High PHR, 8-stage, 40 mm (1.5") hexagonal tube

Applications :	For imaging cameras such as fly's eye arrays		
Description :	Window :	Material :	lime glass
		Photocathode :	bi-alkali
		Refr. index at 420 nm :	1.54
	Multiplier :	Structure :	linear focused
		Nb of stages :	8
	Mass :	55 g	

Photocathode characteristics

	Spectral range :				290-650	nm
	Maximum sensitivity at :				420	nm
	Sensitivity ① :					
	Luminous :				90	µA/lm
☑	Blue :	min.:	9	typ.:	11.5	µA/lmF
	Radiant, at 420 nm :			typ.:	90	mA/W

Characteristics with voltage divider A

	Gain slope (vs supp. volt., log/log) :				5.8	
	For an anode blue sensitivity of :				3	A/lmF
☑	Supply voltage :	max.:	1300	typ.:	1100	V
		min.:	880			
	Gain :			typ.:	2.6×10^5	
☑	Anode dark current ② :	max.:	20	typ.:	1	nA
☑	Pulse height resolution for ^{57}Co ③ :	max.:	12.5	typ.:	12	%

Mean anode sensitivity deviation ④

long term (16 h) :	1	%
after change of count rate :	1	%
vs temperature from 0 to +40°C at 420 nm :	- 0.2	%/K
anode sensitivity change for a magnetic field of 0.05 mT :	10	%

Characteristics with voltage divider ⑤ :

		A	**C**	
	For a supply voltage of :	1100	1000	V
	typical gain :	2.6×10^5	10^5	
	linearity (2%) of anode current up to :	60	80	mA
	anode pulse rise time ⑥ :	3	3.5	ns
	anode pulse duration at half height :	4.5	4.7	ns
	signal transit time :	30	31	ns
	Capacitance anode to all		5	pF

Recommended voltage divider

Type A for maximum gain

K	G	D1	D2	D3	D4	D5	D6	D7	D8	A	
0.05	3	1	1	1	1	1	1	1	1		(total : 11.05)

Type C for timing / linearity / gain compromise

K	G	D1	D2	D3	D4	D5	D6	D7	D8	A	
0.05	3	1	1	1	1	1	1.25	1.75	1.25		(total : 12.3)

K: photocathode G: focusing electrode Dn: dynode A: anode

Limiting values

Anode blue sensitivity ⑦ :			max.:	15	A/lmF
Supply voltage :			max.:	1600	V
Continuous anode current ⑧ :			max.:	0.2	mA
Voltage between	D1 and photocathode :	min.: 200	max.:	500	V
	consecutive dynodes :		max.:	300	V
	anode and D8 ⑨ :	min.: 30	max.:	300	V
Ambient temperature	short operation (< 30 mn) :	min.: -30	max.:	+80	°C
	continuous operation & storage :	min.: -30	max.:	+50	°C

Notes

☑ Characteristic measured and mentioned on the test ticket of each tube.

① Luminous sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. The blue sensitivity, expressed in A/lmF ("F" as in Filtered) is measured with a tungsten filament lamp with a color temperature of 2856 ± 5 K. Light is transmitted through a blue filter Corning CS no. 5-58, polished to half stock thickness. The radiant sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5K. Light is transmitted throught an interference filter. Radiant sensitivity at 420 nm, expressed in mA/W, can be estimated by multiplying the blue sensitivity, expressed in µA/lmF, by 7.5 for this type of tube.

② Dark current is measured at ambient temperature, after the tube has been in darkness for approximately 1 min. A lower value can be obtained after a longer stabilisation period in darkness (approx. 30 min.).

③ Pulse amplitude resolution for ^{57}Co is measured with a NaI(Tl) cylindrical scintillator with a diameter of 51 mm and a height of 51 mm. The count rate used is ~ 10^4 c/s.

④ The mean pulse amplitude deviation is measured by coupling a NaI(Tl) scintillator to the window of the tube. Long term (16h) deviation is measured by placing a ^{137}Cs source at a distance from the scintillator such that the count rate is ~ 10^4 c/s, corresponding to an anode current of ~ 300 nA. The mean pulse amplitude deviation after change of count rate is measured with a ^{137}Cs source at a distance from the scintillator such that the count rate can be changed from 10^4 to 10^3 c/s, corresponding to an anode current of ~ 1 µA and 0.1 µA respectively. Both tests are carried out according to ANSI-N42-9-1972 of IEEE recommendations.

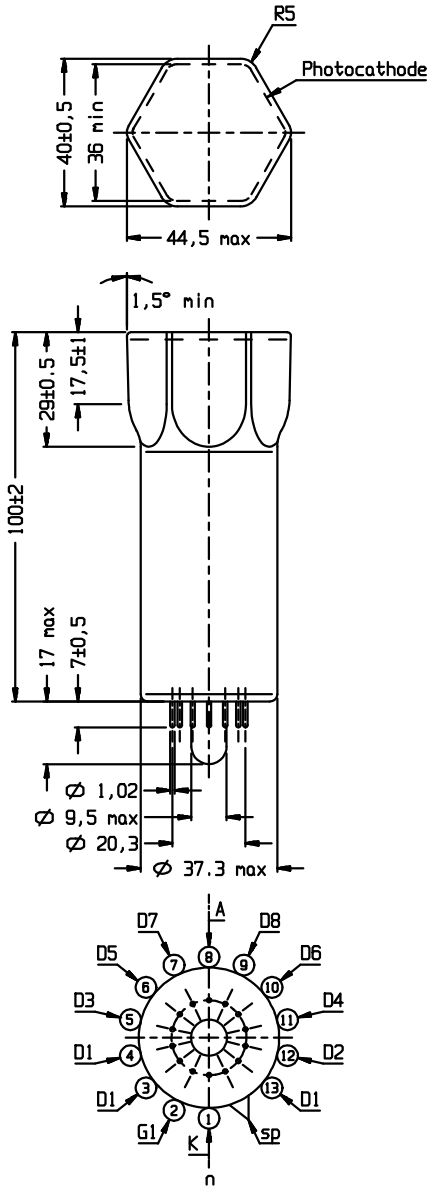
⑤ To obtain a peak pulse current greater than that obtainable with divider A, it is necessary to increase the inter-dynode voltage progressively. Divider circuit C is an example of a progressive divider, giving a compromise between gain, speed and linearity. Other dividers can be conceived to achieve other compromises. It is generally recommended that the voltage ratio between two successive stages is less than 2.

⑥ Measured with a pulse light source, with a pulse duration (FWHM) of approximately 1 ns., the cathode being completely illuminated. The rise time is determined between 10 % and 90 % of the anode pulse amplitude. The signal transit time is measured between the instant at which the illuminating pulse of the cathode becomes maximum, and the instant at which the anode pulse reaches its maximum. Rise time, pulse duration and transit time vary with respect to high tension supply voltage Vht as (Vht)-½.

⑦ The voltage corresponding to this maximum anode blue sensitivity is equal to 1.5 times the voltage indicated on the test ticket of the tube.

⑧ A value less than 10 µA is recommanded for applications requiring good stability.

⑨ When calculating the anode voltage, the voltage drop across the load resistor should be taken into account.

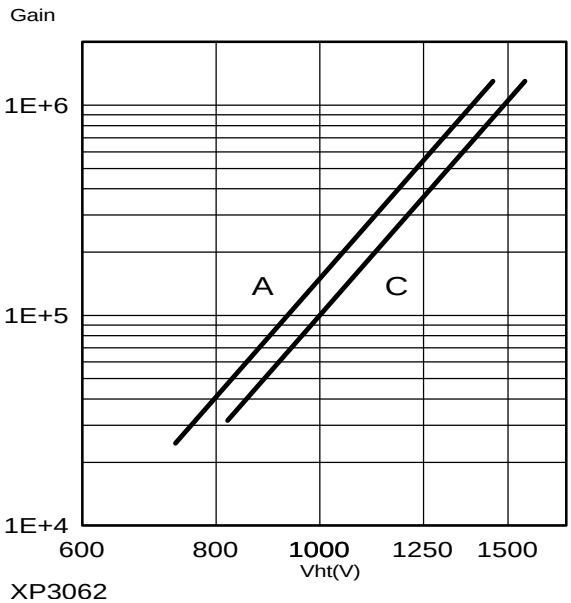


ref.: 22100023

sp: short pin
n: plane of symmetry of the multiplier

K: cathode G: focusing electrode
Dn: dynode A: anode

Typical gain curve



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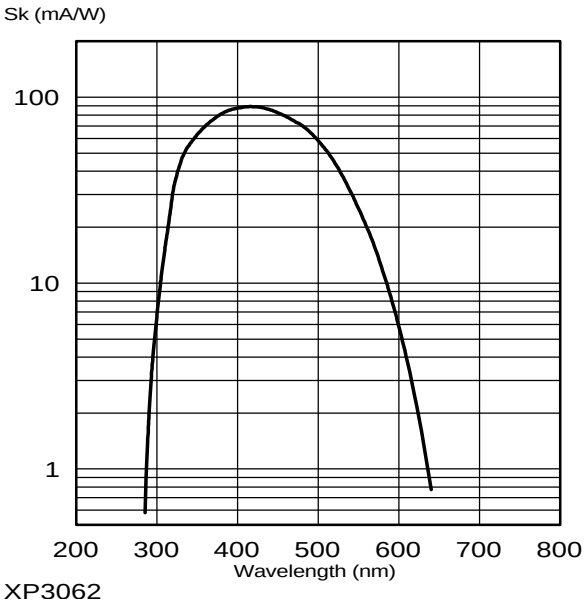
Typical spectral characteristics



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Accessories

Socket : for PCB FE1113
for wires FE1113/W