

# 29 mm (1.13") photomultiplier

## 9924B series data sheet

### 1 description

The 9924B is a 29 mm (1.13") diameter, end window photomultiplier with enhanced green sensitive bialkali photocathode and 11 high gain, high stability, SbCs dynodes of box and grid design. The 9924QB 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

### 3 features

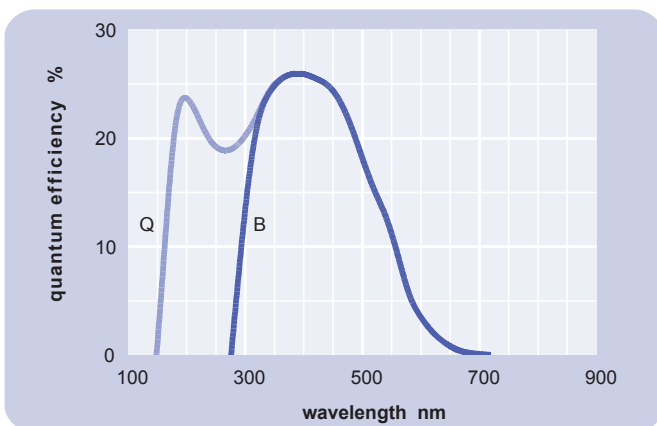
- high gain
- low operating voltage
- good SER

### 4 window characteristics

	9924B borosilicate	9924QB* fused silica
spectral range**(nm)	280 - 680	160 - 680
refractive index ( $n_d$ )	1.49	1.46
radiopurity:		
K (ppm)	300	<10
Th (ppb)	250	<10
U (ppb)	100	<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

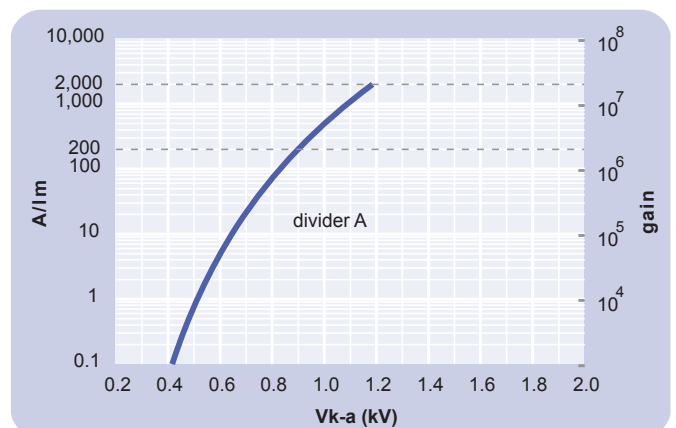


### 6 characteristics

	unit	min	typ	max
<b>photocathode: bialkali</b>				
active diameter	mm		25	
quantum efficiency at peak	%		26	
luminous sensitivity	$\mu\text{A}/\text{lm}$		95	
with CB filter		8	12	
with CR filter			7.5	
<b>dynodes: 11BGSbCs</b>				
<b>anode sensitivity in divider A:</b>				
nominal anode sensitivity	$\text{A}/\text{lm}$		200	
max. rated anode sensitivity	$\text{A}/\text{lm}$		2000	
overall V for nominal $\text{A}/\text{lm}$	V		900	1050
overall V for max. rated $\text{A}/\text{lm}$	V		1200	
gain at nominal $\text{A}/\text{lm}$	$\times 10^6$		2	
<b>dark current at 20 °C:</b>				
dc at nominal $\text{A}/\text{lm}$	nA		0.2	5
dc at max. rated $\text{A}/\text{lm}$	nA		2	
dark count rate	$\text{s}^{-1}$		200	
<b>pulsed linearity (-5% deviation):</b>				
divider A	mA		0.1	
<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	
<b>temperature coefficient:</b>				
timing:	$\% \text{ } ^\circ\text{C}^{-1}$		$\pm 0.5$	
single electron rise time	ns		15	
single electron (fwhm)	ns		30	
transit time	ns		85	
weight:	g		55	
<b>maximum ratings:</b>				
anode current	$\mu\text{A}$			100
cathode current	nA			25
gain	$\times 10^6$			21
sensitivity	$\text{A}/\text{lm}$			2000
temperature	$^\circ\text{C}$	-30		60
V (k-a) <sup>(1)</sup>	V			2000
V (k-d1)	V			300
V (d-d) <sup>(2)</sup>	V			300
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

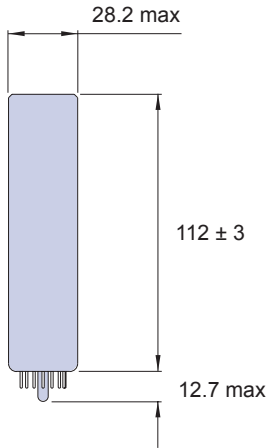


## 8 voltage divider distribution

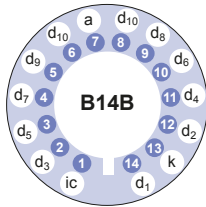
k	d <sub>1</sub>	d <sub>2</sub>	.....	d <sub>8</sub>	d <sub>9</sub>	d <sub>10</sub>	d <sub>11</sub>	a	
A	150V	R	.....	R	R	R	2R	R	Standard

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

## 9 external dimensions mm



## 10 base configuration (viewed from below)



'ic' indicates an internal connection

Our range of B14B sockets, available for this series, includes versions with or without a mounting flange, and versions with contacts for mounting directly onto printed circuit boards.

## 11 ordering information

The 9924B 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 9924A. 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.

9924

### window variants

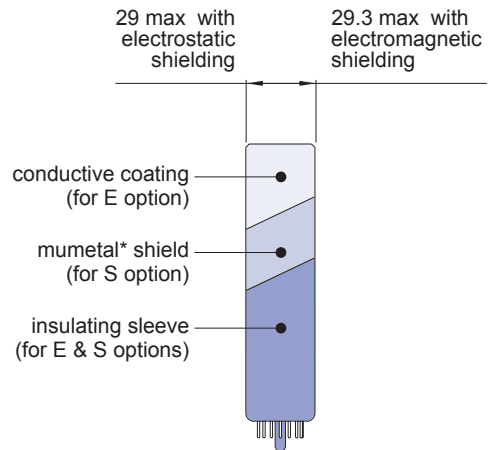
**Q** fused silica

### 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:

k	d <sub>1</sub>	d <sub>2</sub>	.....	d <sub>7</sub>	d <sub>8</sub>	d <sub>9</sub>	d <sub>10</sub>	d <sub>11</sub>	a
C637E	2R	R	.....	R	R	R	R	R	
C637F	2R	R	.....	R	R	R	2R	R	

R = 330 kΩ

\*mumetal is a registered trademark of Magnetic Shield Corporation

**ET Enterprises Limited**  
45 Riverside Way  
Uxbridge UB8 2YF  
United Kingdom  
tel: +44 (0) 1895 200880  
fax: +44 (0) 1895 270873  
e-mail: sales@et-enterprises.com  
web site: www.et-enterprises.com

**ADIT Electron Tubes**  
300 Crane Street  
Sweetwater TX 79556 USA  
tel: (325) 235 1418  
toll free: (800) 521 8382  
fax: (325) 235 2872  
e-mail: sales@electron tubes.com  
web site: www.electrontubes.com

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