

1 description

The PDM03-9107-PD is a detector module designed for monitoring PM2.5 and PM10 particles. The module incorporates a plastic scintillator coupled to the photomultiplier window, a fast amplifier-discriminator, and a low power high-voltage supply. The unit produces TTL pulses in the presence of beta decay.

The combination of high-speed electronics and fast photomultiplier with low dark counts enables a wide dynamic range to be achieved. A positive polarity high-voltage supply is used for maximum count rate stability at very low light levels. The module is operated with a single +5V supply and the fixed pulse width TTL output is fully compatible with the ET Enterprises MCS-CT3 multi-channel scaler/counter-timer.

2 applications

- PM2.5 and PM10 particle detection

3 features

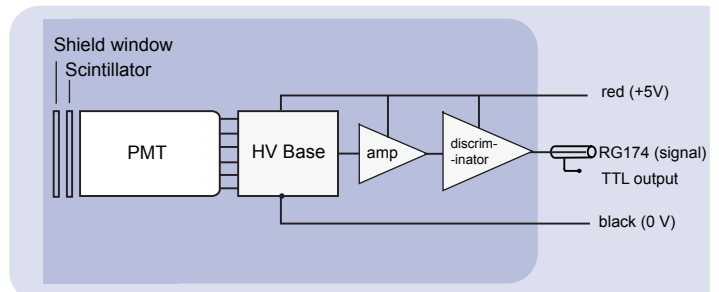
- pre-configured for optimum performance and ease of use
- wide dynamic range
- operation from a single +5V supply
- low background counts
- low power consumption

4 characteristics

	unit	min	typ	max
photocathode: biakali				
active diameter	mm		25	
output pulse:				
TTL high level (terminated)	V	2.6		
rise and fall time	ns		1.2	
pulse-pair resolution	ns		500	
output impedance	Ω		50	
background counts (@ 20°C)	cps		1	
signal counts with 10μCi ¹⁴C source	kHz		40	
supply voltage	V	4.5		5.5
warm-up time	s		1	
temperature (operating)	°C	5		55
temperature (storage)	°C	-40		60
humidity (non-condensing)	%			93
weight	g		240	



5 functional diagram



The figure above illustrates a block diagram of the internal structure of PDM03-9107-PD. It is integrated with a shield window, plastic scintillator, high performance photomultiplier, high voltage power supply incorporating voltage divider and signal processing electronics.

As the β -ray enters the plastic scintillator through the shielding window it interacts with the scintillator to produce fluorescent photons which is detected by the photomultiplier and the output pulse from the photomultiplier is then processed into a TTL pulse using the signal processing electronics.

6 installation and operation

Each module is supplied with test data. Remove the protective cap from the package before use.

Please take care when handling the shielding window as it is very delicate and can be easily pierced by sharp objects.

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

7 ordering information

PDM03-9107-PD

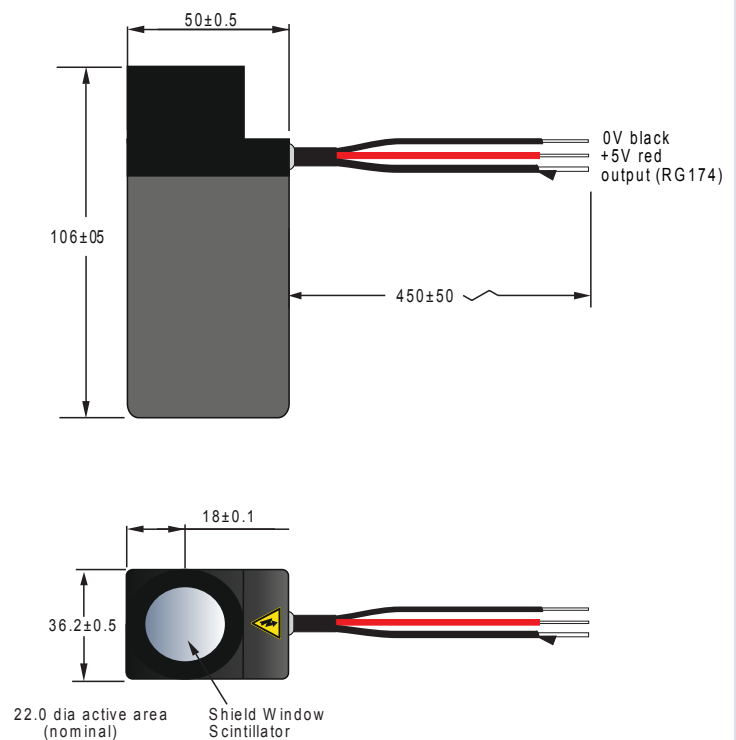
visible range (280-630nm)

8 warning

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

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

9 outline drawing mm



电话: 0755-84870203

邮箱: sales@highlightoptics.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 Ltd, 2021
DS_PDM03-9107-PD Issue 2 (27/09/21)

photodetector module

PDM9107-TTL-USB data sheet (provisional)

1 description

The PDM9107-TTL-USB is a plug-and-play photon counting module incorporating a high sensitivity, low noise, 29mm diameter photomultiplier, fast counting electronics and a low-power high voltage supply. The counting electronics consist of an amplifier/discriminator with an adjustable threshold and a multi-channel scaler/counter timer which records and stores data as a function of time. There is a choice of three software configurable counting modes: pre-set number of channels, pre-set total measurement period, or continuous. HV level and data retrieval are controlled by dedicated application software. The module also has the facility to output a TTL signal directly from the amplifier-discriminator.

The spectral range of the PDM9107-TTL-USB is 280-630nm. Other versions are available with a wider range, for example the PDM9107Q-TTL-USB, which extends the UV sensitivity to 160 nm.

The combination of an effective photosensitive diameter of 25mm, and a dark count of typically 100cps at 20°C, results in a unique detection capability. The module is also very easy to use, the only additional requirement being a PC or laptop with a free USB port.

A positive-polarity high-voltage supply is used for maximum count-rate stability at very low light levels.

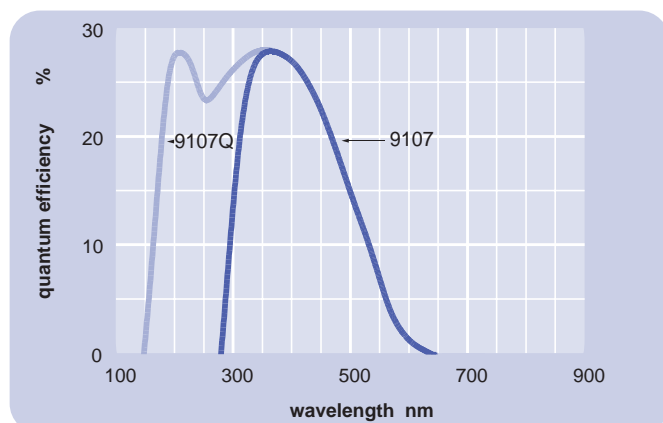
2 applications

The PDM9107-TTL-USB is suitable for all applications involving photon-counting mode light detection down to single photons. Typical uses are time-resolved fluorescence, luminescence and similar investigations.

3 features

- easy plug-and-play operation
- wide dynamic range
- no external power supply required
- magnetic and electrostatic shielding
- spectral range options
- 25mm diameter detection area
- low noise

4 photocathode spectral response



5 characteristics

	unit	min	typ	max
photocathode: biakali				
active diameter	mm		25	
spectral response range	nm	280		630
quantum efficiency (peak)	%		28	
USB output:				
interface type				USB 2.0 or higher
connector type				USB type A
TTL output:				
TTL high level	V		3.3	
rise and fall time	ns		1.2	
output impedance	Ω		50	
signal:				
pulse-pair resolution	ns		25	
dead time	ns		25	
count rate:				
without dead-time correction	cps			30M
with dead-time correction	cps			100M
channel width	ms	0.2		999
discriminator level (adjustable)	mV	2		8
dark count rate at 20°C	cps		100	200
supply (from USB connection)				
voltage	V	4.5		5.5
current:				
no signal	mA		40	
signal = 100Mcps	mA		120	
operating voltage	V	100		2000**
warm-up time	s		1	
temperature (operating)	°C	5		55
temperature (storage)	°C	-40		60
weight	g		220	

**subject to not exceeding maximum rated gain of the pmt

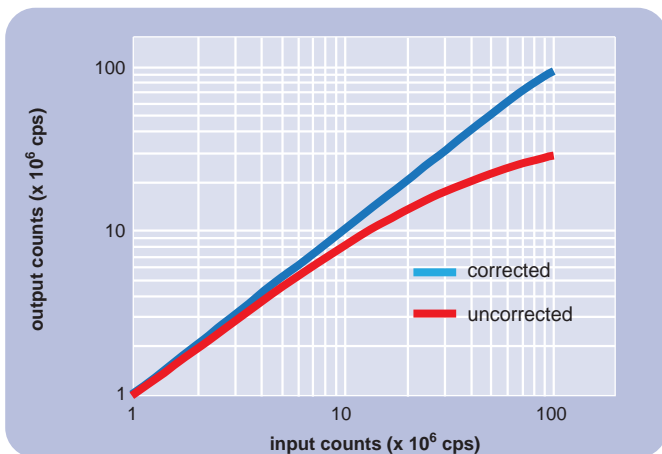
6 dynamic range

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:

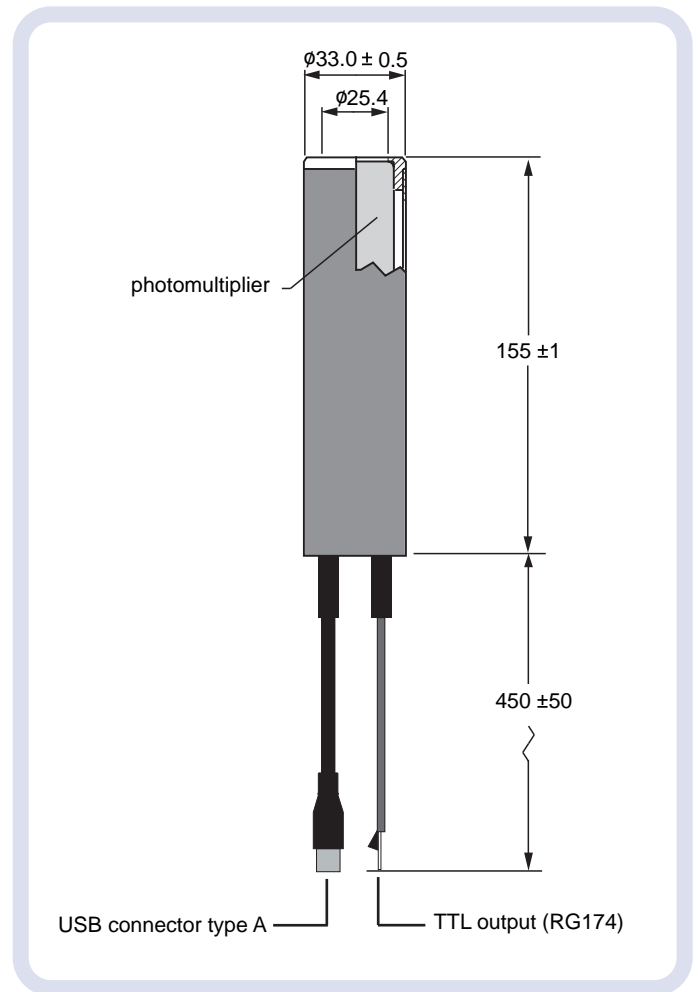
$$N = n/(1-nT)$$

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

Using this correction, deviation from linearity is typically within $\pm 5\%$ at 100Mcps.



8 outline drawing mm



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 or cover 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 in a light-tight enclosure with the light source to be measured and install the application software by downloading from the ET Enterprises Limited website (www.et-enterprises.com). Connect the USB cable to the PC or laptop and run the application. Further details are given in the user manual which can also be downloaded from the ET Enterprises website.

9 ordering information

PDM9107-TTL-USB visible range (280-630nm)

10 warning

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



电话: 0755-84870203
邮箱: sales@highlightoptics.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, 2017
DS_PDM9107-TTL-USB Issue 1 (20/10/17)