THORLABS INC
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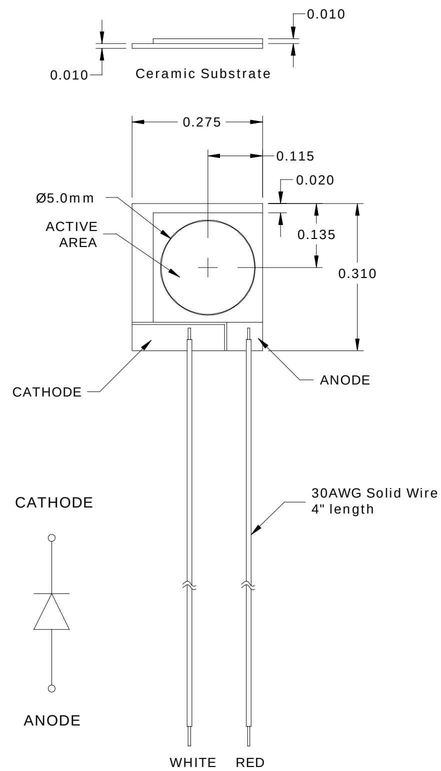
FDG05 Ge Photodiode

--Large Active Area
--Low Capacitance

Electrical Characteristics

Spectral Response:	800-1800nm
Active Diameter:	5.0mm
Rise/Fall Time (RL=50Ω):	220ns (3V)
Cut Off Frequency (50Ω, 3V):	1.6 MHz (typ.)
NEP@980nm:	4.0×10^{-12} W/√Hz
Dark Current:	40 A max (3V)
Shunt Resistance (R_{SH}):	2k @ 25 C (typ)
Junction Capacitance (C_J):	3000pF @ 5V (typ)
Package:	TO-8 ceramic
Package Size:	0.275" x 0.310"



Maximum Ratings

Damage Threshold CW:	100 mW/cm^2
Max Reverse Voltage:	5V
Storage Temperature:	-55 to 60 C
Operating Temperature:	-55 to 60 C

The Thorlabs FDG05 photodiode is ideal for measuring both pulsed and CW light sources, by converting the optical power to an electrical current. The Ge detector is mounted on a 0.25"x0.35" ceramic wafer package with a 3" 30 AWG anode and cathode. The photodiode anode produces a current, which is a function of the incident light power and the wavelength. The responsivity $\Re(\lambda)$, can be read from Figure 1 to estimate the amount of photocurrent to expect. This can be converted to a voltage by placing a load resistor (R_{LOAD}) from the photodiode anode to the circuit ground. The output voltage is derived as:

$$Vo = P * \Re(\lambda) * R_{LOAD}$$

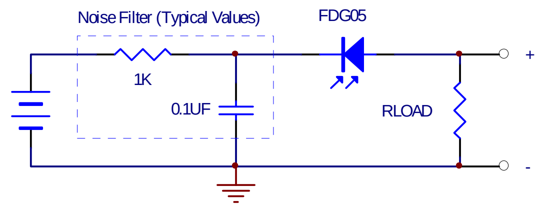
The bandwidth, f_{BW}, and the rise time response, t_R, are determined from the diode capacitance, C_J, and the load resistance, R_{LOAD}, as shown below. Placing a bias voltage from the photo diode cathode to the circuit ground can lower the photo diode capacitance.

$$f_{BW} = 1/(2\pi * R_{LOAD} * CJ),\ t_R = 0.35/f_{BW}$$

Related Thorlabs Products

FGA10, FGA03PT, FGA03PT/FC, D400FC, PDA255, PDA400, WS02, TM2448

Typical Circuit Diagram



Typical Plots

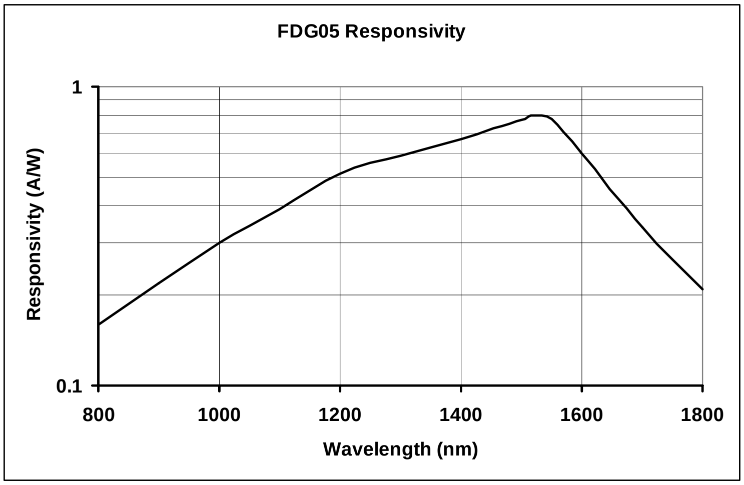


Figure 1: Typical Responsivity curve.

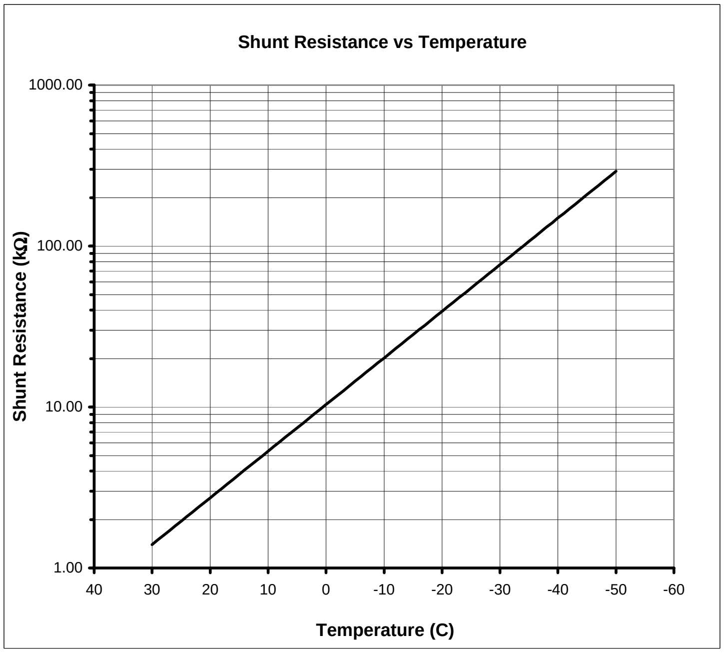


Figure 2: A Typical Shunt Resistance curve for the FDG05 Ge detector. The values above were found using the below equation.

$$R_1(T_1) := R_0(T_0) \cdot 2^{\left(\frac{T_0 - T_1}{10.4}\right)}$$