HAMAMATSU

PHOTON IS OUR BUSINESS

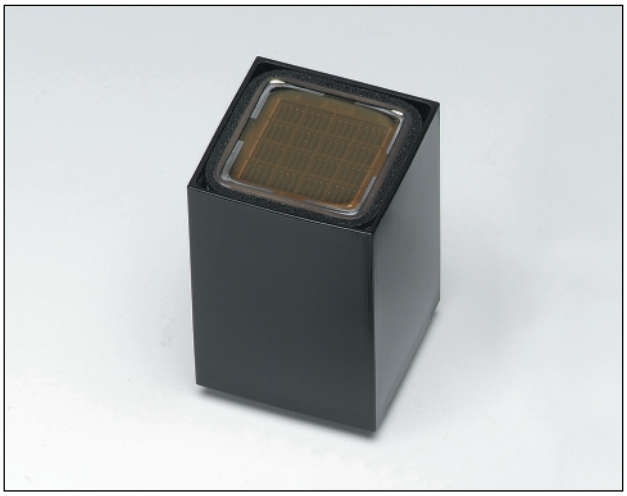
MULTIANODE PHOTOMULTIPLIER TUBE ASSEMBLY H8711 SERIES

PATENT

4 × 4 Multianode, High Speed Response, Low Cross-talk, 30 mm Square Bialkali and Multialkali Photocathode, 12-stage, Head-on Type

FEATURES

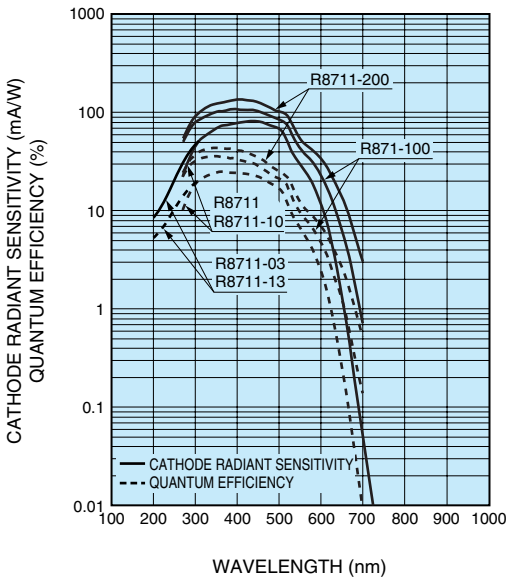
- 4 × 4 Multianode, Anode Size: 4.2 mm × 4.2 mm / Anode
- Effective Area: 18.1 mm × 18.1 mm
- High Speed Response
- Low Cross-talk: 1 % Typ.
- High Cathode Sensitivity
  - Luminous 200 μA/lm Typ. (-01 Type)
  - Luminous 500 μA/lm Typ. (-20 Type)
- Weight: Approx. 50 g

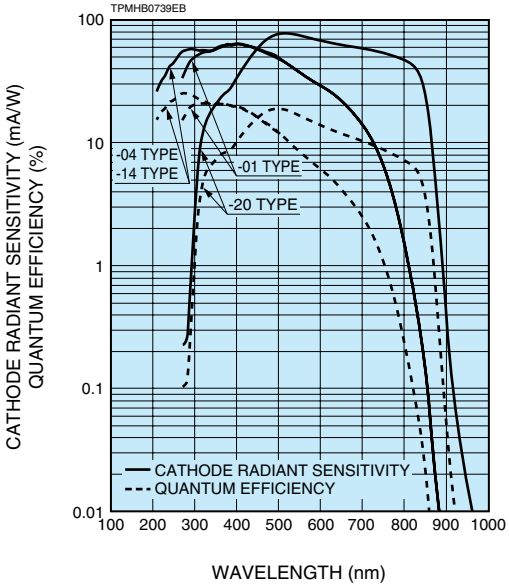


APPLICATIONS

- High Energy Physics
- Flow Cytometer (-01, -20 Type)
- DNA Sequencer (-01, -20 Type)

Figure 1: Typical Spectral Response





MULTIANODE PHOTOMULTIPLIER TUBE ASSEMBLIES H8711 SERIES

Type No.	Spectral Response		Ⓐ	Ⓑ	Ⓒ	Maximum Ratings		Cathode Characteristics				
	Range (nm)	Peak Wavelength (nm)	Photocathode Material	Window Material	Dynode Structure / Stages	Supply Voltage Between Anode and Cathode (V)	Average Anode Output Current in Total (mA) Ⓓ	Luminous Min. (μA/lm)	Luminous Typ. (μA/lm)	Blue Sensitivity Index (CS 5-58) Typ.	Red/White Ratio (R-68) Typ.	Radiant Typ. (mA/W)
Normal Divider Type												
H8711	300 to 650	420	BA	K	MC/12	-1000	0.017	60	80	9.5	—	80
H8711-01	300 to 880	420	MA	K	MC/12	-1000	0.017	150	200	—	0.25	65
H8711-03	185 to 650	420	BA	U	MC/12	-1000	0.017	60	80	9.5	—	80
H8711-04	185 to 880	420	MA	U	MC/12	-1000	0.017	150	200	—	0.25	65
H8711-20	300 to 920	530	MA	K	MC/12	-1000	0.017	350	500	—	0.4	78
H8711-100	300 to 650	400	SBA	K	MC/12	-1000	0.017	90	105	13.5	—	110
H8711-200	300 to 650	400	UBA	K	MC/12	-1000	0.017	110	135	13.5	—	130
Taper Divider Type												
H8711-10	300 to 650	420	BA	K	MC/12	-1000	0.017	60	80	9.5	—	80
H8711-11	300 to 880	420	MA	K	MC/12	-1000	0.017	150	200	—	0.25	65
H8711-13	185 to 650	420	BA	U	MC/12	-1000	0.017	60	80	9.5	—	80
H8711-14	185 to 880	420	MA	U	MC/12	-1000	0.017	150	200	—	0.25	65

NOTE: Ⓐ BA: Bialkali, MA: Multialkali, SBA: Super Bialkali, UBA: Ultra Bialkali
Ⓑ K: Borosilicate glass, U: UV glass
Ⓒ MC: Metal channel
Ⓓ The maximum average anode current is defined as 5 % of divider current when standard high voltage is applied.

Figure 2: Typical Gain

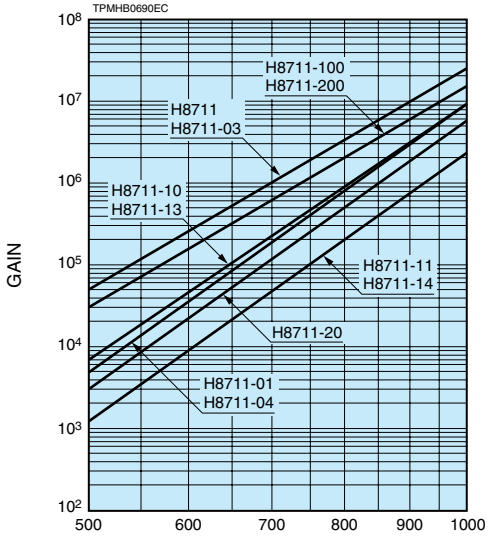


Figure 3: Time Response (Example)

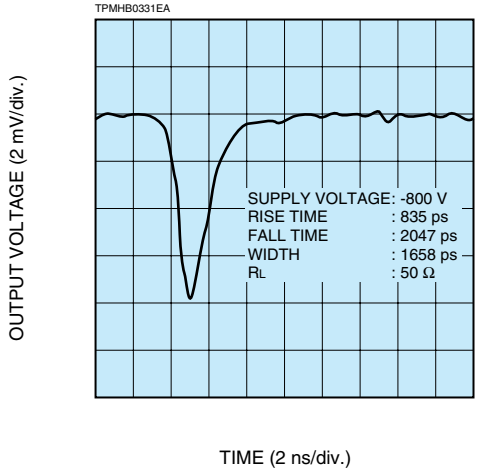
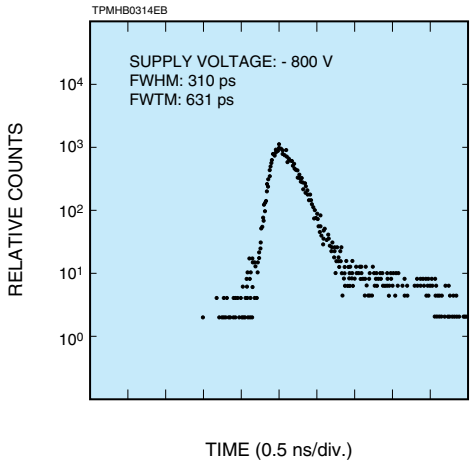


Figure 4: TTS Characteristic (Example)



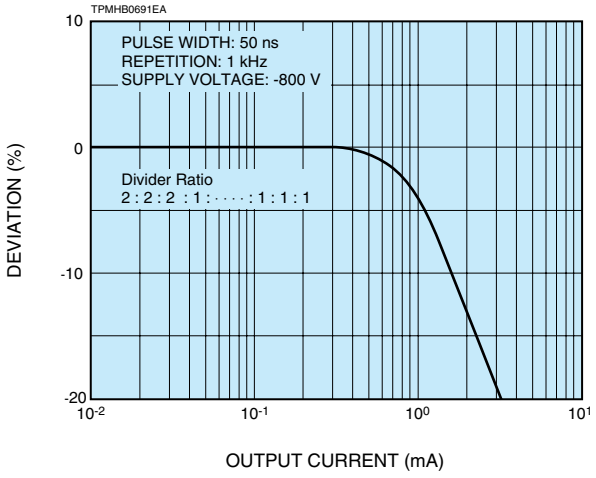
Anode to Cathode Supply Voltage (V)	Anode Characteristics									Pulse Linearity per Channel		Uniformity Between Each Anode		Type No.
	Luminous		Gain	Dark Current per Channel (After 30 min)		Time Response								
	Min. (A/lm)	Typ. (A/lm)	Typ.	Typ. (nA)	Max. (nA)	Rise Time Typ. (ns)	Transit Time Typ. (ns)	TTS Typ. (ns)		2 % Deviation (mA)	5 % Deviation (mA)	Typ.	Max.	
-800	80	280	3.5×10^6	0.8	4	0.83	12.0	0.33		0.5	1	1: 2.5	1: 4	**H8711**
-800	50	150	0.8×10^6									1: 3	1: 5	**H8711-01**
-800	80	280	3.5×10^6									1: 2.5	1: 4	**H8711-03**
-800	50	150	0.8×10^6									1: 3	1: 5	**H8711-04**
-800	50	250	0.5×10^6									1: 3	1: 5	**H8711-20**
-800	50	210	2.0×10^6									1: 2.5	1: 4	**H8711-100**
-800	50	270	2.0×10^6									1: 2.5	1: 4	**H8711-200**
-800	20	70	0.9×10^6	0.4	2	0.83	12.0	0.33		1.5	3	1: 2.5	1: 4	**H8711-10**
-800	10	35	0.2×10^6									1: 3	1: 5	**H8711-11**
-800	20	70	0.9×10^6									1: 2.5	1: 4	**H8711-13**
-800	10	35	0.2×10^6									1: 3	1: 5	**H8711-14**

VOLTAGE DISTRIBUTION RATIO AND SUPPLY VOLTAGE

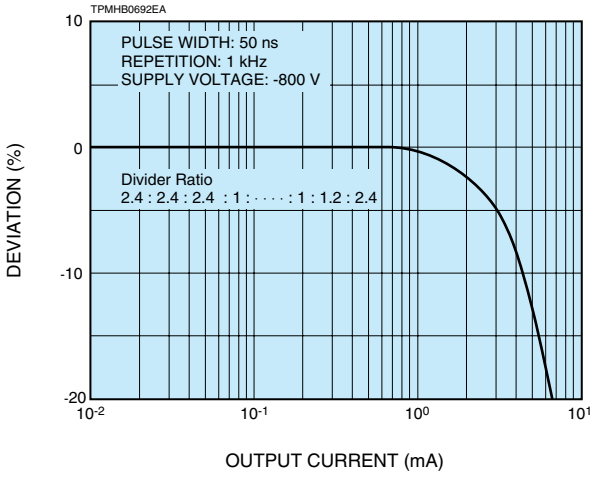
Electrodes	K	Dy1	Dy2	Dy3	Dy4	Dy5	···	Dy9	Dy10	Dy11	Dy12	P
Normal Divider Type	2	2	2	1	1	1···1		1	1	1	1	
Tapered Divider Type	2.4	2.4	2.4	1	1	1···1		1	1	1.2	2.4	

Supply Voltage: -800 V, K: Cathode, Dy: Dynode, P: Anode

Figure 5: Pulse Linearity per Channel (Example)



H8711



H8711-10

Figure 6: Anode Cross-talk (Example)

0.1	0.8	0.1	*
0.5	100	0.3	*
0.1	0.3	0.1	*
*	*	*	*

Supply Voltage: -800 V
Light Source: Tungsten Lamp (uniform DC light)
Spot Illumination: 4 mm × 4 mm

Figure 7: Dimensional Outline and Basing Diagram (Unit: mm)

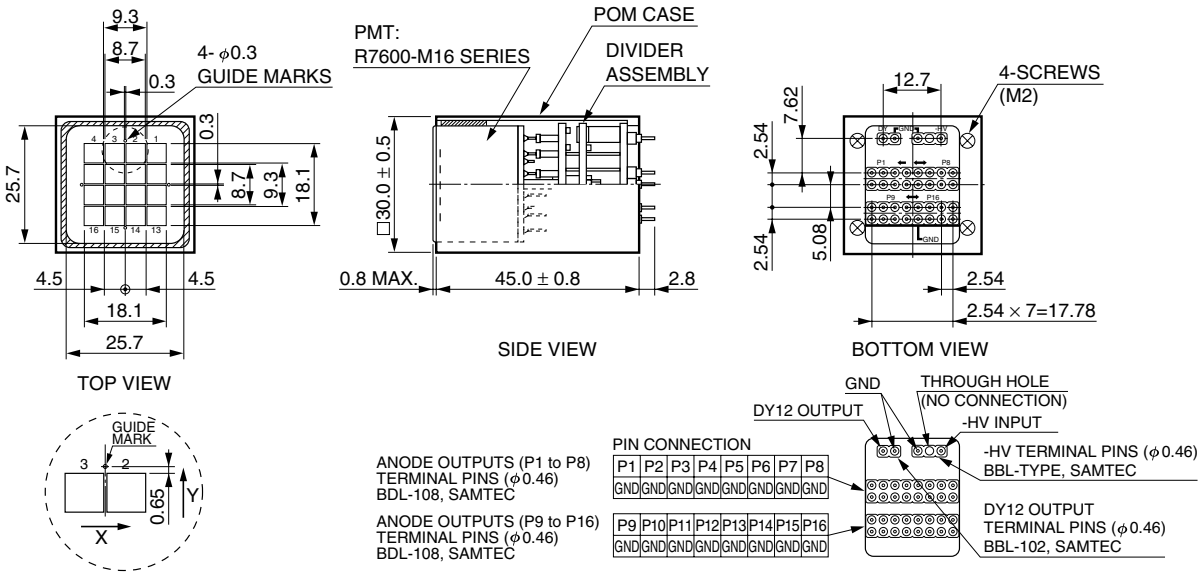
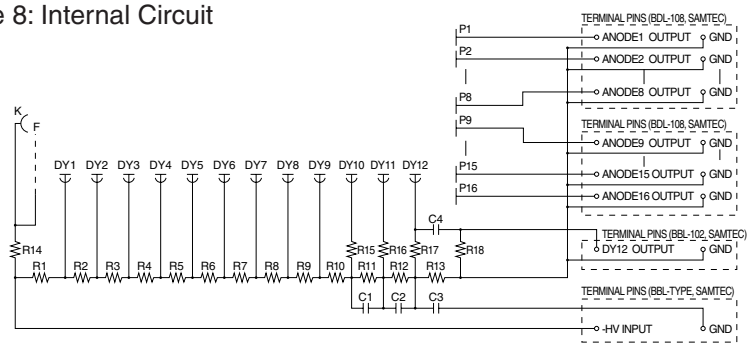


Figure 8: Internal Circuit



Normal Divider Type

R1 to R3: 360 kΩ
R4 to R13: 180 kΩ
R14: 1 MΩ
R15 to R17: 51 Ω
R18 : 10 kΩ
C1 to C4: 0.01 μF

DIVIDER CURRENT: 347 μA
at -1000 V (Max. INPUT VOLTAGE)

Tapered Divider Type

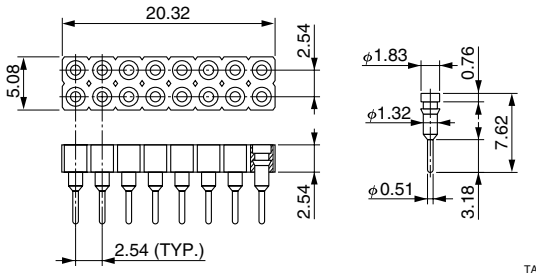
R1 to R3, R13: 360 kΩ
R4 to R11: 150 kΩ
R12: 180 kΩ
R14: 1 MΩ
R15 to R17: 51 Ω
R18: 10 kΩ
C1 to C4: 0.01 μF

DIVIDER CURRENT: 355 μA
at -1000 V (Max. INPUT VOLTAGE)

TPMHA0497ED

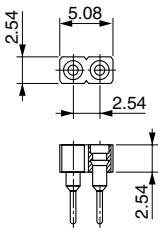
Figure 9: Suitable Sockets (Unit: mm) Supplied

SD-108-T-22 ×2 pcs
(for Anode Output Pins)



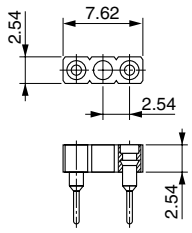
TACCA0263EA

SS-102-T-22
(for GND, DY12 Pin)



TACCA0265EA

ASP-24307-02
(for GND, -HV Pin)



TACCA0266EA

⚠ 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.

HAMAMATSU PHOTONICS K.K. www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., 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, P. O. Box 6910, Bridgewater. N.J. 08807-0910, 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)8152-2658 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, United Kingdom, Telephone: 44-(0)1707-294888, Fax: 44(0)1707-325777 E-mail: info@hamamatsu.co.uk
North Europe: Hamamatsu Photonics Norden AB: Smidesvägen 12, SE-171-41 SOLNA, 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/E, 20020 Arese, (Milano), Italy, Telephone: (39)02-935 81 733, Fax: (39)02-935 81 741 E-mail: info@hamamatsu.it

TPMH1320E01
NOV. 2010 IP