

# 51 mm (2") photomultiplier

## 9814B series data sheet

### 1 description

The 9814B is a 51mm (2") diameter, end window photomultiplier with blue-green sensitive bialkali photocathode and 12 BeCu dynodes of linear focused design. The 9814QB is a variant for applications requiring uv sensitivity.

### 2 applications

- photon counting of bio- and chemi-luminescent samples
- high energy physics

### 3 features

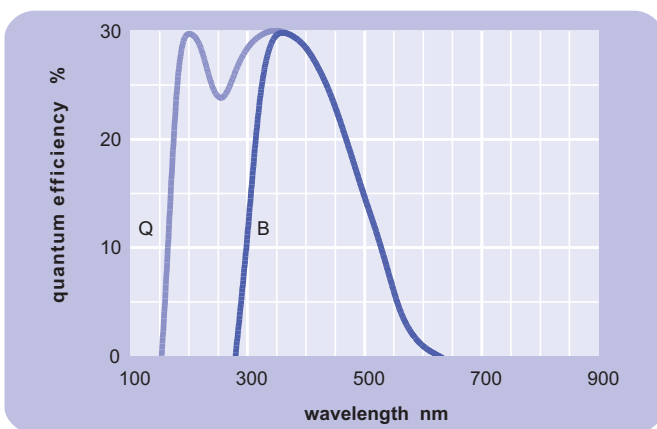
- high gain
- good SER
- high pulsed linearity

### 4 window characteristics

	9814B borosilicate	9814QB* fused silica
spectral range**(nm)	290 - 630	160 - 630
refractive index (n <sub>d</sub> )	1.49	1.46
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

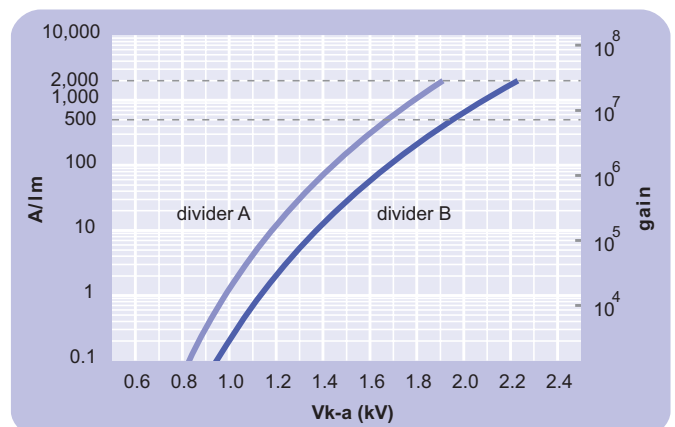


### 6 characteristics

	unit	min	typ	max
<b>photocathode: bialkali</b>				
active diameter	mm		46	
quantum efficiency at peak	%		30	
luminous sensitivity	μA/lm		70	
with CB filter		8	11.5	
with CR filter			2	
<b>dynodes: 12LFBcCu</b>				
<b>anode sensitivity in divider B:</b>				
nominal anode sensitivity	A/lm		500	
max. rated anode sensitivity	A/lm		2000	
overall V for nominal A/lm	V		1950	2300
overall V for max. rated A/lm	V		2250	
gain at nominal A/lm	x 10 <sup>6</sup>		7	
<b>dark current at 20 °C:</b>				
dc at nominal A/lm	nA		3	20
dc at max. rated A/lm	nA		20	
dark count	s <sup>-1</sup>		300	
<b>pulsed linearity (-5% deviation):</b>				
divider A	mA		50	
divider B	mA		150	
<b>pulse height resolution:</b>				
single electron peak to valley	ratio		2	
<b>rate effect (I<sub>a</sub> for Δg/g=1%):</b>				
	μA		1	
<b>magnetic field sensitivity:</b>				
the field for which the output decreases by 50 %				
most sensitive direction	T x 10 <sup>-4</sup>		2	
<b>temperature coefficient:</b>				
	% °C <sup>-1</sup>		± 0.5	
<b>timing:</b>				
single electron rise time	ns		2	
single electron fwhm	ns		3	
single electron jitter (fwhm)	ns		2.2	
transit time	ns		43	
<b>weight:</b>				
	g		180	
<b>maximum ratings:</b>				
anode current	μA			100
cathode current	nA			100
gain	x 10 <sup>6</sup>			30
sensitivity	A/lm			10000
temperature	°C	-30		60
V (k-a) <sup>(1)</sup>	V			2800
V (k-d1)	V			500
V (d-d) <sup>(2)</sup>	V			450
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

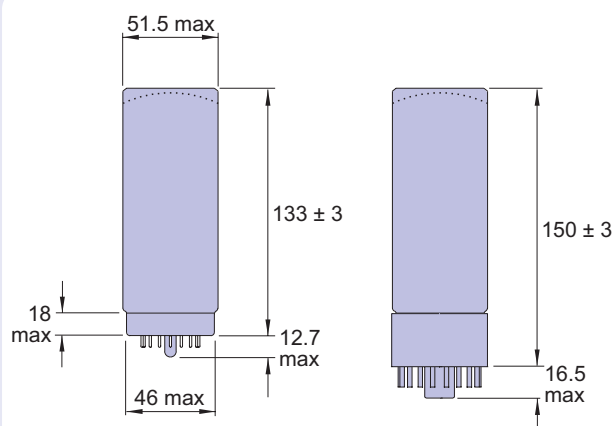
	k	d <sub>1</sub>	d <sub>2</sub>	.....	d <sub>11</sub>	d <sub>12</sub>	d <sub>13</sub>	d <sub>14</sub>	a	
A	300V	R	.....		R	R	R	R	R	Standard
B	300V	R	.....		R	1.25R	1.5R	2R	3R	High Pulsed linearity

note: focus connected to d<sub>1</sub>

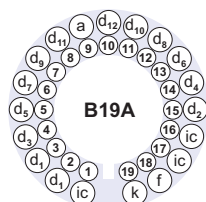
Characteristics contained in this data sheet refer to divider B unless stated otherwise.

## 9 external dimensions mm

The drawings below show the 9814B in hardpin format and the 9814KB with the B20 cap fitted.



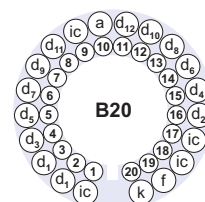
## 10 base configuration (viewed from below)



B19A hardpin base  
(for 9814B)

'ic' indicates an internal connection

note: connect f to d<sub>1</sub>



B20 cap  
(for 9814KB)

'ic' indicates an internal connection

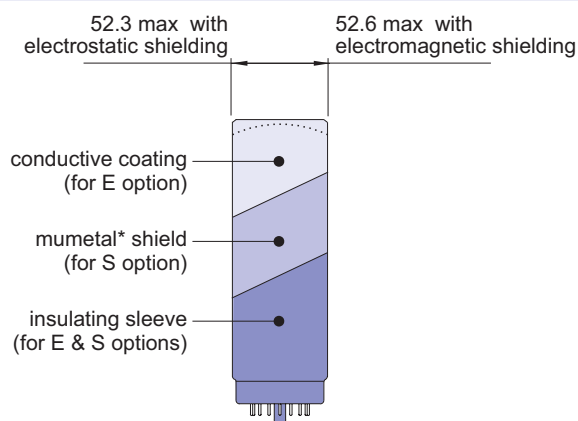
note: connect f to d<sub>1</sub>

Our range of B19A sockets is available to suit the hardpin base. Our range of B20 sockets is available to suit the B20 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 9814B 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 9814A. 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.

9814	
<b>window variants</b>	
Q	fused silica
<b>base options</b>	
K	capped
<b>options</b>	
E	electrostatic shielding see drawing below
S	electromagnetic shielding see drawing below
M	supplied with spectral response calibration
<b>specification options</b>	
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>10</sub>	d <sub>11</sub>	d <sub>12</sub>	d <sub>13</sub>	d <sub>14</sub>	a
C638A	3R	R	.....		R	R	R	R	R	
C638C	300V	R	.....		R	R	R	R	R	
C638B	3R	R	.....		R	1.25R	1.5R	2R	3R	
C638D	300V	R	.....		R	1.25R	1.5R	2R	3R	

R = 330 kΩ note: focus connected to d<sub>1</sub>

\*mumetal is a registered trademark of Magnetic Shield Corporation

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