DET20 Free-Space Biased Detector

OVERVIEW

Guangyi Intelligent' Biased Photodetectors are available in several models that cover the wavelength range from the UV to the mid-IR (200 nm to 2.6 μm). With a wide bandwidth DC-coupled output, these detectors are ideal for monitoring fast pulsed lasers as well as DC optical sources. The direct photodiode anode current is provided on a side panel SMA. This output is easily converted to a positive voltage using a terminating resistor. When looking at high-speed signals, **Guangyi Intelligent** recommends using a 50 Ω load resistor. For lower bandwidth applications, our variable terminator or fixed stub-style terminators quickly adjusts the measured voltage. The detectors below do not have amplifiers or built-in gain, which generally allows them to operate at higher speeds than our FPD510 series of amplified photodetectors; for applications that require gain, an amplified photodetector may be more suitable.

FEATURES

- Internal 12V Li Battery Include
- Rise Time as Fast as 0.35ns
- Compatible With 30 mm Cage System
- Can be Fiber Coupled Using Fiber Adapters
- M6 Mounting Holes

APPLICATIONS

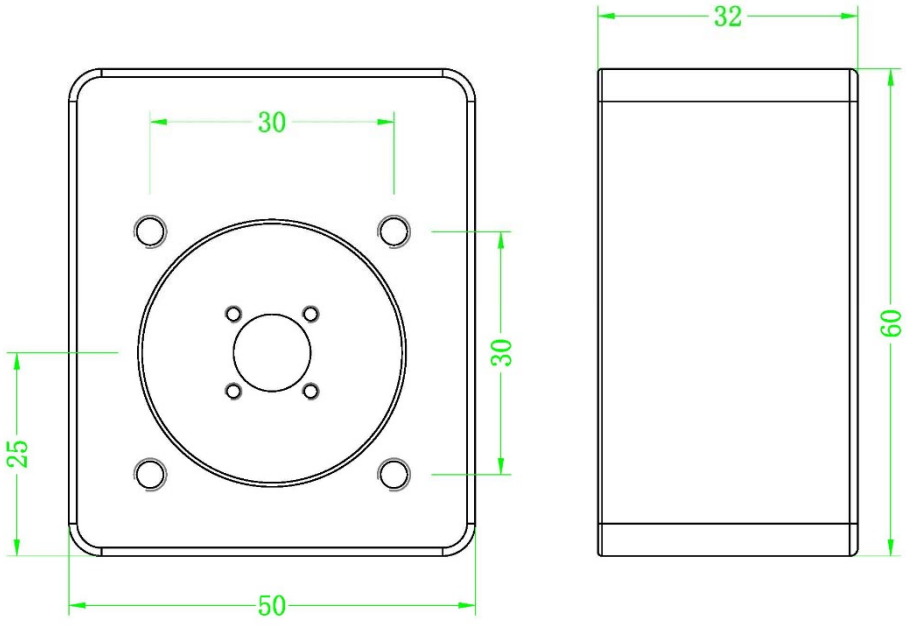
- Monitor CW or Fast Pulsed Lasers

SPECIFICATIONS

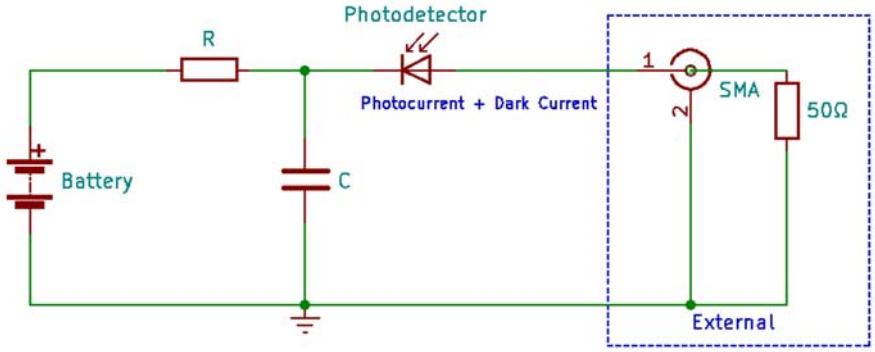
Item	DET20-20M	DET20-100M	DET20-500M	DET20-1G
Detector	Si			
Wavelength Range	320-1000nm			
Active Area	3.6x3.6mm	Φ1.2mm	Φ0.8mm	Φ0.4mm
PD Surface Depth	2.4mm	2.9mm	2.9mm	2.9mm
Peak Response	0.55A/W @850nm	0.60A/W @830nm	0.55A/W @830nm	0.51A/W @780nm

Bandwidth	DC-20MHz	DC-100MHz	DC-500MHz	DC-1GHz
Rise Time	18ns	3.5ns	0.8ns	0.35ns
Dark Current	1nA	1nA	0.5nA	0.1nA
Saturated Power	30mW	20mW	20mW	20mW
Junction Capacitance	20pF	3pF	3pF	1.6pF
Bias Voltage	12V			
Accessories	Battery charger; SMA to BNC Cable			
Output	SMA female (DC Coupled)			
Operating Temp	-20~65℃			
Storage Temp	-40~85℃			
Package Size	60mm x 50mm x 32mm			

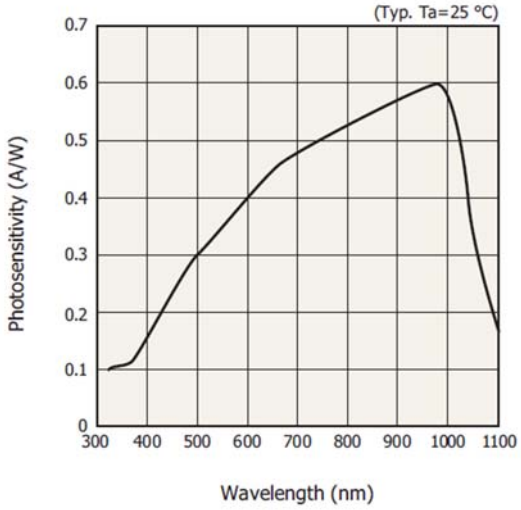
MECHANICAL DRAWING



SCHEMATICS



RESPONSE CURVE



OPERATION

A． Adjust the voltage of the oscilloscope to 50mV/division before connecting the detector.

B． Connect the detector to the oscilloscope using a coaxial cable.

C． Use the 50Ω termination input of the oscilloscope.

D． After being certain that the damage threshold of the detector is not exceeded, turn on the laser.

BATTERY LIFETIME

When using a battery-operated photodetector it is important to understand the battery's

lifetime and how this affects the operation of the detector. As a current output device, the output current of the photodetector is directly proportional to the light incident on the detector. Most users will convert this current to a voltage by using a load-terminating resistor. The resistance value is approximately equal to the circuit gain. For very high speed detectors, such as those sold on this page, it is very important to use a 50 Ω terminating resistor to match the impedance of standard coax cables to reduce cable reflections and improve overall signal performance and integrity. Most high bandwidth scopes come equipped with this termination.

The battery usage lifetime directly correlates to the current used by the detector. Most battery manufacturers provide a battery lifetime in terms of mA hr. For example, the battery supplied with the DET20 detectors is rated for 200 mA hrs. This means that it will reliably operate for 200 hr at a current draw of 1.0 mA. This battery will be used in the following example on how to determine battery lifetime based on usage.

For this example we have a 850 nm light source with an average 5 mW power is applied to an DET20-20M. The responsivity of a biased photodetector based on the response curve at this wavelength is 0.55 A/W. The photocurrent can be calculated as:

$$I = 0.55A/W \times 5mW = 2.75mA$$

Given the battery has a rated lifetime of 200 mA hr, the battery will last:

$$T = 200mAh / 2.75mA = 72.7hr$$

When using the recommended 50 Ω terminating load, the 2.75 mA photocurrent will be converted into a voltage of:

$$V = I \times R = 2.75mA \times 50 = 137.5mV$$