

25 mm (1") photomultiplier

9111B series data sheet

1 description

The 9111B is a compact 25 mm (1") diameter, end window photomultiplier with plano-concave window, blue-green sensitive bialkali photocathode and 10 high gain, high stability, SbCs dynodes of circular focused design for fast timing. The 9111WB is a variant for applications requiring UV sensitivity.

2 applications

- wide range of applications
- X-ray & gamma-ray spectroscopy
- photon counting of bio- and chemi-luminescent samples
- high energy physics studies

3 features

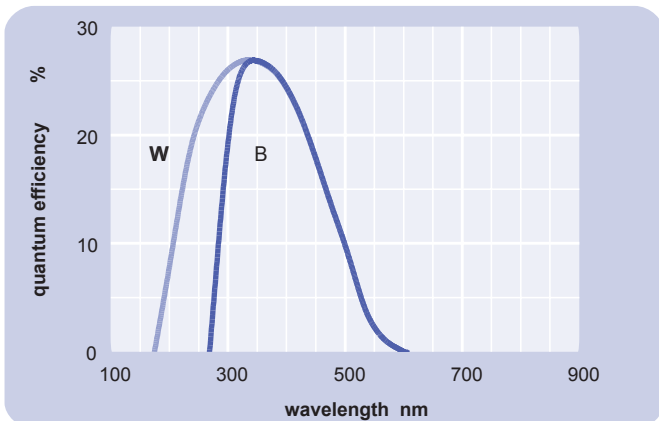
- compact
- fast time response
- low operating voltage

4 window characteristics

	9111B borosilicate	9111WB UV glass
spectral range*(nm)	280 - 630	170 - 630
refractive index (n_o)	1.49	1.48
K (ppm)	300	8500
Th (ppb)	250	30
U (ppb)	100	30

* wavelength range over which quantum efficiency exceeds 1 % of peak

5 typical spectral response curves

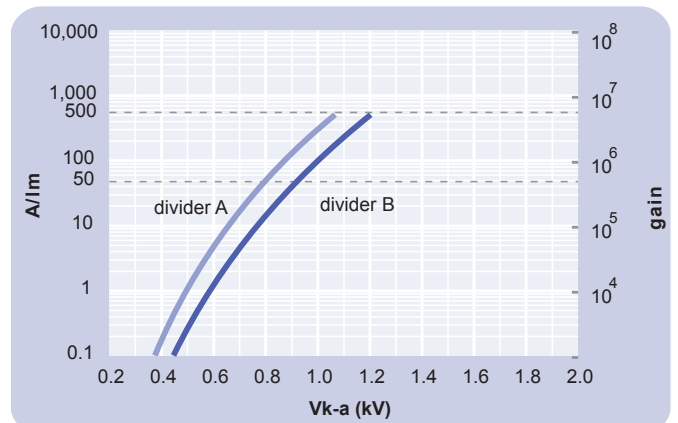


6 characteristics

	unit	min	typ	max
photocathode: bialkali				
active diameter	mm		22	
quantum efficiency at peak	%		28	
luminous sensitivity	$\mu\text{A/lm}$		70	
with CB filter		7	11	
with CR filter			2	
dynodes: 10CFSbCs				
anode sensitivity in divider A:				
nominal anode sensitivity	A/lm		50	
max. rated anode sensitivity	A/lm		500	
overall V for nominal A/lm	V		800	1300
overall V for max. rated A/lm	V		1050	
gain at nominal A/lm	$\times 10^6$		0.7	
dark current at 20 °C:				
dc at nominal A/lm	nA		0.3	1
dc at max. rated A/lm	nA		3	
dark count rate	s^{-1}		100	
afterpulse rate:				
afterpulse time window	μs	0.1	5	6.4
pulsed linearity (-5% deviation):				
divider A	mA		2	
divider B	mA		20	
pulse height resolution:				
single electron peak to valley	ratio		1.5	
^{137}Cs with 0.75" x 0.75" NaI(Tl)	%		7.5	
^{57}Co with 0.75" x 0.75" NaI(Tl)	%		11	
rate effect (I_a for $\Delta g/g=1\%$):	μA		20	
magnetic field sensitivity:				
the field for which the output decreases by 50 %				
most sensitive direction	$\text{T} \times 10^{-4}$		2.5	
temperature coefficient:	$\% \text{ } ^\circ\text{C}^{-1}$		± 0.5	
timing:				
single electron rise time	ns		1.8	
single electron fwhm	ns		3.1	
single electron jitter fwhm	ns		1.2	
transit time delay	ns		15	
weight:	g		20	
maximum ratings:				
anode current	μA			100
cathode current	nA			20
gain	$\times 10^6$			7.1
sensitivity	A/lm			500
temperature	$^\circ\text{C}$	-30		60
V (k-a) ⁽¹⁾	V			1500
V (k-d1)	V			300
V (d-d) ⁽²⁾	V			200
ambient pressure (absolute):	kPa			202

⁽¹⁾ subject to not exceeding max. rated sensitivity ⁽²⁾ subject to not exceeding max rated V(k-a)

7 typical voltage gain characteristics



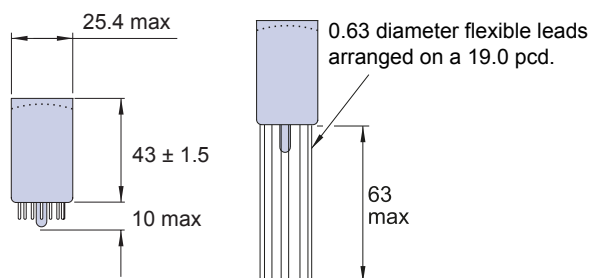
8 voltage divider distribution

	k	d ₁	d ₂	.....	d ₇	d ₈	d ₉	d ₁₀	a	
A	3R	R	.....	R	R	R	R	R	R	Standard
B	3R	R	.....	R	R	R	2R	4R		High Pulsed Linearity

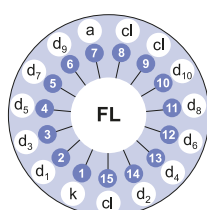
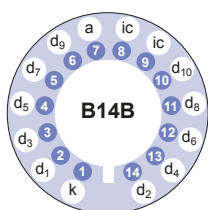
Characteristics contained in this data sheet refer to divider A unless stated otherwise.

9 external dimensions mm

The drawings below show the 9111B in hardpin format and the 9111FLB in flying lead format.



10 base configuration (viewed from below)

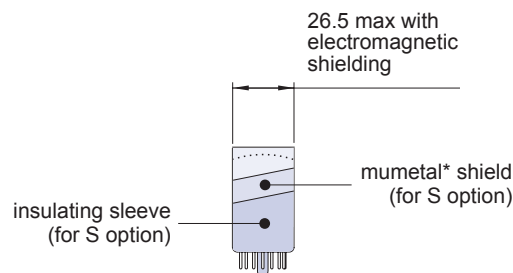
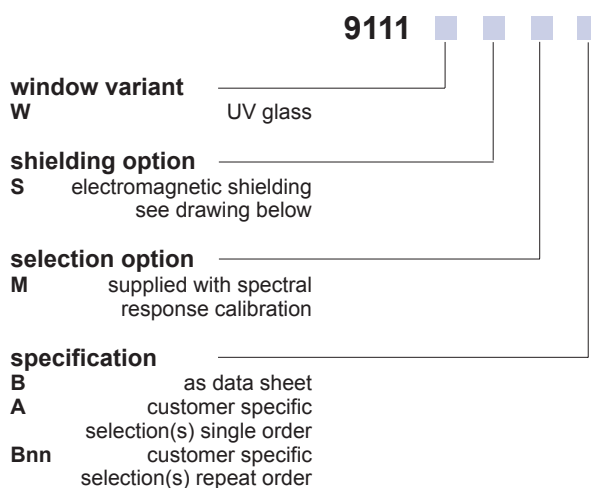


'ic' indicates an internal connection
flying lead base (for 9111FLB)
after removal of temporary cap
'cl' indicates cut lead

Our range of B14B sockets is available to suit the B14B hardpin base. The socket range includes versions with or without a mounting flange, and with contacts for mounting directly onto printed circuit boards.

11 ordering information

The 9111B is the parent type. It meets the specification contained in this datasheet. Variants are listed below with the convention for deriving the type number that includes your selection. Also we can select to different specification limits to suit your particular application. For one-off requirements the selection will change the B suffix to A, or for ongoing requirements ET Enterprises will advise a 2 digit suffix after the letter B that maintains the customers specific



12 voltage dividers

The standard voltage dividers available for this pmt are tabulated below:

9111B	9111FLB	k	d ₁	d ₂	.....	d ₆	d ₇	d ₈	d ₉	d ₁₀	a
C673A	C651A	3R	R	R	R	R	R	R	R	
C673B	C651B	3R	R	R	R	R	2R	4R		
	C651C	150 V	R	R	R	R	R	R		
	C651D	150 V	R	R	R	R	2R	4R		

R = 330 kΩ

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