

A standard fast, low voltage, 10-stage, 29mm (1 1/8") tube

| | | | |
|-----------------------|---|-------------------------|--------------------|
| Applications : | For high energy physics and scintillation counting where high gain good Cerenkov light detection. | | |
| Description : | Window : | Material : | borosilicate glass |
| | | Photocathode : | bi-alkali |
| | | Refr. index at 420 nm : | 1.48 |
| | Multiplier : | Structure : | linear focused |
| | | Nb of stages : | 10 |
| | Mass : | | 34 g |

Photocathode characteristics

| | | | | |
|--|-------|-------|---------|-------|
| Spectral range : | | | 270-650 | nm |
| Maximum sensitivity at : | | | 420 | nm |
| Sensitivity ① : | | | | |
| <input checked="" type="checkbox"/> Luminous : | | typ.: | 85 | μA/lm |
| <input checked="" type="checkbox"/> Blue : | min.: | 9 | typ.: | 11 |
| <input checked="" type="checkbox"/> Radiant, at 400 nm : | | | typ.: | 85 |
| | | | | mA/W |

Characteristics with voltage divider A

| | | | | |
|---|-------|------|---------------------|-------|
| Gain slope (vs supp. volt., log/log) : | | | 7.5 | |
| For an anode sensitivity of : | | | 10 | A/lmF |
| Typical gain : | | | 9.1x10 ⁵ | |
| <input checked="" type="checkbox"/> Supply voltage : | max.: | 1300 | typ.: | 1100 |
| | min.: | 900 | | V |
| <input checked="" type="checkbox"/> Anode dark current ② : | max.: | 5 | typ.: | 1 |
| <input checked="" type="checkbox"/> Pulse height resolution ¹³⁷ Cs ③ : | | | typ.: | 7.7 |
| Mean anode sensitivity deviation ④ : | | | | |
| long term (16 h) : | | | typ.: | 1 |
| after change of count rate : | | | typ.: | 1 |
| vs temperature between 0 and +40°C at 400 nm : | | | typ.: | -0.2 |
| Gain halved for a magnetic field of : | | | | %/K |
| perpendicular to axis "n" : | | | 0.2 | mT |
| parallel to axis "n" : | | | 0.1 | mT |
| parallel to tube axis : | | | 0.3 | mT |

Characteristics with voltage divider :

| | B | A | |
|---|---------------------|---------------------|----|
| For a supply voltage of : | 1800 | 1500 | V |
| Gain : | 8.2x10 ⁶ | 9.1x10 ⁶ | |
| Linearity (2%) of anode current up to : | 80 | 30 | mA |
| Anode pulse ⑤ : | | | |
| Rise time : | 1.9 | 2.1 | ns |
| Duration at half height : | 3 | 3.5 | ns |
| Transit Time : | 23 | 23 | ns |
| Transit Time Difference between centre of PK and 18mm from it : | 0.8 | | |
| Capacitance | | 5 | ns |
| anode to all dynodes : | | | pF |

Recommended voltage divider

Type A for maximum gain

| | | | | | | | | | | | | |
|---|----|-----|----|----|----|----|----|----|----|-----|---|----------------|
| K | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | A | |
| 2 | 1 | 1.5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | (total : 12.5) |

Type B for best timing / linearity compromise

| | | | | | | | | | | | | |
|---|----|-----|----|------|------|-----|------|------|-----|-----|---|----------------|
| K | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | A | |
| 2 | 1 | 1.5 | 1 | 1.25 | 1.25 | 1.5 | 2.25 | 2.25 | 2.5 | 3 | | (total : 19.5) |

K: photocathode Dn: dynode A: anode

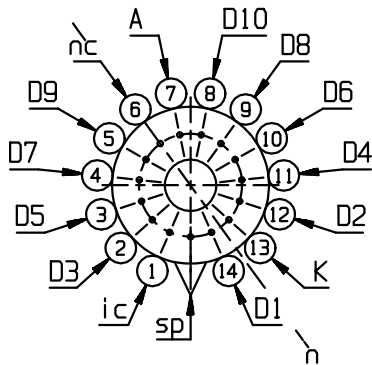
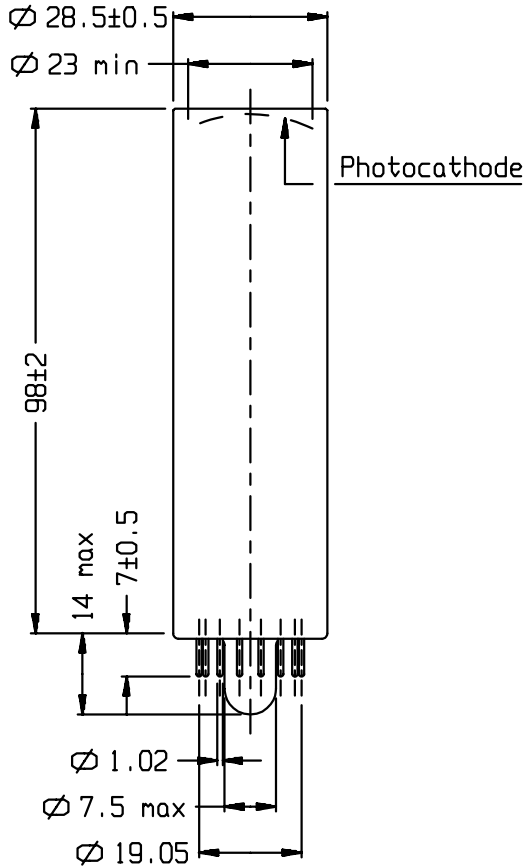
Limiting values

| | | | | | | |
|------------------------------|----------------------------------|-------|------|-------|-----|----|
| Anode luminous sensitivity : | | max.: | 100 | A/ImF | | |
| Supply voltage : | | max.: | 1800 | V | | |
| Continuous anode current : | | max.: | 0.2 | mA | | |
| Voltage between : | | | | | | |
| | D1 and photocathode : | min.: | 120 | max.: | 350 | V |
| | consecutive dynodes : | | | max.: | 250 | 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

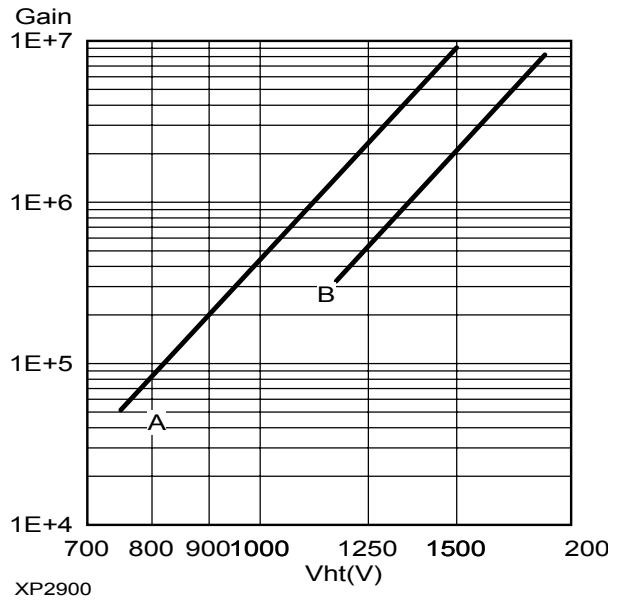
Characteristic measured and mentioned on the test ticket of each tube.

- ① Luminous sensitivity is measured with a tungsten filament lamp with a colour temperature of 2856 ± 5 K. The blue radiant blue sensitivity expressed in A/ImF ("F" as filtered) is measured with a tungsten filament lamp with a colour of 2856 ± 5 K transmitted through a blue filter Corning Cs N°5-58, polished to half stock thickness.
- 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 for ^{137}Cs is measured with NaI(Tl) cylindrical scintillator with a diameter of 12mm and a height of 25mm. The count rate used is $\sim 1.0 \times 10^4$ cps.
- 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 so that the count rate is $\sim 1.0 \times 10^4$ cps, 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 so that the count rate can be changed from 10^4 to 10^3 cps corresponding to an anode current of $\sim 1 \mu\text{A}$ and $0.1 \mu\text{A}$ respectively. Both tests are carried out according to ANSI-N42-9-1972 of IEEE recommendations.
- ⑤ Measured with a pulse light source, with a pulse duration (FWHM) of approximately 1ns., 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 $(Vht)^{-1/2}$.



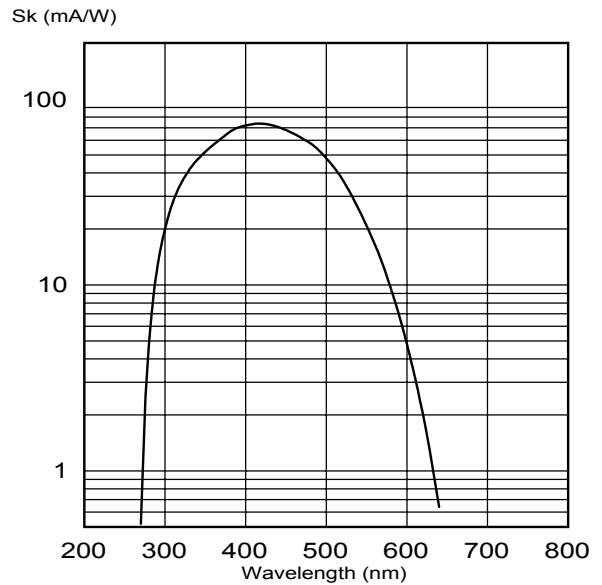
- ref.: 99901155
 sp: short pin
 nc: not connected
 ic: internal connection
 n: plane of symmetry of the multiplier
- K: cathode Dn: dynode
 A: anode

Typical gain curve



XP2900

Typical spectral characteristics



XP2900

Accessories

- Socket for wires : FE1114
- Socket for PCB : FE3114
- Mu-metal shield : MS179
- Voltage divider : VD109