THORLABS INC
435 Route 206 • P.O. Box 366
Newton, NJ 07860-0366
PH. 973-579-7227
FAX 973-383-406

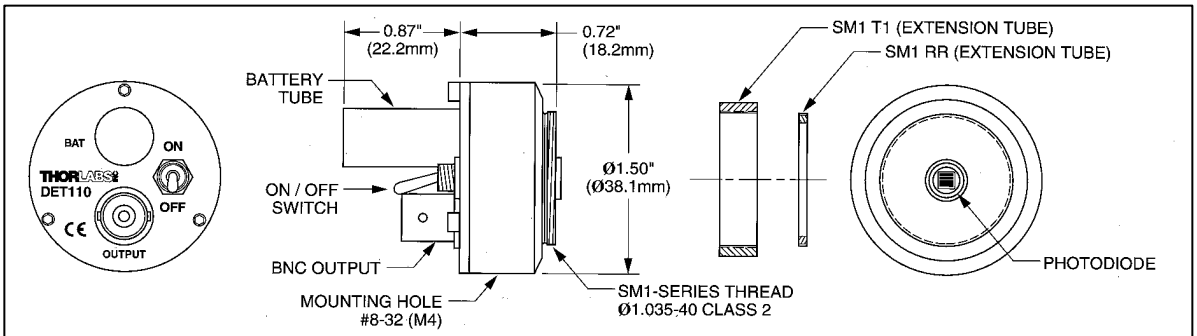
HIGH-SPEED SILICON DETECTOR - DET110

DESCRIPTION

Thorlabs' DET110 is a ready-to-use high-speed photo detector. The unit comes complete with a photodiode and internal 12V bias battery enclosed in a ruggedized aluminum housing. The head includes a removable 1" optical coupler (SM1T1) which provides easy mounting of ND filters, spectral filters and other Thorlabs 1" stackable lens mount accessories. Also available are fiber adapters (SMA, FC and ST style). An #8-32 tapped hole is provided on the base of the housing to mount the detector directly to a Thorlabs' positioning device (1/2" post holder, mounting plates, etc.).

SPECIFICATIONS:

Detector:	Silicon PIN	**Housing:**	Black Anodized Aluminum
Spectral Response:	320-1100nm	**Size:**	1.50" RD x 1.60"
Peak Wavelength:	960nm+/-50nm	**Output:**	BNC, DC-Coupled
Rise/Fall Time[1]:	20ns	**Bias:**	12V Battery (Type A23)
Diode Capacitance:	20pF	**Mounting:**	8-32 (M4) Tapped Hole
NEP:	1.2 x 10^{-14}W/?HZ	**Diode Socket:**	TO-5, Anode Marked
Dark Current:	10nA	**Damage Threshold:**	100mW CW
Active Area:	13mm^2		0.5 J/cm^2 (10ns pulse)
	3.6mm x 3.6mm square		
Linearity Limit:	1mW		



Mechanical Dimensions

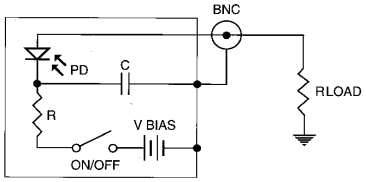
Thorlab's DET series are ideal for measuring both pulsed and CW light sources. The DET110 includes a reverse-biased PIN photo diode, bias battery, and an ON/OFF switch packaged in a ruggedized housing. The BNC output signal is the direct photocurrent out of the photo diode anode and is a function of the incident light power and wavelength. The responsivity, $\Re(\lambda)$, can be read from Figure 1 to estimate the amount of photocurrent to expect. Most users will wish to convert this photocurrent to a voltage for viewing on an oscilloscope or DVM. This is accomplished by adding an external load resistance, R_{LOAD}. The output voltage is derived as:

$$V_0 = P^*\Re(\lambda)^*R_{LOAD}.$$

The bandwidth, f_{BW}, and the rise-time response, T_R, are determined from the diode capacitance, C_J, and the load resistance, R_{LOAD}:

$$f_{BW} = 1/(2\pi^*R_{LOAD}^*C_J),\ T_R = 0.35/f_{BW}$$

Notes:
1. Measuring with a 50Ω Terminating Resistor.



For maximum bandwidth, we recommend using a 50Ω coax cable with a 50Ω terminating resistor at the end of the coax. This will also minimize ringing by matching the coax with its characteristic impedance. If bandwidth is not important, you can increase the amount of voltage for a given input light by increasing the R_{LOAD} up to a maximum of 10KΩ.

Also Available: 1ns Silicon, Germanium Detectors (800-1800nm), InGaAs and amplified detectors.

Note: The detector has an AC path to ground even with the switch in the off position. It is normal to see an output response to an AC signal with the switch in this state. However, because the detector is unbiased, operation in this mode is not recommended.

TYPICAL SPECTRAL RESPONSE FOR DET110 & DET210