

Photodetector Package Type P30CWAD5-07

High Speed Photon Counting Detector with TTL Output

- compact assembly
- electrostatic and magnetic shielding
- operates from single low voltage input
- preset photomultiplier tube voltage
- preset discriminator level
- wide dynamic range

Application

The P30CWAD5-07 photodetector package is intended for ultra low light measurement applications requiring single photon detection. It features fully enclosed, preset high voltages, simplicity of operation and typically only 120 mW total power dissipation, making it ideal for use in battery powered, portable instruments.

Description

The P30CWAD5-07 photodetector package comprises a type 9107, 30 mm diameter end window photomultiplier tube, high voltage power supply and high speed amplifier-discriminator. The photomultiplier tube and high voltage power supply are encapsulated within a cylindrical mu-metal case, providing a high level of immunity from external magnetic fields. The amplifier-discriminator circuit board is mounted on the side of the mu-metal case and is fitted with flying leads for low voltage input and signal output connections.

The mu-metal case is not electrically connected within the package but may be grounded, if required, via the case ground connection point.

The discriminator is preset to 2 mV and the photomultiplier tube voltage is preset to the optimum level for photon counting, thereby eliminating the requirement for user adjustments.

Warning

High voltages used by these products may present an electric shock hazard. They should be installed and serviced only by qualified personnel and operated in accordance with the specified ratings.

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

Typical Specification

Photocathode type	:	Bialkali
Photocathode active diameter	:	23 mm (0.9")
Spectral response range	:	310 to 650 nm
Peak quantum efficiency at 400 nm	:	25 %
Output pulse	:	TTL high level
Output pulse amplitude (unterminated)	:	5 V
Output pulse rise time	:	2 ns
Output pulse fall time	:	2 ns
Output impedance	:	50 Ω
Discriminator level	:	2 mV
Pulse pair resolution	:	20 ns
Dark counts at 20°C (typ)	:	100 s ⁻¹
(max)	:	200 s ⁻¹
Output count rate (max)	:	10 ⁷ s ⁻¹
Power input at 10 ⁶ s ⁻¹ count rate	:	+5V, 24 mA
Warm up time	:	10 s

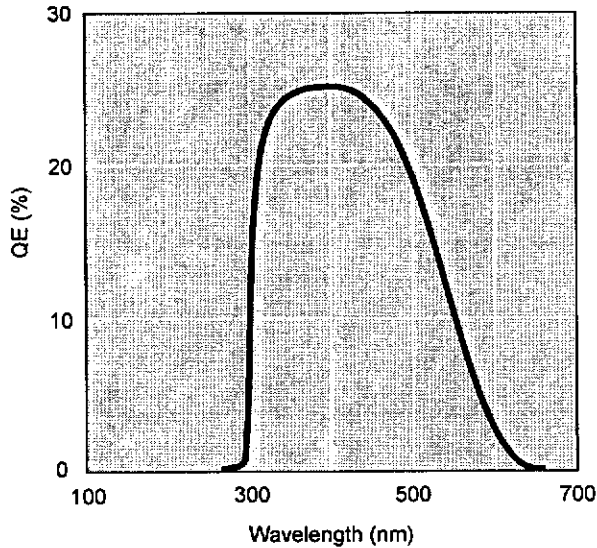
Ratings

Input voltage	:	+4.75 V to +6.0 V
Temperature (operating)	:	+5 °C to +55 °C
(storage)	:	-40 °C to +55 °C

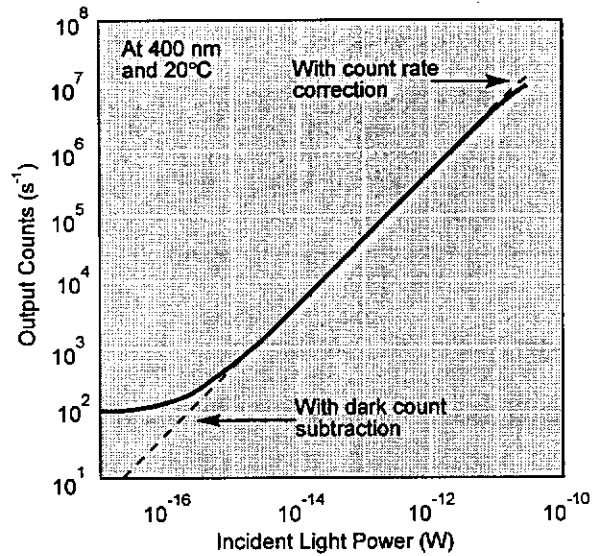
General

Weight	:	190 g
Operating position	:	any
Finish	:	matt black paint

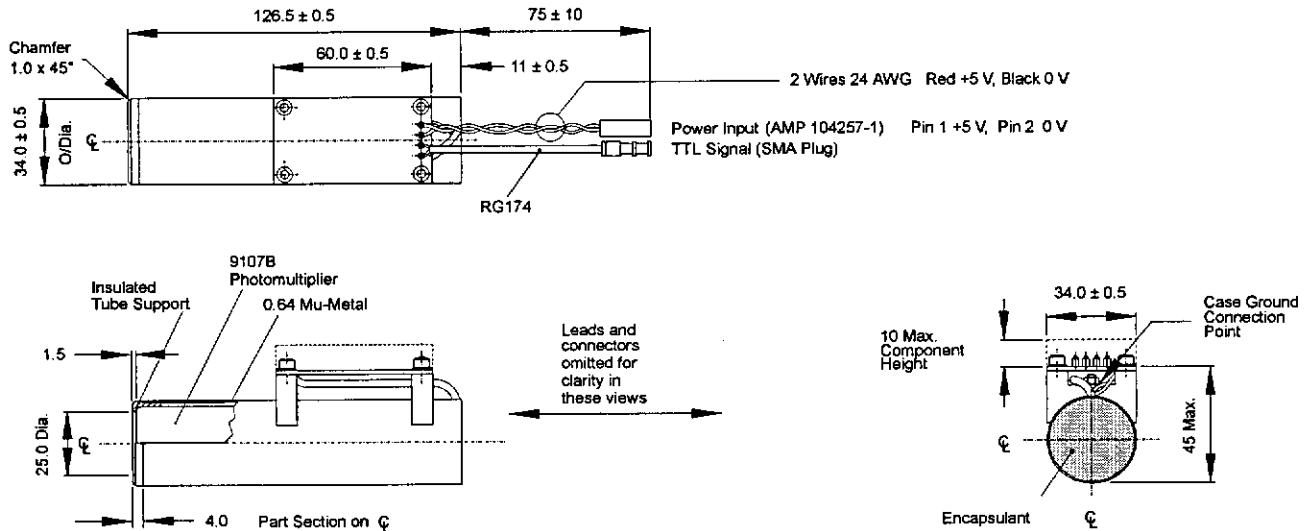
Spectral Response



Dynamic Range



Outline Drawing (mm)



Installation and Operation

Each package is supplied with test data including a photon counting plateau characteristic and dark counts.

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 solvents.

Mount the package and make the power input and signal connections. Where the signal lead is longer than 200 mm, it should be terminated into 50 Ω. Do not expose the photomultiplier tube photocathode to strong lights whilst the package is energised.

Full dynamic range can be realised by cooling the package to reduce dark counts, by dark count subtraction, and by count rate correction to compensate for departure from linearity at high count rates due to pulse pile up:

$$\text{True count rate } N = \frac{N'}{1 - N'T}$$

Where N' is the measured count rate (s^{-1}) and T is the count rate correction factor (3×10^{-9} s).

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