51 mm (2") photomultiplier
9813B series data sheet

ET Enterprises electron tubes

1 description

The 9813B is a 51mm (2") diameter, end window photomultiplier with blue-green sensitive bialkali photocathode and 14 BeCu dynodes of linear focused design. The 9813QB is a variant for applications requiring uv sensitivity.

2 applications

- high energy physics studies
- low light level detection

3 features

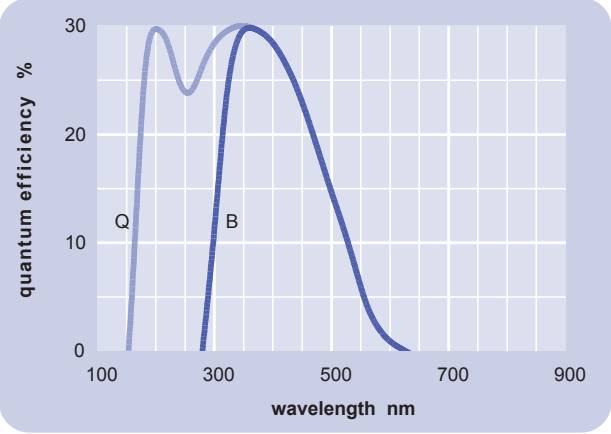
- high gain
- good SER
- high pulsed linearity

4 window characteristics

	9813B borosilicate	9813QB* fused silica
spectral range**(nm)	290 - 630	160 - 630
refractive index (n_d)	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

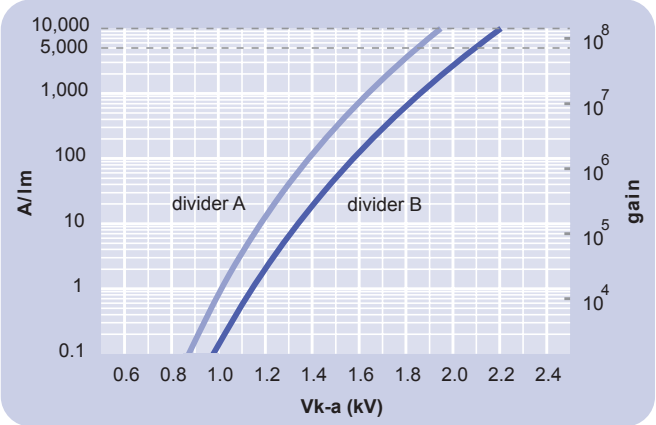


6 characteristics

	unit	min	typ	max
photocathode: bialkali				
active diameter	mm		46	
quantum efficiency at peak	%		30	
luminous sensitivity	µA/lm		70	
with CB filter		8	11.5	
with CR filter			2	
dynodes: 14LFBeCu				
anode sensitivity in divider B:				
nominal anode sensitivity	A/lm		5000	
max. rated anode sensitivity	A/lm		10000	
overall V for nominal A/lm	V		2100	2500
overall V for max. rated A/lm	V		2200	
gain at nominal A/lm	x 10^6		70	
dark current at 20 °C:				
dc at nominal A/lm	nA		10	200
dc at max. rated A/lm	nA		20	
dark count	s^{-1}		300	
pulsed linearity (-5% deviation):				
divider A	mA		50	
divider B	mA		150	
pulse height resolution:				
single electron peak to valley	ratio		2	
rate effect (I_a for $\Delta g/g=1\%$):	µA		1	
magnetic field sensitivity: the field for which the output decreases by 50 %				
most sensitive direction	T x 10^{-4}		2	
temperature coefficient:	% $°C^{-1}$		± 0.5	
timing:				
single electron rise time	ns		2	
single electron fwhm	ns		3	
single electron jitter (fwhm)	ns		2.2	
transit time	ns		46	
weight:	g		180	
maximum ratings:				
anode current	µA			100
cathode current	nA			100
gain	x 10^6			140
sensitivity	A/lm			10000
temperature	°C	-30		60
V (k-a) [1]	V			3000
V (k-d1)	V			500
V (d-d) [2]	V			450
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

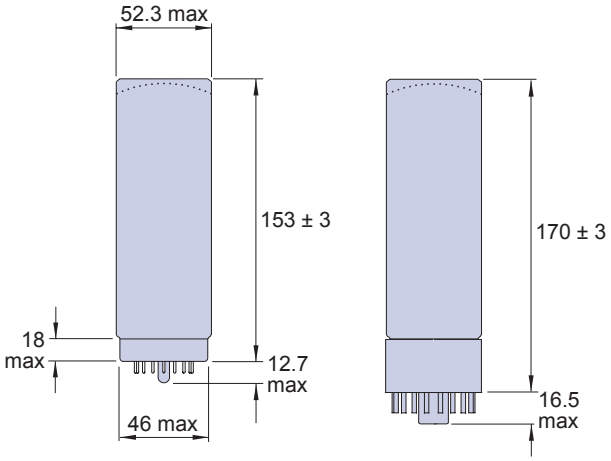
	k	d_1	d_2	d_{11}	d_{12}	d_{13}	d_{14}	a	
A	300V	R	.....	R	R	R	R	R	Standard
B	300V	R	.....	R	1.25R	1.5R	2R	3R	High Pulsed linearity

note: focus connected to d_1

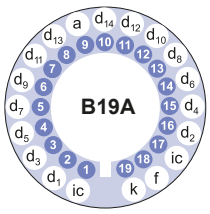
Characteristics contained in this data sheet refer to divider B unless stated otherwise.

9 external dimensions mm

The drawings below show the 9813B in hardpin format and the 9813KB with the B20 cap fitted.

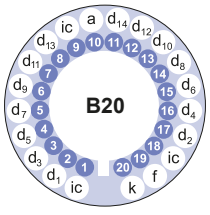


10 base configuration (viewed from below)



B19A hardpin base
(for 9813B)
'ic' indicates an internal connection

note: connect f to d_1



B20 cap
(for 9813KB)
'ic' indicates an internal connection

note: connect f to d_1

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 9813B 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 a one-off order, then the product will be referred to as 9813A. For a repeat order, ET Enterprises Limited will give the product a two digit suffix after the letter B, for example B21. This identifies your specific requirement.

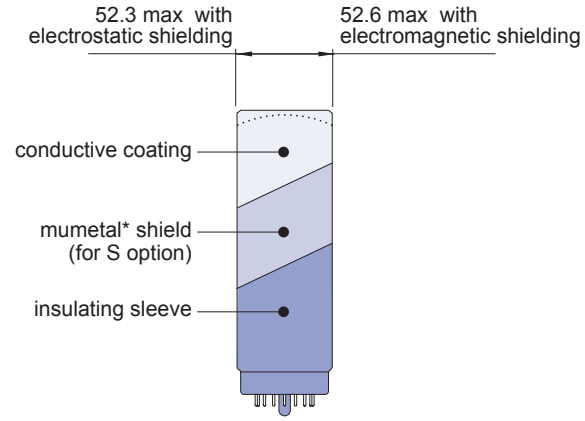
9813 □ □ □ □

window variants
Q fused silica

base options
K capped

options
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:

9813B	9813KB	k	d_1	d_2	d_{10}	d_{11}	d_{12}	d_{13}	d_{14}	a
C638A	C643A	3R	R	.....	R	R	R	R	R	
C638B	C643B	3R	R	.....	R	1.25R	1.5R	2R	3R	
C638C	C643C	300 V	R	.....	R	R	R	R	R	
C638D	C643D	300 V	R	.....	R	1.25R	1.5R	2R	3R	

R = 330 kΩ note: focus connected to d_1

*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) 399 4557
fax: (325) 235 2872
e-mail: sales@electrontubes.com
web site: www.electrontubes.com

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