

38 mm (1.5") photomultiplier

9903B series data sheet

1 description

The 9903B is a 38 mm (1.5") diameter, end window photomultiplier with enhanced green sensitive bialkali photocathode and 10 BeCu dynodes of linear focused design for good linearity and timing.

2 applications

- radiation monitoring
- scintillation spectroscopy

3 features

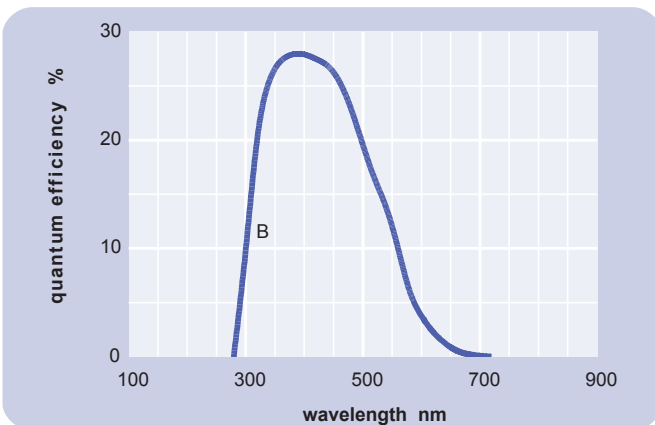
- good pulse height resolution
- high pulsed linearity

4 window characteristics

9903B borosilicate	
spectral range *(nm)	290 - 680
refractive index (n _d)	1.49
K (ppm)	300
Th (ppb)	250
U (ppb)	100

* wavelength range over which quantum efficiency exceeds 1 % of peak

5 typical spectral response curves

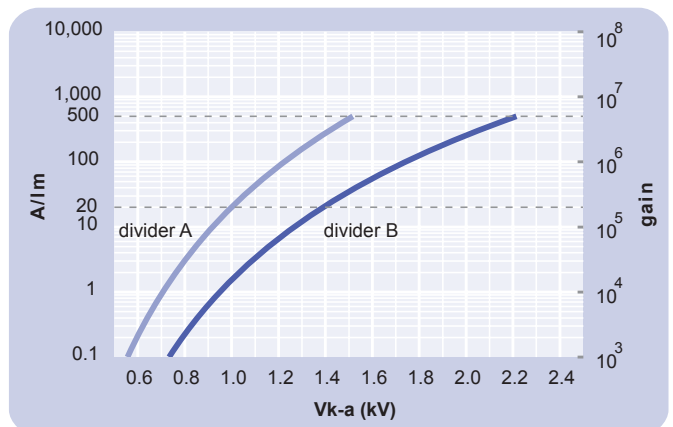


6 characteristics

	unit	min	typ	max
photocathode: bialkali				
active diameter	mm		32	
quantum efficiency at peak	%		28	
luminous sensitivity	μA/lm	8	100	
with CB filter			12	
with CR filter			9	
dynodes: 10LFBBeCu				
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		1000	1100
overall V for max. rated A/lm	V		1500	
gain at nominal A/lm	x 10 ⁶		0.2	
dark current at 20 °C:				
dc at nominal A/lm	nA		0.1	3
dc at max. rated A/lm	nA		2.5	
dark count rate	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	
¹³⁷ Cs with 1.13" x 1.13" NaI(Tl)	%		7.5	
⁵⁷ Co with 1.13" x 1.13" NaI(Tl)	%		11	
rate effect (I_a for Āg/g=1%):	μA		1	
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		30	
weight:	g		60	
maximum ratings:				
anode current	μA			100
cathode current	nA			150
gain	x 10 ⁶			5
sensitivity	A/lm			500
temperature	°C	-30		60
V (k-a) ⁽¹⁾	V			2200
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



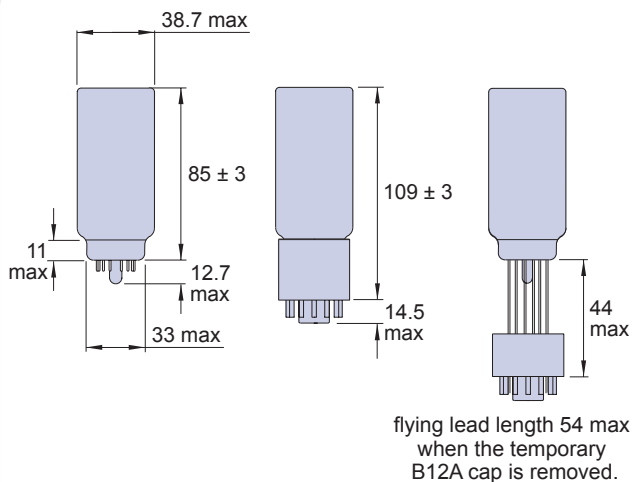
8 voltage divider distribution

	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 9903B in hardpin format and the 9903KB with the B12A cap fitted. The 9903KFLB is shown in flying lead format with a temporary cap fitted. This temporary cap is attached as agreed with the customer.



11 ordering information

The 9903B 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 9903A. 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.

base options

K capped
KFL flying lead base with temporary B12A cap

options

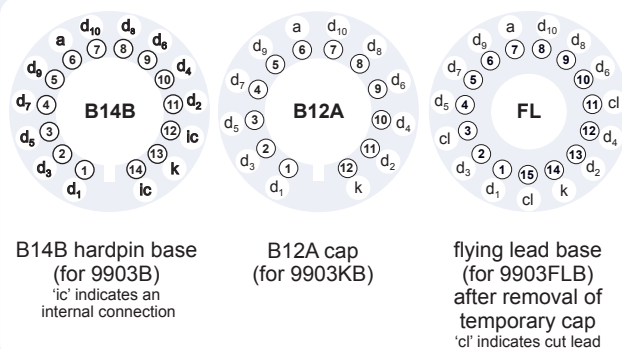
E electrostatic shielding see drawing below
S electromagnetic shielding see drawing below
M supplied with spectral response calibration

specification options

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

9903

10 base configuration (viewed from below)



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.

12 voltage dividers

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

	k	d ₁	d ₂	.....	d ₆	d ₇	d ₈	d ₉	d ₁₀	a
C646A	2R	R	.....		R	R	R	R	R	
C646B	2R	R	.....		R	2R	3R	4R	3R	

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

choose accessories for this pmt on our website

an ISO 9001 registered company

The company reserves the right to modify these designs and specifications without notice. Developmental devices are intended for evaluation and no obligation is assumed for future manufacture. While every effort is made to ensure accuracy of published information the company cannot be held responsible for errors or consequences arising therefrom.



© ET Enterprises Ltd, 2010
DS_ 9903B Issue 5 (16/06/10)