

Red-sensitive, 10-stage, 38 mm (1.5") round tube

Applications :	Industrial applications such as laser reading and flying spot scanners.		
Description :	Window :	Material :	(frosted) borosilicate glass
		Photocathode :	tri-alkali
		Refr. index at 420 nm :	1.48
	Multiplier :	Structure :	linear focused
		Nb of stages :	10
	Mass :		55 g

Photocathode characteristics

Spectral range : 270-850 nm
Maximum sensitivity at : 450 nm

Sensitivity ① :

<input checked="" type="checkbox"/>	Luminous :	min.: 100	typ.: 200	$\mu\text{A/lm}$
<input checked="" type="checkbox"/>	Radiant, at 700 nm :	min.: 10	typ.: 20	mA/W

Characteristics with voltage divider A

Gain slope (vs supp. volt., log/log) : 7.5

For an anode blue sensitivity of : 60 A/lm
Supply voltage : max.: 1600 V typ.: 1250
min.: 1000

Gain : 3×10^5

Anode dark current ② : max.: 50 nA typ.: 2

Mean anode sensitivity deviation ④ :

long term (16 h) : 1 %
after change of count rate : 1 %
vs temperature between 0 and +40 °C at 420 nm : ± 0.1 %/K

Gain halved for a magnetic field of

perpendicular to axis "n" of : 0.35 mT
parallel to axis "n" of : 0.15 mT
parallel to tube axis of : 0.6 mT

Characteristics with voltage divider ⑤ :

	B	A	
For a supply voltage of :	1700	1350	V
Gain :	5×10^5	5.3×10^5	
Linearity (2%) of anode current up to :	200	65	mA

Anode pulse ⑥ :

Rise time :	2.5	3	ns
Duration at half height :	6	7	ns
Transit Time :	26	28	ns

Capacitance anode to all : 5 pF

product specification

Recommended voltage divider

Type A for maximum gain

K	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	A	
2	1	1	1	1	1	1	1	1	1	1	1	(total :12)

Type B for best timing / linearity compromise

K	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	A	
2	1	1	1	1.25	1.25	1.5	2.25	2.25	2.5	2.25	2.25	(total :18.25)

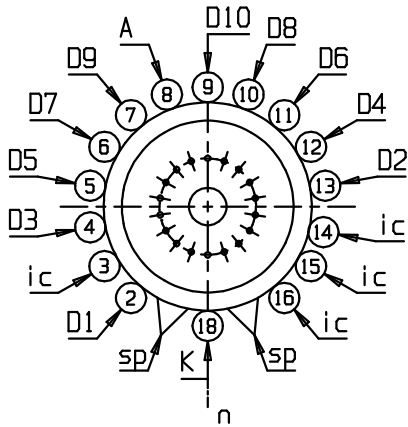
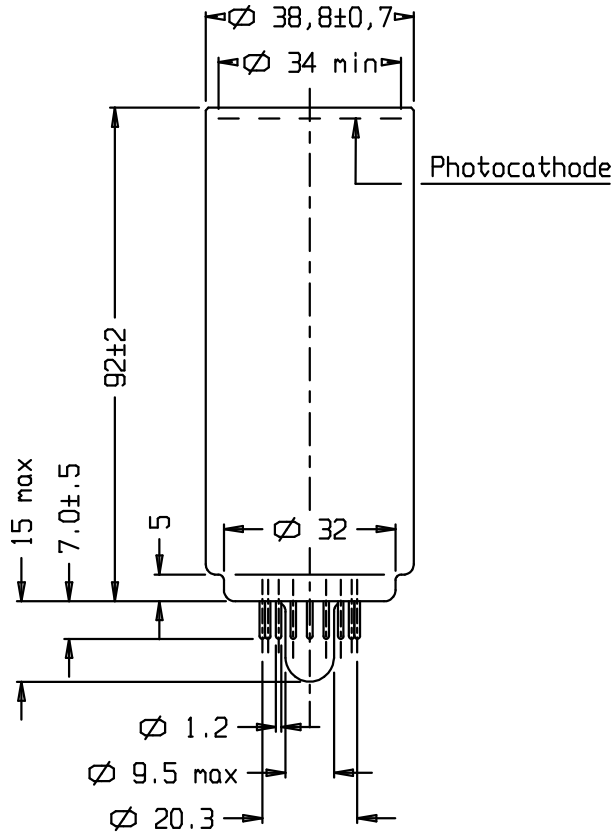
K: photocathode Dn: dynode A: anode

Limiting values

Anode luminous sensitivity :			max.:	1000	A/Im
Supply voltage :			max.:	1800	V
Continuous anode current :			max.:	0.2	mA
Voltage between :					
	D1 and photocathode :	min.:	100	max.:	500 V
	consecutive dynodes :			max.:	300 V
	anode and D10 :	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.

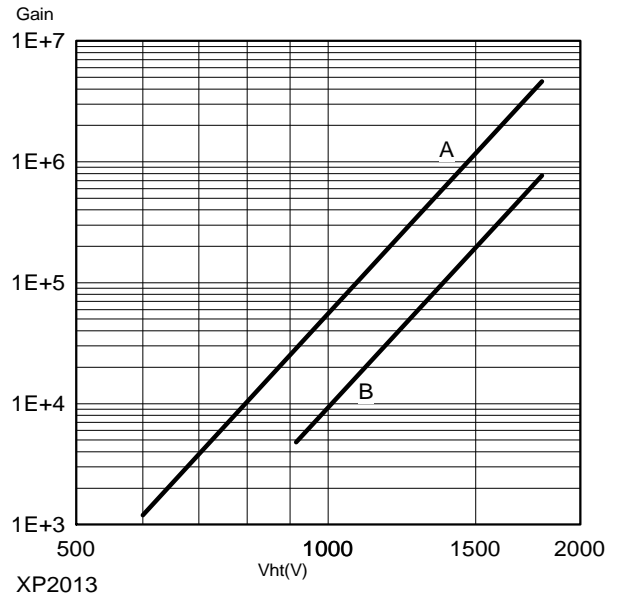
- ① Luminous and radiant sensitivities are measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. For radiant sensitivity, the light is transmitted through an interference filter centered on 700 nm and expressed in mA/W.
- ② Dark current is measured at ambient temperature, after the tube has been in darkness for approximately 1 min. Lower value can be obtained after a longer stabilisation period in darkness (approx. 30 min.).
- ③ Pulse amplitude resolution for ¹³⁷Cs is measured with NaI(Tl) cylindrical scintillator with a diameter of 12 mm and a height of 25 mm. The count rate used is ~ 10⁴ 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 ¹³⁷Cs source at a distance from the scintillator such that the count rate is ~10⁴ c/s, corresponding to an anode current of ~ 300 nA. The mean pulse amplitude deviation after change of count rate is measured with a ¹³⁷Cs source at a distance from the scintillator such that the count rate can be changed from 10⁴ to 10³ 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)^{-1/2}.



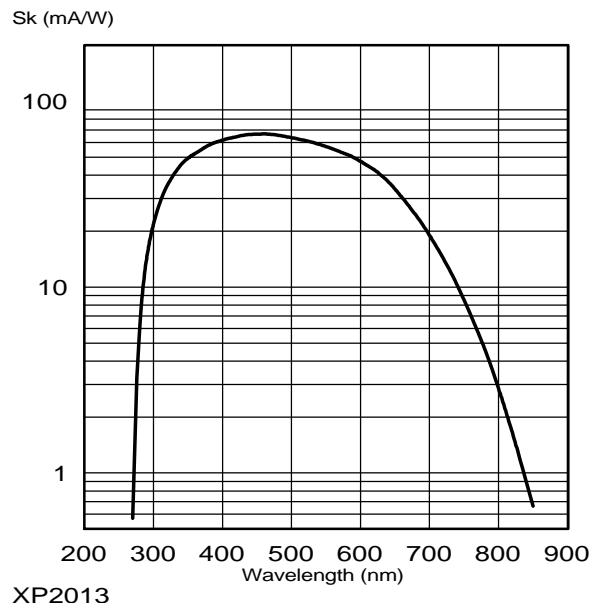
ref: 99900466
sp: short pin
ic: internal connection
n: plane of symmetry of the multiplier

K: cathode Dn: dynode
A: anode

Typical gain curve



Typical spectral characteristics



Accessories

Socket: FE1112
Mu-metal shield: MS170