

FEATURES

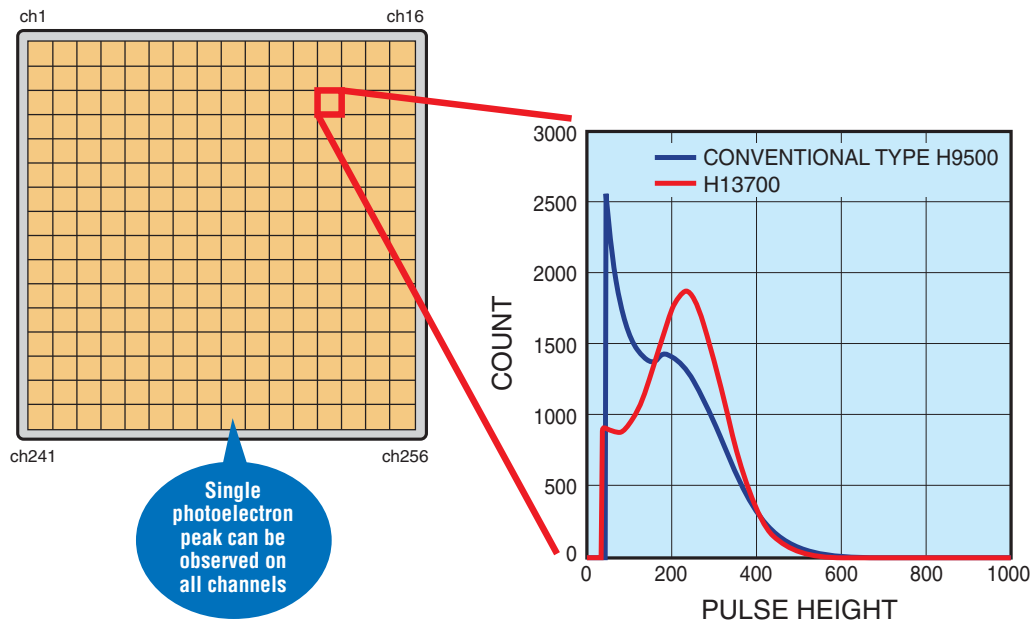
- High quantum efficiency: 33 % Typ.
- High collection efficiency: 80 % Typ.
- Single photoelectron peaks observable at every anode (pixel)
- Wide effective area: 48.5 mm × 48.5 mm
- 16 × 16 multianode,
pixel size: 3 mm × 3 mm / anode



APPLICATIONS

- Academic research
(RICH, gamma ray telescope, etc.)
- Nuclear medicine equipment
(PET, gamma camera, etc.)
- Neutron imaging

SINGLE PHOTON COUNTING (EXAMPLE)



TPMH0915EA

FLAT PANEL TYPE MULTIANODE PMT ASSEMBLIES H13700 SERIES

SPECIFICATIONS

Type No.	Spectral response		Photo-cathode material ^(A)	Window material ^(B)	Dynode structure / stages ^(C)	Maximum ratings			Cathode characteristics		Anode to cathode supply voltage (V)	
	Range (nm)	Peak wavelength (nm)				Supply voltage between anode and cathode (V)	Average anode output current in total (μA)	Divider current at -1100 V (μA)	Luminous ^(D)			Blue sensitivity index (CS 5-58) Typ.
									Min. (μA/lm)	Typ. (μA/lm)		
H13700	300 to 650	400	BA	K	MC/10	-1100	100	185	60	75	12	-1000
H13700-03	185 to 650	400	BA	U	MC/10	-1100	100	185	60	75	12	-1000

- NOTE:** (A) BA: Bialkali (B) K: Borosilicate glass, U: UV glass (C) MC: Metal channel
 (D) The light source is a tungsten filament lamp operated at a distribution temperature of 2856 K. Supply voltage is 150 volts between the cathode and all other electrodes connected together as anode.
 (E) 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 (D).
 (F) Measured with the same light source as Note (D) and with the anode-to-cathode supply voltage and voltage distribution ratio shown in Table 1 below.
 (G) Measured with the same supply voltage and voltage distribution ratio as Note (F) after 30 minutes storage in darkness.
 (H) Those are test data when a signal from a central channel (P120) of 256 anodes is used, while all photocathode are illuminated by pulsed light source.
 (J) The rise time is the time for the output pulse to rise from 10 % to 90 % of the peak amplitude when the whole photocathode is illuminated by a delta function light pulse.
 (K) 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.
 (L) Also called transit time jitter. This is the fluctuation in electron transit time between individual pulses in the single photoelectron event, and defined as the FWHM of the frequency distribution of electron transit time.

Table 1: Voltage distribution ratio and supply voltage

Electrodes	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	GR	P
Distribution ratio	2	1	1	1	1	1	1	1	1	1	1	1	0.5

Supply voltage: -1000 V, K: Cathode, Dy: Dynode, GR: Guard ring P: Anode

Figure 1: Typical spectral response

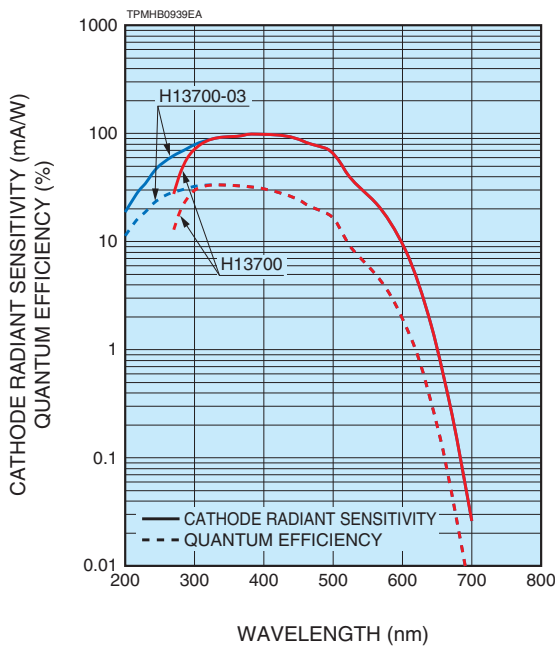
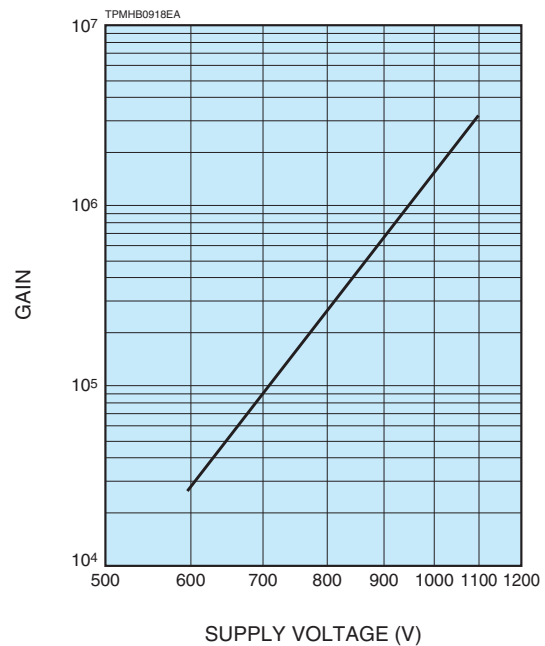
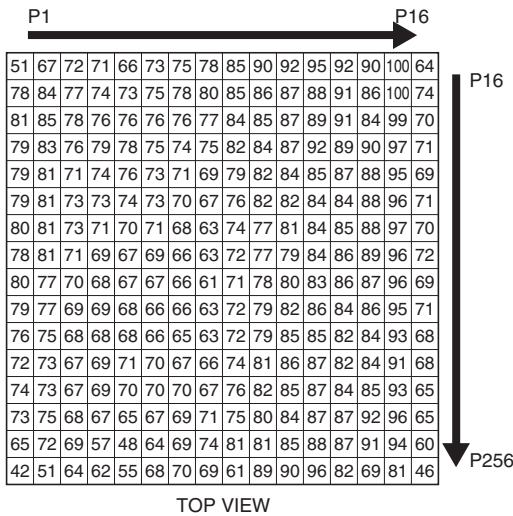


Figure 2: Typical gain



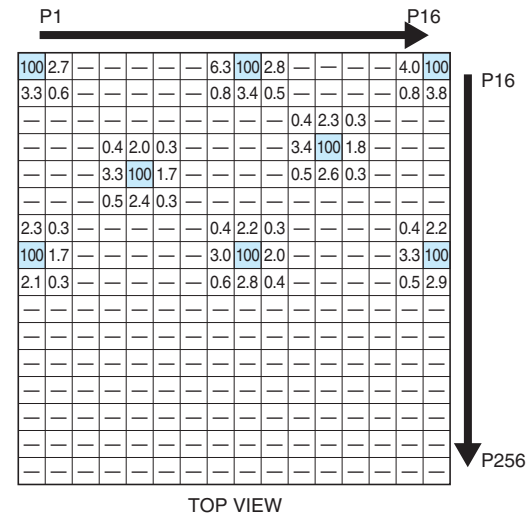
Anode characteristics											Pulse linearity per channel [±2% deviation] (mA)	Uniformity between each anode		Type No.
Luminous [Ⓕ]		Gain [Ⓕ]	Dark current per channel [Ⓖ]		Dark current in total [Ⓖ]		Time response [Ⓗ]							
Min. (A/lm)	Typ. (A/lm)		Typ.	Typ. (nA)	Max. (nA)	Typ. (nA)	Max. (nA)	Rise time [Ⓙ] Typ. (ns)	Transit time [Ⓚ] Typ. (ns)	Transit time spread [Ⓛ] Typ. (ns)				
—	110	1.5 × 10 ⁶	0.02	—	5	50	0.45	5.2	0.38	0.15	1: 3	1: 5	H13700	
—	110	1.5 × 10 ⁶	0.02	—	5	50	0.45	5.2	0.38	0.15	1: 3	1: 5	H13700-03	

Figure 3: Anode uniformity (Example)



SUPPLY VOLTAGE: -1000 V
 LIGHT SOURCE: TUNGSTEN LAMP with BLUE FILTER (DC LIGHT)
 SPOT ILLUMINATION (APERTURE SIZE): 3 mm square on each channel

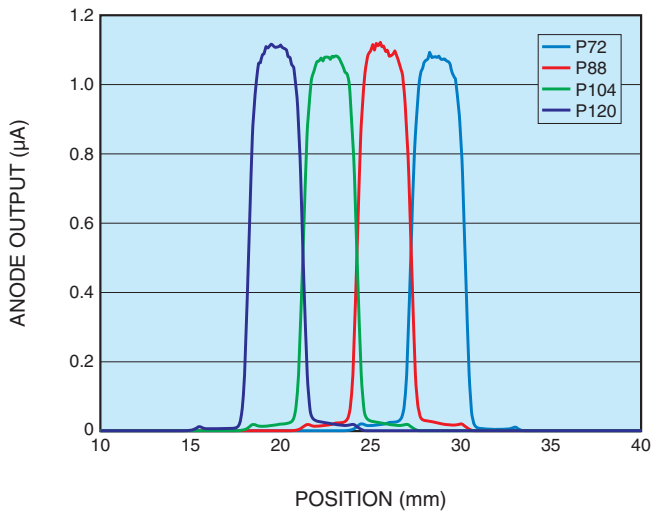
Figure 4: Anode cross-talk (Example)



SUPPLY VOLTAGE: -1000 V
 LIGHT SOURCE: TUNGSTEN LAMP with BLUE FILTER (DC LIGHT)
 FIBER SIZE: φ 1.0 mm (KURARAY: CLEAR FIBER NA=0.72)

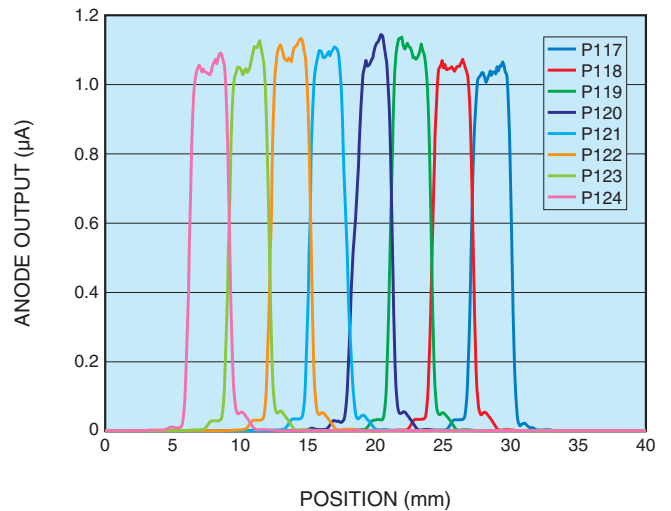
Figure 5: Cross uniformity

X-axis



SUPPLY VOLTAGE: -1000 V
 SPOT SIZE: φ1.0 mm

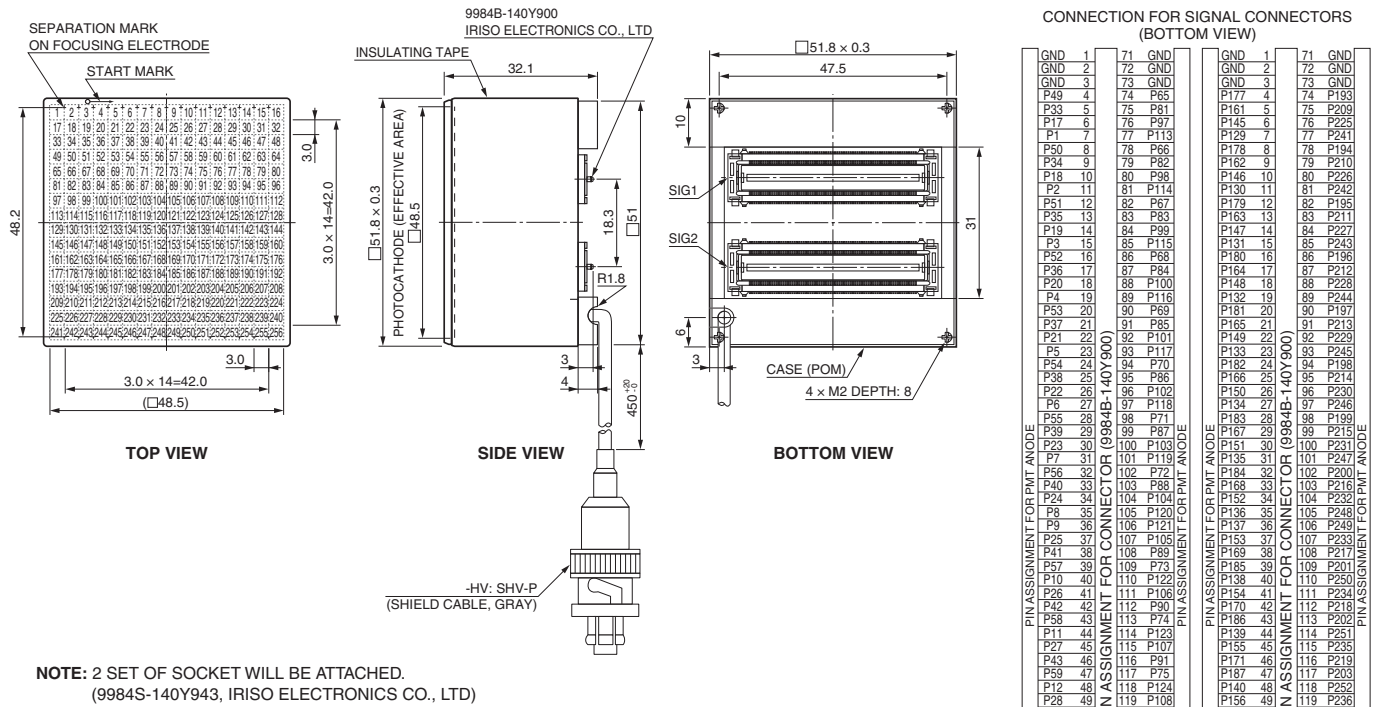
Y-axis



SUPPLY VOLTAGE: -1000 V
 SPOT SIZE: φ1.0 mm

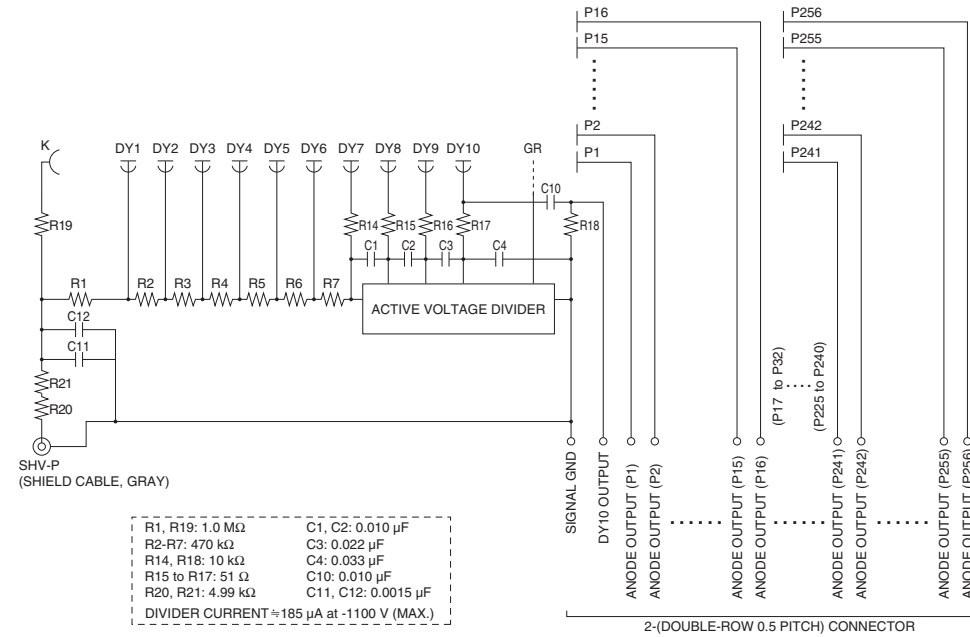
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Figure 6: Dimensional outline (Unit: mm)



NOTE: 2 SET OF SOCKET WILL BE ATTACHED.
(9984S-140Y943, IRISO ELECTRONICS CO., LTD)

Figure 7: Internal circuit



TPMH00168B

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