APD12702 Avalanche Photodetector

1. Overview

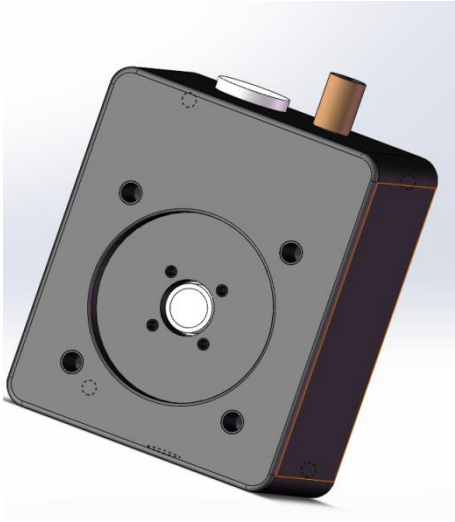
Avalanche photodiodes (APD) are designed to offer higher sensitivity and lower noise than standard PIN diodes, making them ideal for applications at low light power levels. In addition to standard APD, we also offer versions with variable gain (i.e., M-factor).

Generally, avalanche photodiodes utilize an internal gain mechanism to increase sensitivity. A high reverse bias is applied to the diode to generate a strong electric field. When an incident photon creates an electron-hole pair, the electric field accelerates the electron, leading to the emission of secondary electrons via collision ionization. The resulting avalanche of electrons produces a gain factor of several hundred, represented by the multiplication factor M, which is a function of the reverse bias and temperature. Generally, the M factor increases as the temperature decreases and decreases as the temperature increases. Similarly, the M factor increases as the reverse bias voltage increases and decreases as the reverse bias voltage decreases.

The APD12702 integrates a thermistor to adjust the bias voltage, thereby compensating for the effect of temperature changes on the M factor.

Features

- Temperature compensation
- UV enhancement
- Optional FC flange
- High sensitivity
- Large photosensitive area (3 mm)
- 30 mm optical cage system



Applications

- Detection of weak light signals
- Fluorescence measurement
- Chemical analysis instruments

Specifications

Model	APD12702A-40M	APD12702A-80M
Material	Si	
Wavelength Range	300-1000nm	
SensitiveArea Diameter	3mm	
Sensitivity @M=1	0.5A/W @ 800nm	
Bandwidth [b]	DC-40MHz	DC-80MHz
Rise Time [b]	8.5ns	4.8ns
Gain [a]	$1.8x10^4$V/W	$3.0x10^4$V/W
Saturation Power	256uW	153uW
Noise Voltage [b]	5mVpp	8mVpp
Maximum Output Voltage [a]	4.6V	4.6V
Equivalent Noise Power	5.56pW/ √ Hz	5.37pW/ √ Hz
Operating Voltage	9V	
Operating Current	<200mA	
Output Impedance	50Ω	
Output Coupling	DC	
Output Connector	SMA female	
Operating Temperature	-10~65℃	
Storage Temperature	-40~85℃	

Notes:

a For high-impedance loads

b For 50-ohm loads

Model Description

Detector model naming convention: Detector Series-Bandwidth-SM1-ADJ

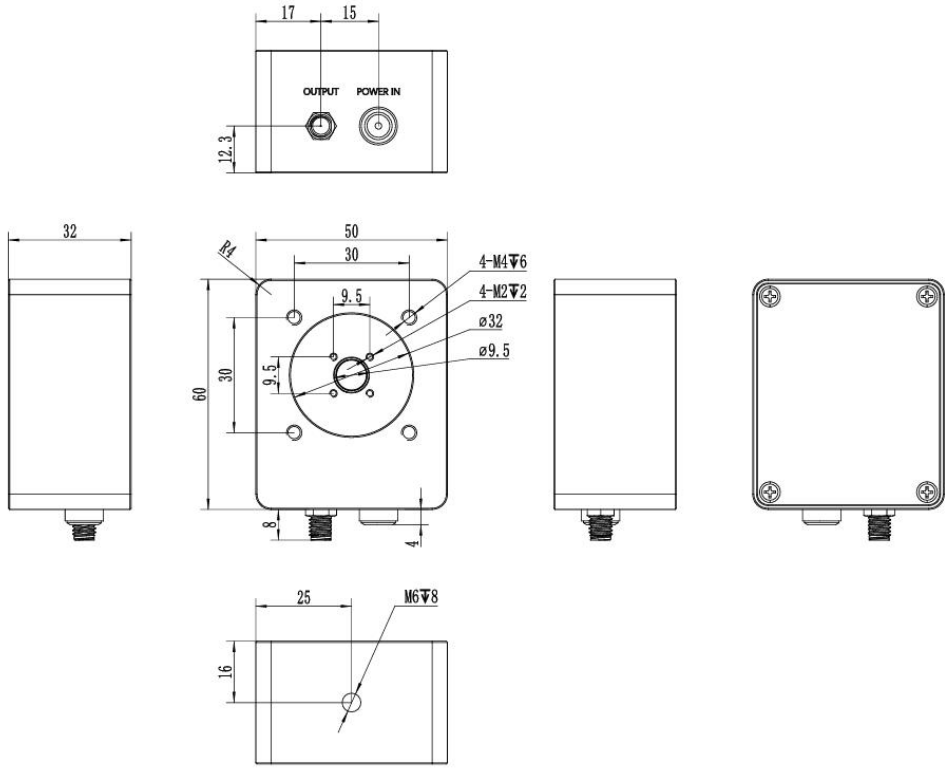
Example:

APD12702A-40M indicates a 30mm cage structure.

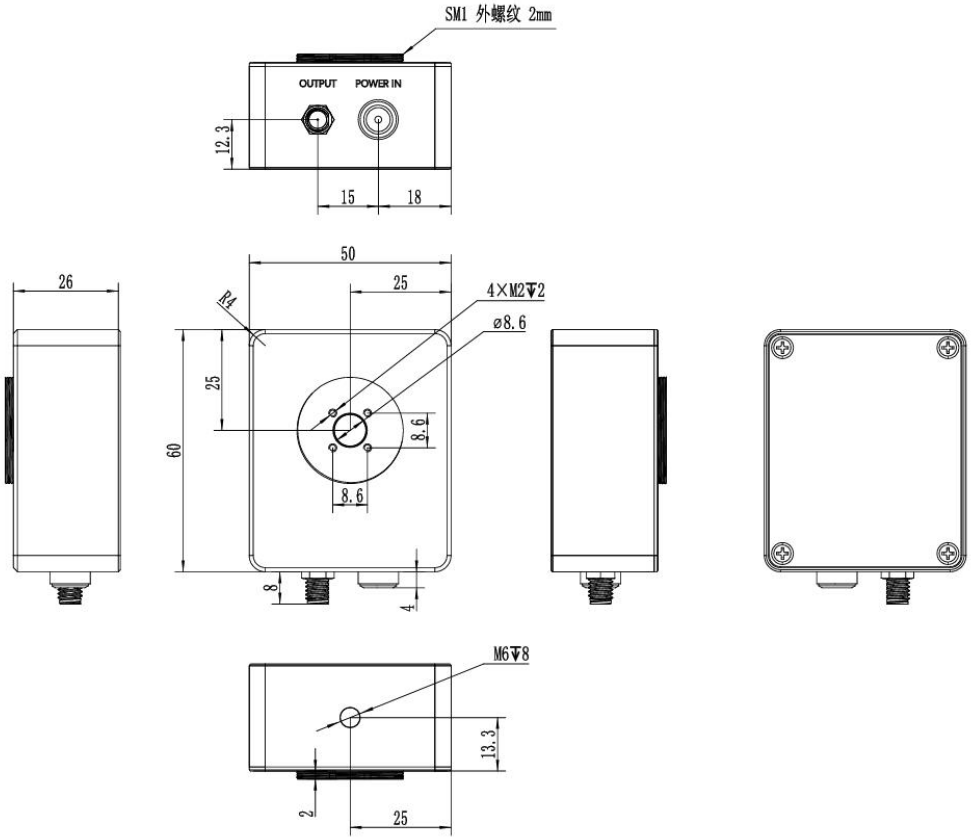
APD12702A-40M-SM1 indicates a structure with an SM1 external threaded connection.

APD12702A-40M-SM1-ADJ indicates a structure with an SM1 external threaded connection and adjustable gain.

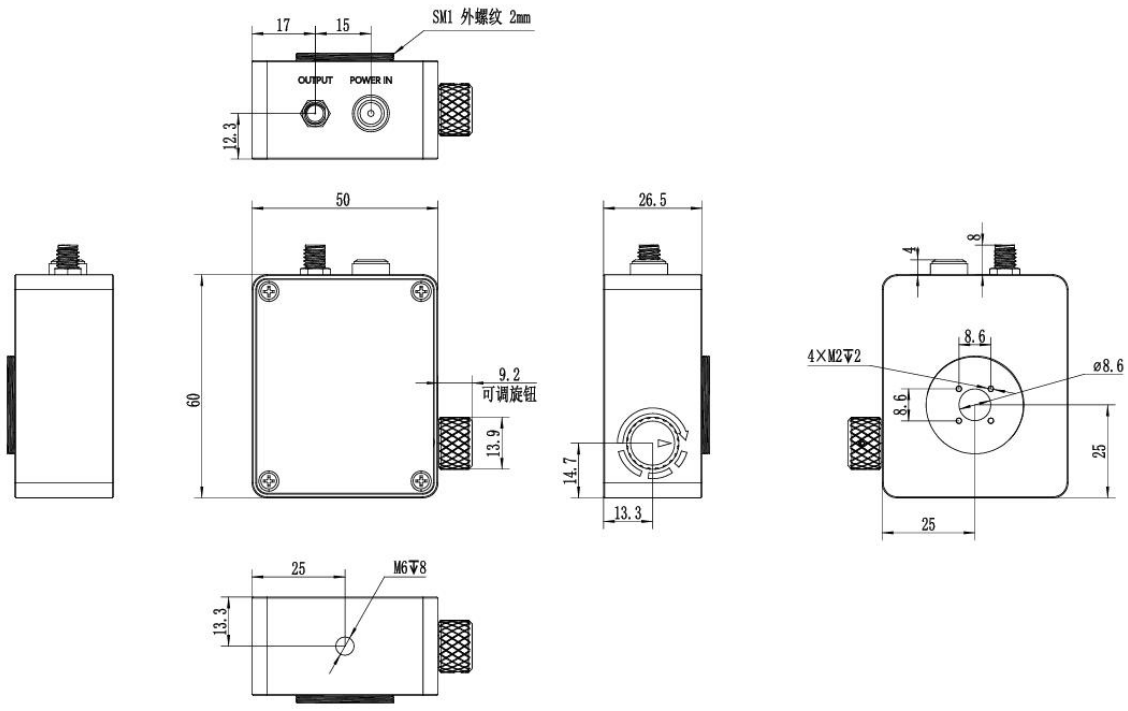
Mechanical Dimensions



30mm 笼式结构（默认）

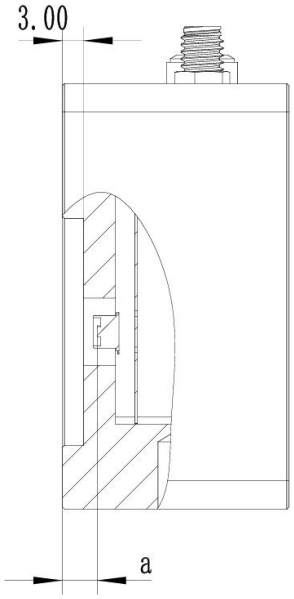


SM1 外螺纹结构（选配）

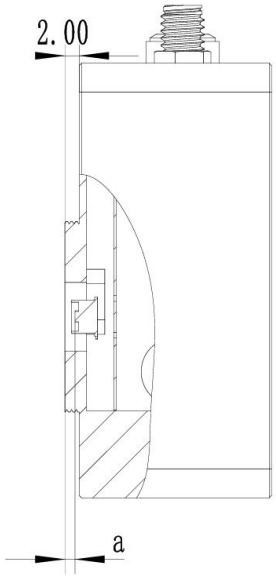


SM1 External Threaded Adjustable Gain Structure (Optional)

Schematic Diagram of Light-Sensitive Distance Measurement



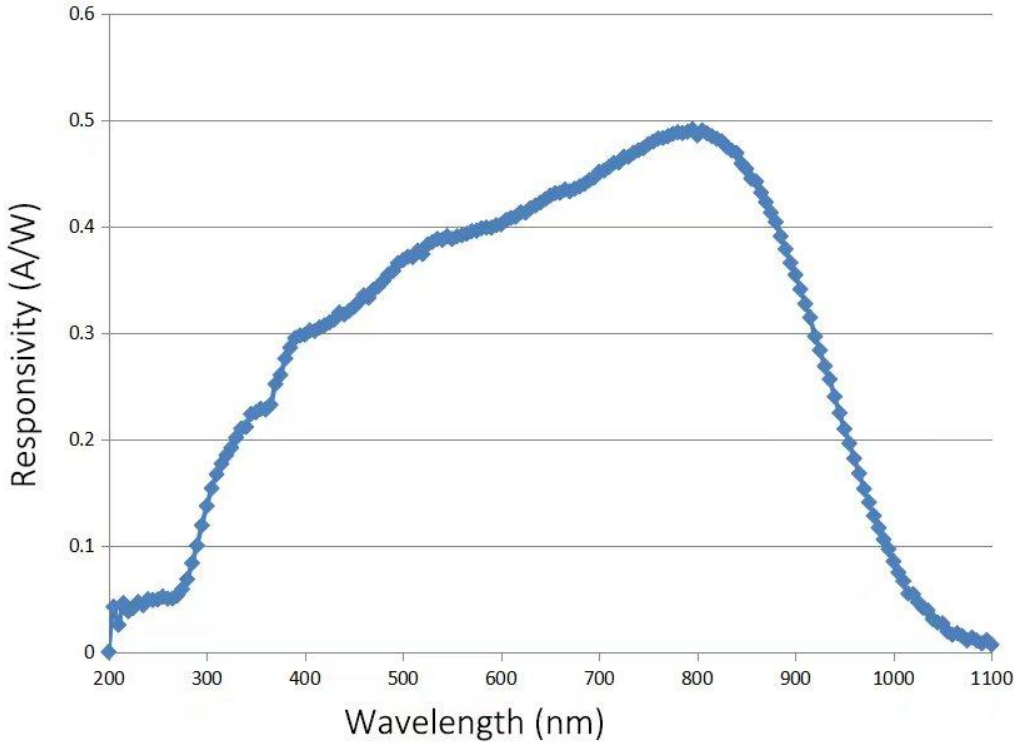
30mm cage structure



SM1 External Thread Design

Distance	A Series	A Series SM1
a=	6mm	2mm

1. Response Curve



Note: The response curve shows typical values and is for reference only.

Packing List

NO	Item Name	Quantity	Unit	Remarks
1	Photodetector	1	piece	
2	Power Adapter	1	piece	9V
3	SMA-to-BNC RF Cable	1	stem	