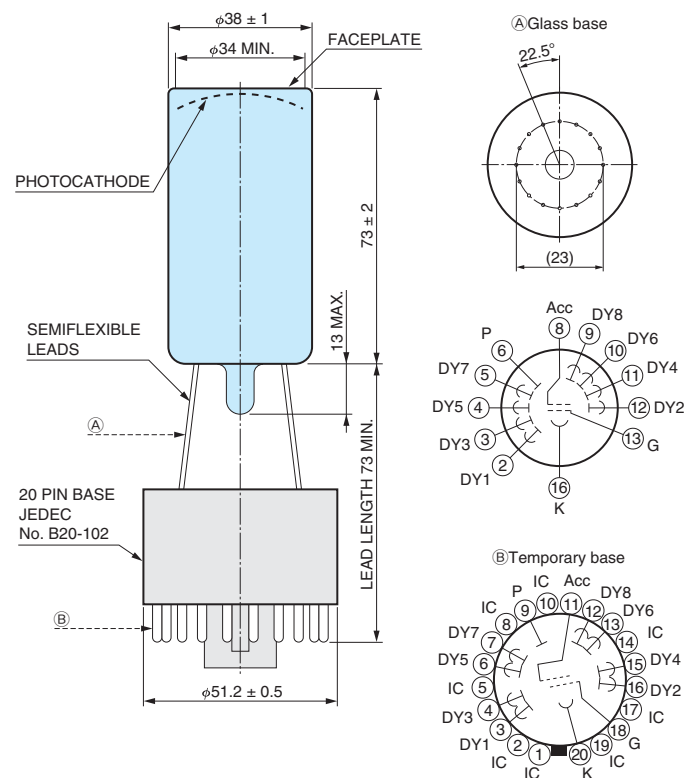


Anode characteristics								Pulse linearity		Storage temperature (°C)	Operating ambient temperature (°C)	Type No.
Luminous Typ. (A/lm)	Radiant Typ. (A/W)	Gain Typ.	Dark current (After 30 min)		Time response			2 % deviation (mA)	5 % deviation (mA)			
			Typ. (nA)	Max. (nA)	Rise time Typ. (ns)	Transit time Typ. (ns)	T.T.S. (FWHM) Typ. (ps)					
50	4.2×10^4	5.3×10^5	3	30	0.9	9.1	130	10	25	-80 to +50	-30 to +50	R13478
50	4.2×10^4	5.3×10^5	3	30	0.9	10	170	10	30	-80 to +50	-30 to +50	R13449
50	4.2×10^4	5.3×10^5	3	30	1.2	13	190	20	50	-80 to +50	-30 to +50	R13408
30	2.5×10^4	3.2×10^5	10	50	2.0	20	230	30	60	-80 to +50	-30 to +50	R13089
800	7.1×10^5	9.4×10^6	15	100	1.9	26	400	30	60	-30 to +50	-30 to +50	R15608

● R13449



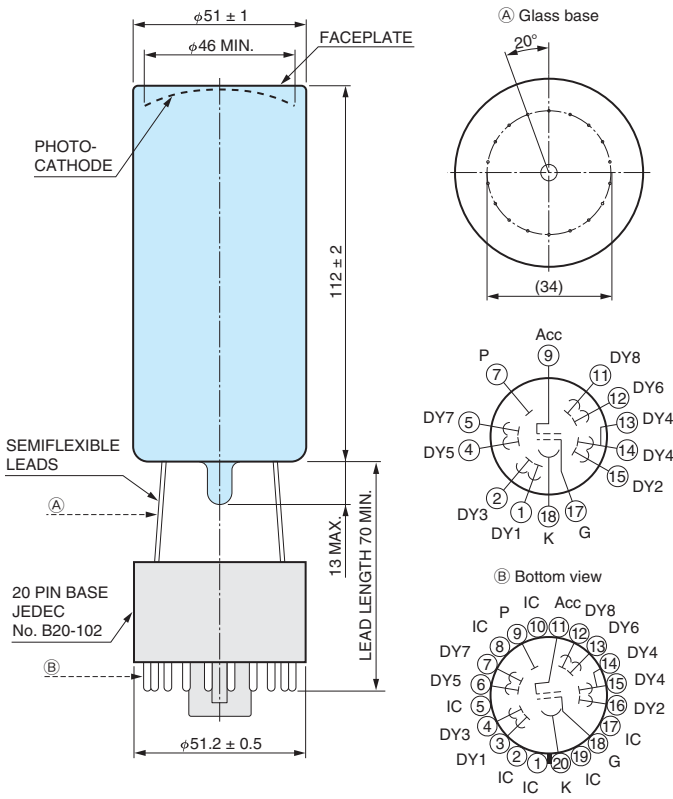
● R13408



PHOTOMULTIPLIER TUBES

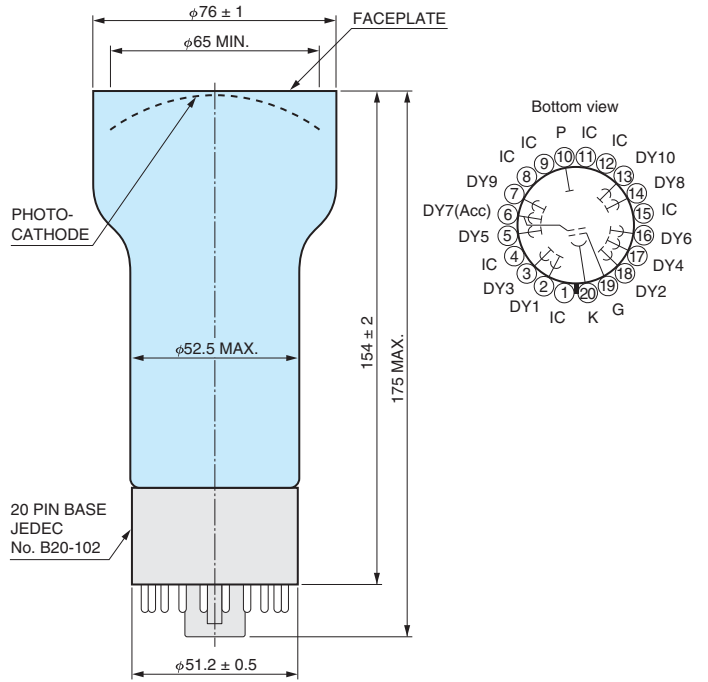
R13478, R13449, R13408, R13089, R15608

● R13089

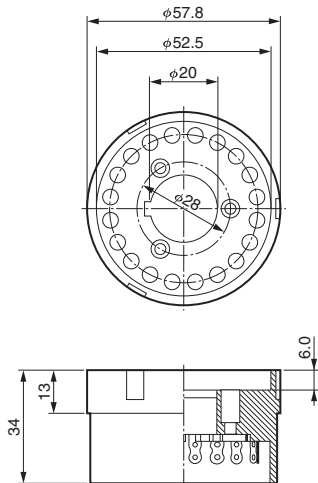


TPMHA0606EA

● R15608



● Socket E678-20B (Supplied)



TACCA0309EA

HAMAMATSU PHOTONICS K.K. www.hamamatsu.com

Electron Tube Division

314-5, Shimokanzo, Iwata City, Shizuoka Pref., 438-0193, Japan, Telephone: (81)539/62-5248, Fax: (81)539/62-2205

U.S.A.: Hamamatsu Corporation, 360 Foothill Road, Bridgewater, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218 E-mail: usa@hamamatsu.com

Germany: Hamamatsu Photonics Deutschland GmbH, Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: info@hamamatsu.de

France: Hamamatsu Photonics France S.A.R.L., 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: infos@hamamatsu.fr

United Kingdom: Hamamatsu Photonics UK Limited, 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777 E-mail: info@hamamatsu.co.uk

North Europe: Hamamatsu Photonics Norden AB, Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509 031 00, Fax: (46)8-509 031 01 E-mail: info@hamamatsu.se

Italy: Hamamatsu Photonics Italia S.r.l., Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41 E-mail: info@hamamatsu.it

China: Hamamatsu Photonics (China) Co., Ltd., 1201 Tower B, Jiaming Center, 27 Dongsanhuan Belu, Chaoyang District, 100020 Beijing, P.R. China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: hpc@hamamatsu.com.cn

Taiwan: Hamamatsu Photonics Taiwan Co., Ltd., 8F-3, No.158, Section 2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: info@hamamatsu.com.tw

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