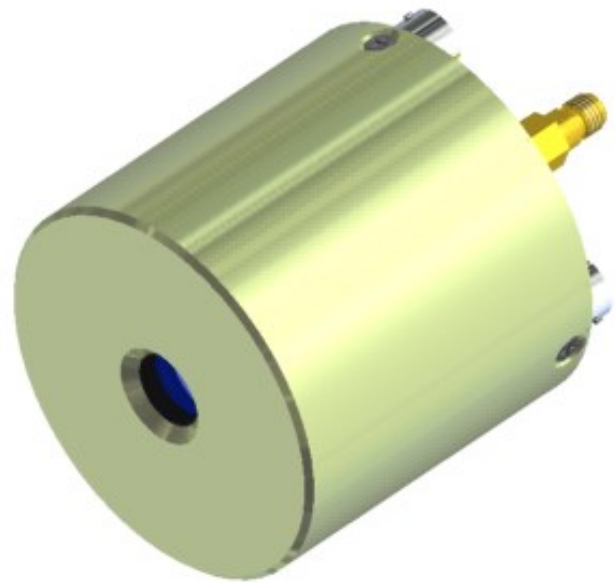




Photodiode

Photek is the world leading manufacturer of vacuum based photodiodes for analysis of ultra-fast optical phenomena in a range of applications. The vacuum photodiode is a sealed vacuum tube with a much faster response than solid state photodiodes. Vacuum Photodiodes do not contain the MicroChannel Plate electron multipliers used in our Photomultiplier Tubes, resulting in unity gain devices. A benefit of this is the vacuum photodiode's high dynamic range, enabling measurement of extremely high light signals without degradation. Photek's photodiodes are available in 10 mm, 25 mm and 40 mm formats for use in the UV, visible and NIR spectrum. Photek's photodiodes are the fastest in the world with pulse rise times to 36* ps and pulse FWHM to 55* ps.



APPLICATIONS

- ◆ Analysis of fast optical pulses
- ◆ Cherenkov light detection
- ◆ Fluorescence spectroscopy
- ◆ LIDAR
- ◆ Particle and nuclear physics
- ◆ Measurement of broadband optical phenomena including extreme ultra-violet and vacuum-ultraviolet emission

KEY ATTRIBUTES

- ◆ 10, 25 and 40 mm active areas, other sizes available on request
- ◆ Unity gain
- ◆ Wide range of photocathodes including UV, solar blind, visible and NIR response
- ◆ High dynamic range
- ◆ Rise time <36* ps
- ◆ Integral 50 ohm output

Photek Limited

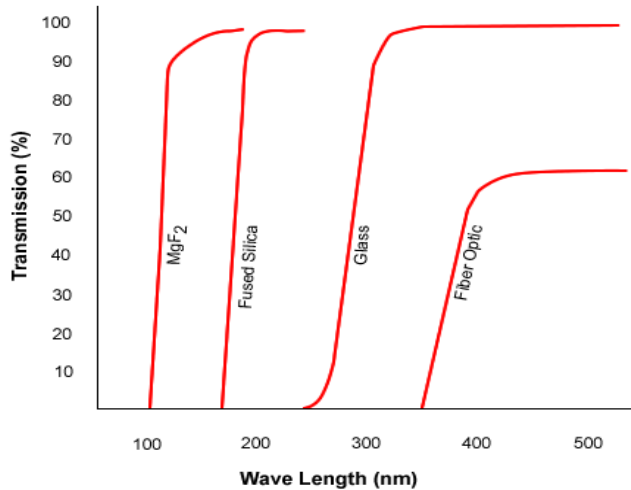
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Datasheet No.	DS041
Issue	01
Date	27th November 2018

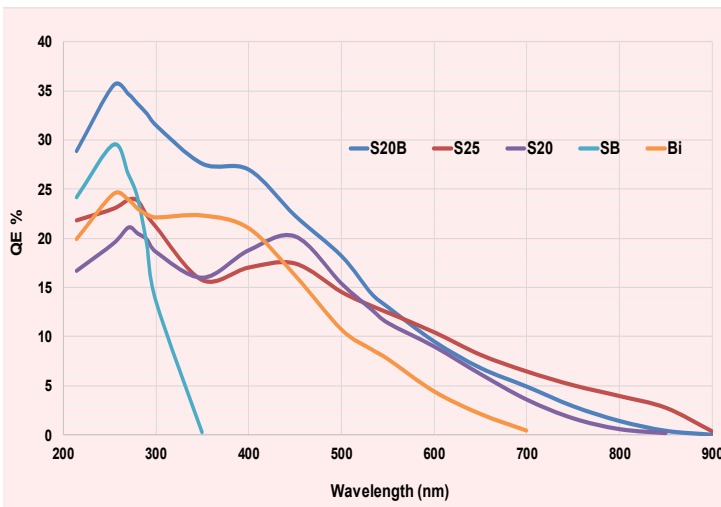
OPTIONS AVAILABLE INPUT WINDOW

Photek photodiodes are available with a choice of input window materials. These include MgF₂, fused silica and fibre optic.



QUANTUM EFFICIENCY CURVES

Photek offer a full range of Gen II photocathodes, these include CsI, Solar Blind, Bialkali, S20 and S25 which demonstrate the broad spectral response that you can achieve as seen below. Please contact the Sales office to discuss your exact requirements.



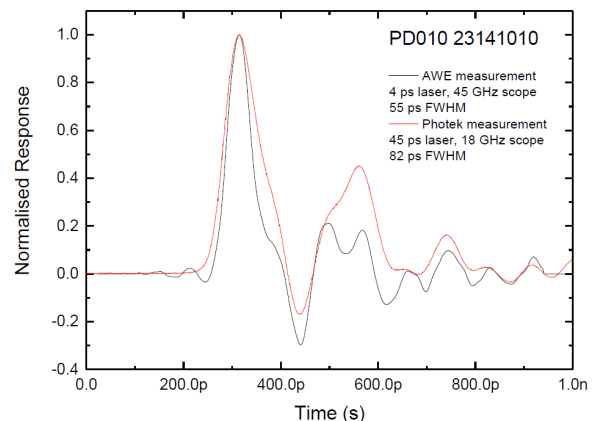
TIME RESPONSE

Time response characteristics are very important when choosing a photodiode (PD) for a particular application, particularly when observing and measuring ultra-fast optical pulses. With the PD010 having the fastest response times, it is the most recommended size. However, 25 mm and 40 mm versions are also available. The pulse rise times and pulse full width half maximum (FWHM) for different sizes of photodiodes are shown below.

PULSE RISE TIME			
Diameter (mm)	Minimum (ps)	Typical (ps)	Maximum (ps)
10	36*	50	60
25	60	80	100
40	60	80	100

PULSE FWHM			
Diameter (mm)	Minimum (ps)	Typical (ps)	Maximum (ps)
10	55*	60	100
25	100	150	200
40	100	150	200

*Results taken from *J. Milnes et al., Recent Developments in Ultra-High Speed and Large Area Photomultiplier Tubes, PoS (ECPD2015)005*. The figure below is taken from the paper and shows the influence of the laser pulse width and measurement bandwidth on the observed result:



ELECTRICAL

-5 kV

ENVIRONMENTAL

Operational Limits: -40 °C to +45 °C

Storage: -40 °C to +60 °C

ENVIRONMENTAL TESTING

For applications where the photodiode is exposed to temperature and shock conditions Photek has the appropriate facilities to offer environmental stress screening. Our vibration system offers shock, sine, random, and sine-on-random testing. Our thermal chamber has a temperature range of -75 °C to +160 °C and can control humidity from 10% to 98%.

POWER SUPPLY

Photek manufactures a range of power supplies for our photodiodes. Our power supplies use the very latest in power supply design and are available in a bench top format.

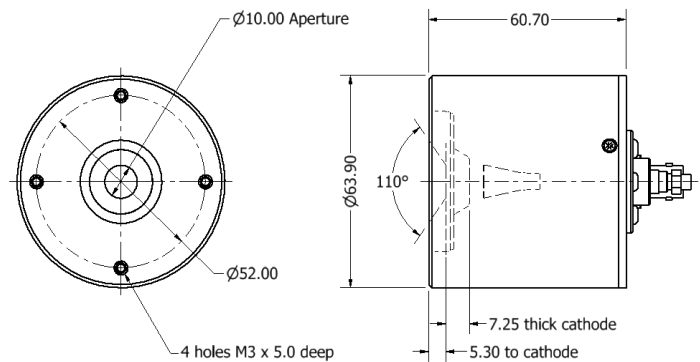
PRE-AMPLIFIER

Photek manufactures a 2 GHz bandwidth 20 dB gain pre-amplifier, the PA200-10 that is designed to be used with Photek's photodiodes. The PA200-10 is used in close conjunction with the photodiode to amplify the timing pulses for connection by a 50 ohm cable to oscilloscopes or other fast timing electronics.

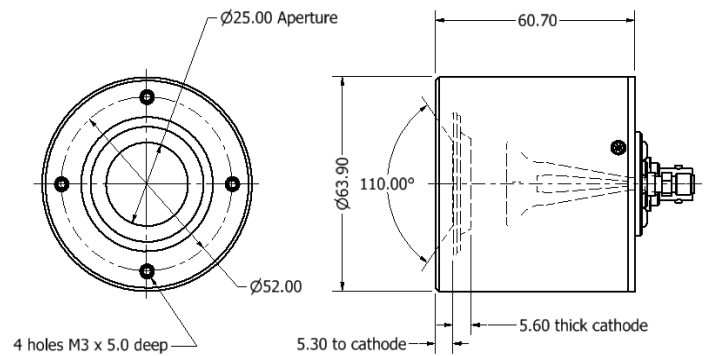
MECHANICAL

OUTLINE DRAWING

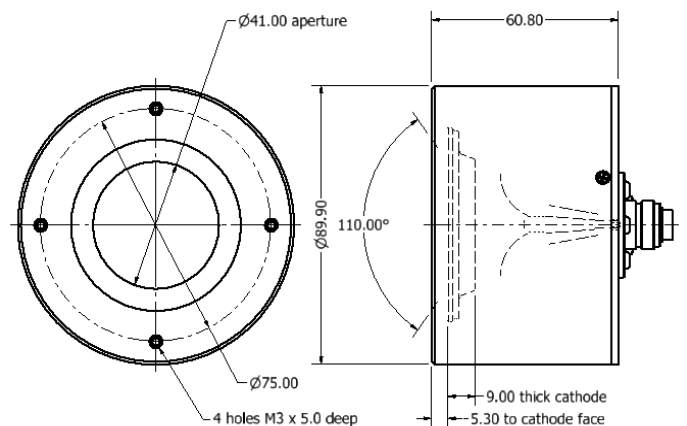
PD010



PD025



PD040



Photek Ltd reserves the right to update and improve this specification without prior notice

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