

# photodetector module

## PDM9130/100-CP-TTL data sheet

### 1 description

The PDM9130/100-CP-TTL is a photon counting module incorporating a low noise, S20 infra-red sensitive photomultiplier with an effective photosensitive diameter of 2.5mm, and fast photon counting electronics. The module operates from a low voltage (5V to 15V) supply and achieves a dark count of typically 40cps at 20°C, which is exceptional for an S20 photocathode without cooling.

This combination of low dark count, high-speed electronics and a fast photomultiplier enables a wide dynamic range to be achieved. A positive polarity internal high-voltage supply is used for maximum count rate stability at very low light levels and a mumetal\* cylindrical housing provides a high level of immunity to external magnetic fields. The spectral range of the PDM9130/100-CP-TTL is 280-850nm.

The photomultiplier high voltage and discriminator threshold level are factory pre-set for optimum performance, enabling photon counting operation simply by connecting to a 5V supply and suitable counter/timer. The fixed pulse-width of the TTL output is fully compatible with the ET Enterprises MCS-CT3 multi-channel scaler/counter-timer. When used together, these units can be controlled and powered from a pc USB port, subject to the USB port current limitations.

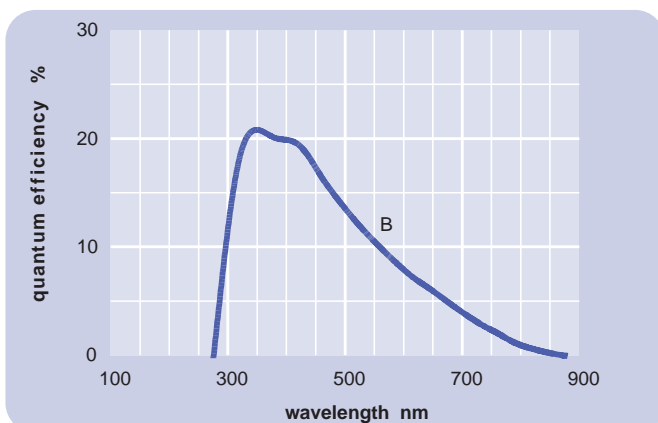
### 2 applications

- fluorescence spectroscopy
- luminometry
- portable photon counting equipment

### 3 features

- pre-configured for optimum performance and ease of use
- wide dynamic range (up to 100Mcps)
- operation from a single 5V to 15V supply
- magnetic and electrostatic shielding
- only 250mW power dissipation (typical)

### 4 photocathode spectral response



### 5 characteristics

	unit	min	typ	max
<b>photocathode: biakali</b>				
active diameter	mm		2.5	
quantum efficiency at peak	%		21	
spectral range	nm	280		850
<b>output pulse:</b>				
TTL high level (terminated)	V	3.3		
rise and fall time	ns		1.2	
pulse-pair resolution	ns		25	
dead-time	ns		25	
<b>signal count rate:</b>				
without dead time correction	cps			30M
with dead time correction	cps			100M
<b>output impedance</b>	Ω		50	
<b>discriminator level</b>	mV		-2	
<b>dark counts (@ 20°C)</b>	cps		40	80
<b>supply voltage</b>	V	4.5		15
<b>supply current (@ 5V, no signal)</b>	mA		40	
<b>supply current (@ 5V, signal = 150Mcps)</b>	mA		120	
<b>warm-up time</b>	s		1	
<b>temperature (operating)</b>	°C	5		55
<b>temperature (storage)</b>	°C	-40		60
<b>humidity (non-condensing)</b>	%			93
<b>weight</b>	g		220	

\*mumetal is a registered trademark of Magnetic Shield Corporation

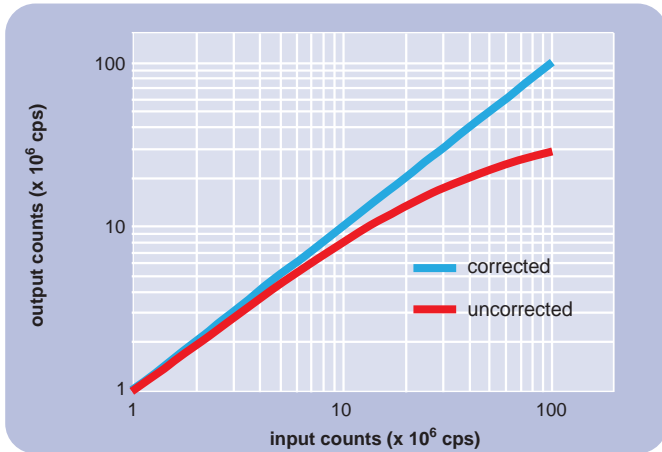
## 6 dynamic range

Extended dynamic range can be obtained by dead time correction to compensate for departure from linearity at high count rates due to pulse pile-up. Dead time may be corrected for, as follows:

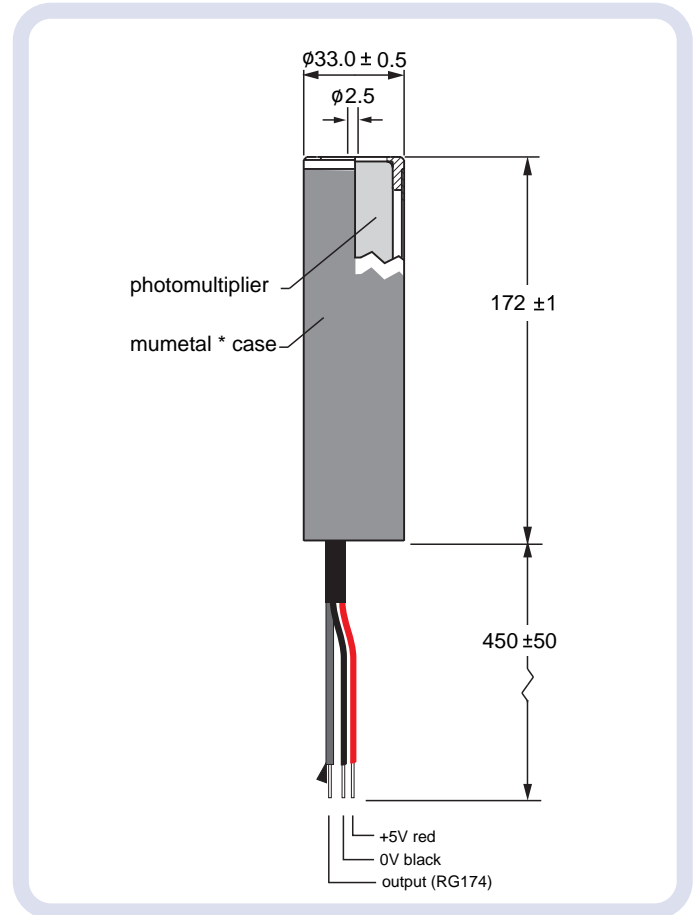
$$N = n/(1-nT)$$

where: N is the true count rate (cps),  
n is the measured count rate (cps),  
T is the count rate correction factor ( $25 \times 10^{-9}$ s),

Using this correction, deviation from linearity is typically within  $\pm 5\%$  at 120Mcps.



## 8 outline drawing mm



\*mumetal is a registered trademark of Magnetic Shield Corporation

## 9 ordering information

**PDM9130/100-CP-TTL** visible ir range (280-850nm)

## 10 warning

No attempt must be made to repair or dismantle this product. High voltages used within the module may present an electric shock hazard.

Operation beyond the maximum ratings, or reversal of the input voltage polarity may result in loss of performance or permanent damage to the product.

## 7 installation and operation

Each module is supplied with test data. Wherever possible, installation should be carried out in subdued light. Exposure to strong lights, particularly those containing a high UV content, can result in a temporary increase in dark counts during subsequent operation.

Remove the protective cap from the package. If necessary, the photomultiplier window can be cleaned using a lens tissue moistened with alcohol. Do not use any other solvent.

Mount the module and make power input and signal output connections. The signal lead should be terminated into  $50\Omega$ . Do not expose the photomultiplier photocathode to strong light while the module is energised.

**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@electron tubes.com  
web site: www.electrontubes.com

an ISO 9001 and ISO 14001 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**  
electron tubes

© ET Enterprises Ltd, 2016

DS\_ PDM9130/350-CP-TTL Issue 1 (02/06/16)