

# 29 mm (1.13") photomultiplier

## 9142B series data sheet

### 1 description

The 9142B is a 29 mm (1.13") diameter end window photomultiplier with plano-concave window, blue-green sensitive bialkali photocathode and 10 high gain, high stability, SbCs dynodes of linear focused design for good linearity and timing. The 9142WB and 9142QB are variants for applications requiring uv sensitivity.

### 2 applications

- high energy physics studies

### 3 features

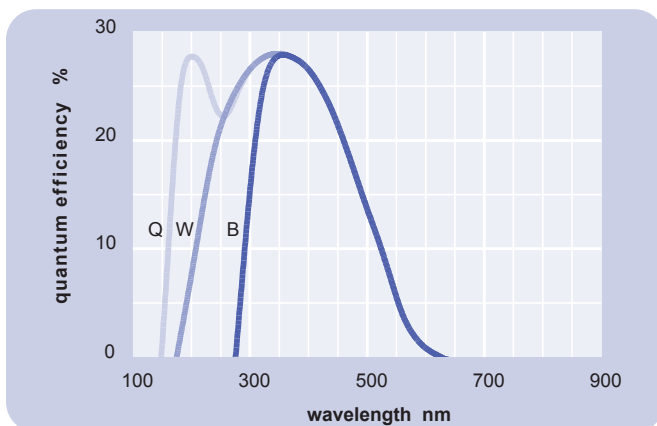
- low operating voltage
- good SER
- fast time response
- high pulsed linearity
- low afterpulse rate

### 4 window characteristics

	9142B borosilicate	9142WB uv glass	9142QB* fused silica
spectral range**(nm)	280 - 630	170 - 630	160 - 630
refractive index ( $n_d$ )	1.49	1.48	1.46
K (ppm)	300	8500	<10
Th (ppb)	250	30	<10
U (ppb)	100	30	<10

\* note that the sidewall of the envelope contains graded seals of high K content  
\*\* wavelength range over which quantum efficiency exceeds 1 % of peak

### 5 typical spectral response curves

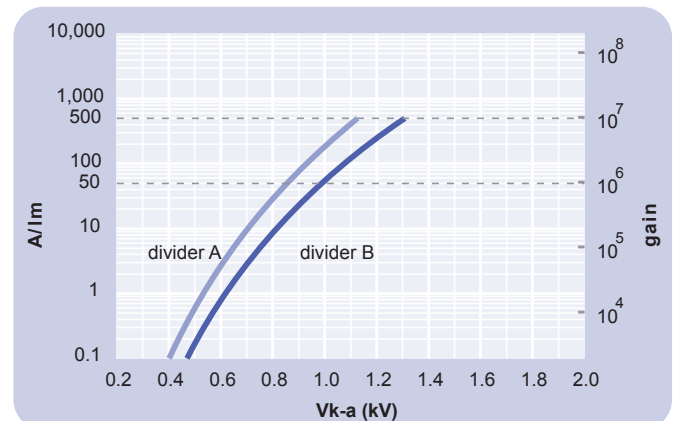


### 6 characteristics

	unit	min	typ	max
<b>photocathode: bialkali</b>				
active diameter	mm		25	
quantum efficiency at peak	%		28	
luminous sensitivity	$\mu\text{A}/\text{lm}$		65	
with CB filter		7	11	
with CR filter			1	
<b>dynodes: 10LFSbCs</b>				
<b>anode sensitivity in divider A:</b>				
nominal anode sensitivity	$\text{A}/\text{lm}$		50	
max. rated anode sensitivity	$\text{A}/\text{lm}$		500	1200
overall V for nominal $\text{A}/\text{lm}$	V		850	
overall V for max. rated $\text{A}/\text{lm}$	V		1100	
gain at nominal $\text{A}/\text{lm}$	$\times 10^6$		0.8	
<b>dark current at 20 °C:</b>				
dc at nominal $\text{A}/\text{lm}$	nA		0.1	1
dc at max. rated $\text{A}/\text{lm}$	nA		1	
dark count rate	$\text{s}^{-1}$		100	
<b>afterpulse rate:</b>	%		1	
afterpulse time window	$\mu\text{s}$	0.1		6.4
<b>pulsed linearity (-5 % deviation):</b>				
divider A	mA		10	
divider B	mA		70	
<b>rate effect (<math>I_a</math> for <math>\Delta g/g=1\%</math>):</b>	$\mu\text{A}$		20	
<b>magnetic field sensitivity:</b>				
the field for which the output decreases by 50%				
most sensitive direction	$\text{T} \times 10^{-4}$		2.4	
<b>pulse height resolution:</b>				
single electron peak to valley	ratio		1.8	
<b>temperature coefficient:</b>	$\% \text{ } ^\circ\text{C}^{-1}$		$\pm 0.5$	
<b>timing:</b>				
multi electron rise time	ns		2	
multi electron fwhm	ns		3	
single electron rise time	ns		1.5	
single electron fwhm	ns		2	
single electron jitter (fwhm)	ns		1.5	
transit time delay	ns		19	
<b>weight:</b>	g		35	
<b>maximum ratings:</b>				
anode current	$\mu\text{A}$			100
cathode current	nA			50
gain	$\times 10^6$			7.7
sensitivity	$\text{A}/\text{lm}$			500
temperature	$^\circ\text{C}$	-30		60
V (k-a) <sup>(1)</sup>	V			1500
V (k-d1)	V			300
V (d-d) <sup>(2)</sup>	V			250
ambient pressure (absolute)	kPa			202

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

### 7 typical voltage gain characteristics

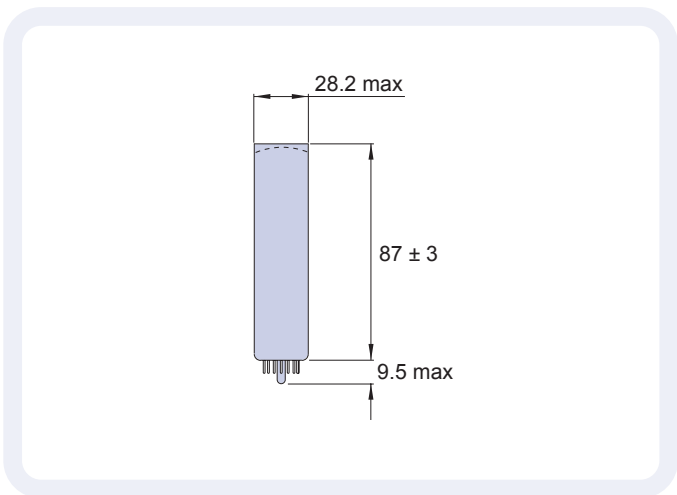


## 8 voltage divider distribution

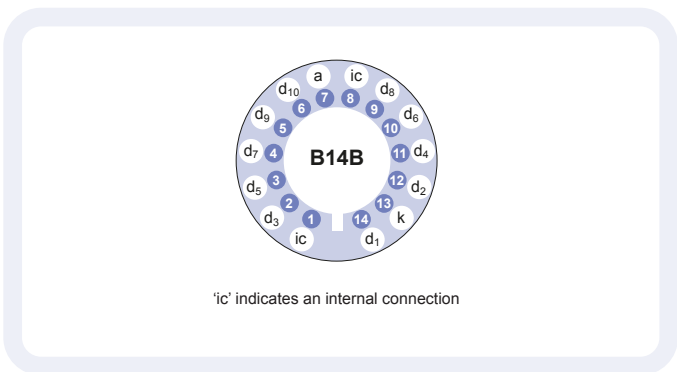
	k	d <sub>1</sub>	.....	d <sub>6</sub>	d <sub>7</sub>	d <sub>8</sub>	d <sub>9</sub>	d <sub>10</sub>	a	
A	2R	R	.....	R	R	R	R	R	R	Standard
B	2R	R	.....	R	1.5R	2R	4R	2R		High Pulsed Linearity

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

## 9 external dimensions mm



## 10 base configuration (viewed from below)



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 versions with contacts for mounting directly onto printed circuit boards.

## 11 ordering information

The 9142B 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 9142A. 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.

**9142** ■ ■ ■

**window options**

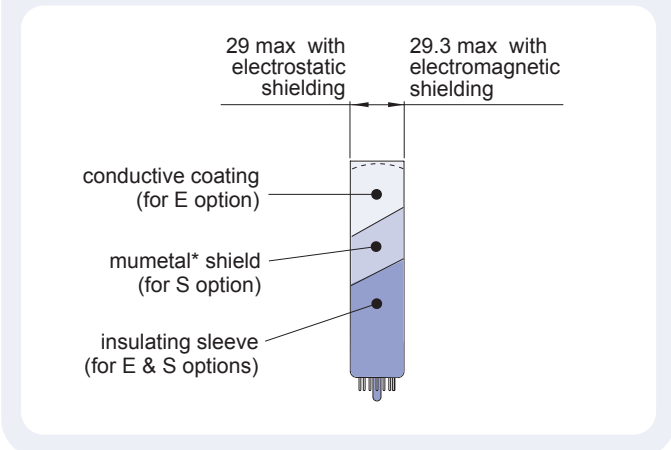
- W** uv glass
- Q** fused silica

**options**

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

**specification**

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



## 12 voltage dividers

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

	k	d <sub>1</sub>	d <sub>2</sub>	.....	d <sub>6</sub>	d <sub>7</sub>	d <sub>8</sub>	d <sub>9</sub>	d <sub>10</sub>	a
C620A	2R	R	.....	R	R	R	R	R	R	
C620B	2R	R	.....	R	2R	3R	4R	3R		

R = 300k Ω

\*mumetal is a registered trademark of Magnetic Shield Corporation