38 mm (1.5") photomultiplier
9102B series data sheet

ET Enterprises electron tubes

1 description

The 9102B is a 38 mm (1.5″) diameter, end window photomultiplier with blue-green sensitive bialkali photocathode and 10 high gain, high stability, SbCs dynodes of linear focused design for good linearity and timing.

2 applications

- wide range of applications
- high energy physics studies
- x-ray and gamma-ray spectroscopy

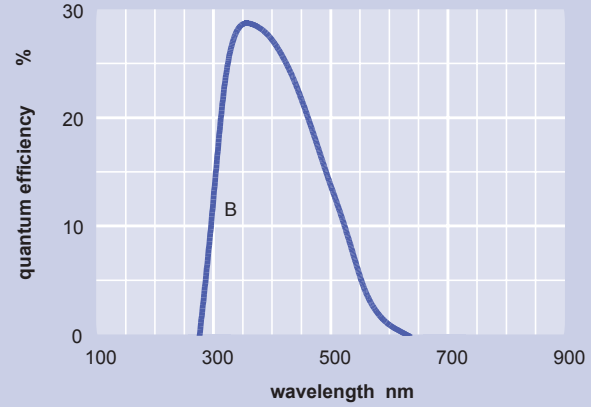
3 features

- good SER
- good pulse height resolution
- excellent stability

4 window characteristics

	9102B borosilicate
spectral range* (nm)	290 - 630
refractive index (n	1.49
K (ppm)	300
Th (ppb)	250
U (ppb)	100

5 typical spectral response curves

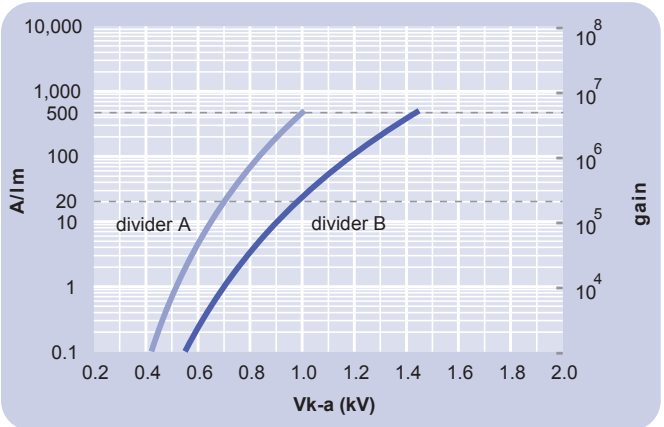


6 characteristics

	unit	min	typ	max
photocathode: bialkali				
active diameter	mm		32	
quantum efficiency at peak	%		28	
luminous sensitivity	µA/lm		90	
with CB filter		8	12.5	
with CR filter			4	
dynodes: 10LFSbCs				
anode sensitivity in divider A:				
nominal anode sensitivity	A/lm		20	
max. rated anode sensitivity	A/lm		500	
overall V for nominal A/lm	V		700	900
overall V for max. rated A/lm	V		1000	
gain at nominal A/lm	x 10^6		0.2	
dark current at 20 °C:				
dc at nominal A/lm	nA		0.05	1
dc at max. rated A/lm	nA		1	
dark count rate	s^{-1}		200	
afterpulse rate:	%		0.3	
afterpulse time window	µs	0.1		6.4
pulsed linearity (-5% deviation):				
divider A	mA		25	
divider B	mA		100	
pulse height resolution:				
single electron peak to valley	ratio		2.5	
^{137}Cs with 1⅛" x 1⅛" NaI(Tl)	%		7.3	
^{57}Co with 1⅛" x 1⅛" NaI (Tl)	%		10.5	
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	T x 10^{-4}		1.3	
temperature coefficient:	% $°C^{-1}$		± 0.5	
timing:				
multi electron rise time	ns		3.5	
multi electron fwhm	ns		6	
single electron rise time	ns		3	
single electron (fwhm)	ns		4	
single electron jitter (fwhm)	ns		4.5	
transit time	ns		35	
weight:	g		60	
maximum ratings:				
anode current	µA			100
cathode current	nA			75
gain	x 10^6			5.6
sensitivity	A/lm			500
temperature	°C	-30		60
V (k-a)(1)	V			1600
V (k-d1)	V			300
V (d-d)(2)	V			300
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



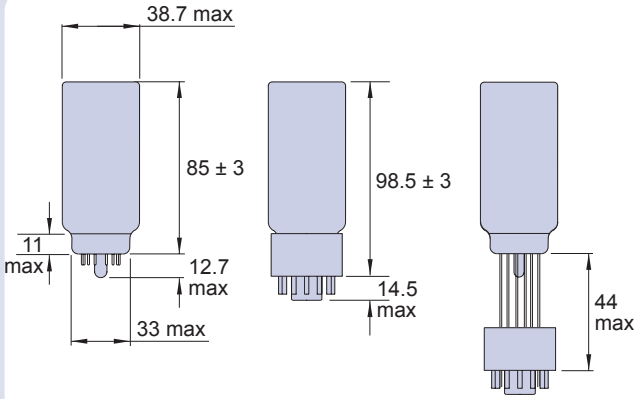
8 voltage divider distribution

	k	d_1	d_2	d_7	d_8	d_9	d_{10}	a	
A	150V	R	. . . . .	R	R	R	R	R	Standard
B	150V	R	. . . . .	R	2R	3R	4R	3R	High Pulsed Linearity

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

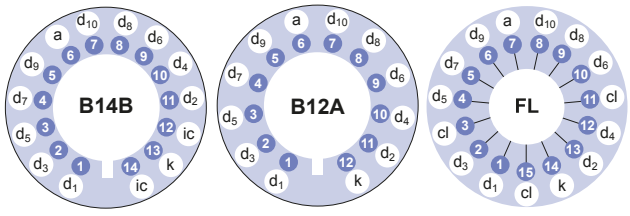
9 external dimensions mm

The drawings below show the 9102B in hardpin format, the 9102KB with the B14A cap fitted and the 9102FLB in flying lead format with the temporary B14A cap fitted. The cap is attached as agreed with the customer.



flying lead length 54 max when the temporary B12A cap is removed.

10 base configuration (viewed from below)



B14B hardpin base (for 9102B)
'ic' indicates an internal connection

B12A cap (for 9102KB)

flying lead base (for 9102FLB) after removal of temporary cap
'cl' indicates cut lead

Our range of B14B sockets is available to suit the hardpin base. Our range of B12A sockets is available to suit the B12A cap. Both socket ranges include versions with or without a mounting flange, and versions with contacts for mounting directly onto printed circuit boards.

11 ordering information

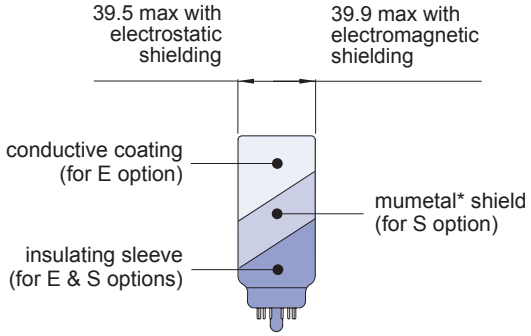
The 9102B meets the specification given in this data sheet. You may order **variants** by adding a suffix to the type number. You may also order **options** by adding a suffix to the type number. You may order product with **specification options** by discussing your requirements with us. If your selection option is for one-off order, then the product will be referred to as 9102A. For a repeat order, ET Enterprises will give the product a two digit suffix after the letter B, for example B21. This identifies your specific requirement.

9102

base options
- **K** capped
- **KFL** flying lead base with temporary B12A cap

options
- **E** electrostatic shielding see drawing below
- **S** electromagnetic shielding see drawing below
- **M** supplied with spectral response calibration

specification options
- **B** as given in data sheet
- **A** single order to selected specification
- **Bnn** repeat order to selected specification



12 voltage dividers

The standard voltage dividers available for these pmts are tabulated below:

B	9102 KB	FLB	k	d_1	d_2	d_6	d_7	d_8	d_9	d_{10}	a
C646A	C674A	C653A	2R	R	. . . .	R	R	R	R	R	
C646B	C674B	C653B	2R	R	. . . .	R	2R	3R	4R	3R	
C646C	C674C	C653C	150 V	R	. . . .	R	R	R	R	R	
C646D	C674D	C653D	150 V	R	. . . .	R	2R	3R	4R	3R	

R = 330kΩ

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