

APD430 Avalanche Photodetector

1. Overview

Avalanche Photodetector (APD) are designed to provide greater sensitivity and lower noise than standard PIN detectors and are well suited for low optical power level applications. We offer versions with variable gain (i.e. M-factor) in addition to the standard APD.

In general, avalanche photodiode utilize an internal gain mechanism to increase sensitivity. A high reverse bias voltage is applied to the diode to create a strong electric field. When an incident photon creates an electron-hole pair, the electric field accelerates the electron, resulting in the creation of secondary electrons from collisional ionization. The resulting avalanche of electrons will produce a gain factor of several hundred times, denoted by the multiplication factor M, which is a function of reverse bias and temperature. In general, the M factor increases with decreasing temperature and decreases with increasing temperature. Similarly, the M factor will increase as the reverse bias voltage increases and decrease as the reverse bias voltage decreases.

The APD430 has an integrated thermistor that adjusts the bias voltage to compensate for the effect of temperature changes on the M-factor. In addition to temperature compensation, the optional adjustable gain version allows the reverse bias voltage across the diode to be adjusted via a potentiometer on the back of the case to change the M-factor.

2. Features

- Temperature Compensation
- Optional adjustable gain
- Maximum bandwidth up to 400MHz
- 30mm optical cage system

3. Applications

- Detecting weak light signals
- laser radar



4. Specifications

Items	APD430A-10M	APD430A-50M	APD430A-200M	APD430A-400M
Materials	Si			
Wavelength	400-1100nm			
Photosensitive diameter	500um		230um	
Responsivity	0.55A/W @ 905nm (M = 1)			
Bandwidth ^a	DC-10MHz	DC-50MHz	DC-200MHz	DC-400MHz

Rise time ^a	40ns	8ns	2ns	1ns
Gain ^b	1.4x10 ⁷ V/W	2.7x10 ⁶ V/W	1.2x10 ⁶ V/W	0.52x10 ⁶ V/W
Saturated Optical power	0.23uW	1.3uW	2.5uW	5.8uW
Noise voltage ^a	20mVpp	20mVpp	20mVpp	20mVpp
Maximum Output Voltage ^b	3.2V	3.2V	3.2V	3.2V
NEP	0.11pW/√Hz	0.23pW/√Hz	0.28pW/√Hz	0.64pW/√Hz

Items	APD430C-10M	APD430C-50M	APD430C-200M	APD430C-400M
Materials	InGaAs			
Wavelength	1000-1700nm			
Photosensitive diameter	500um		200um	
Responsivity	0.9A/W @ 1550nm (M = 1)			
Bandwidth ^a	DC-10MHz	DC-50MHz	DC-200MHz	DC-400MHz
Rise time ^a	40ns	8ns	2ns	1ns
Gain ^b	3.2x10 ⁶ V/W	0.65x10 ⁶ V/W	4.0x10 ⁵ V/W	1.8x10 ⁵ V/W
Saturated Optical power	0.98uW	4.8uW	8uW	16.7uW
Noise voltage ^a	20mVpp	20mVpp	20mVpp	20mVpp
Maximum Output Voltage ^b	3.2V	3.2V	3.2V	3.2V
NEP	0.42pW/√Hz	0.71pW/√Hz	0.84pW/√Hz	1.8pW/√Hz

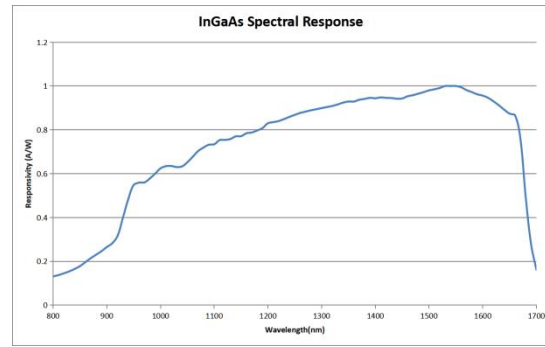
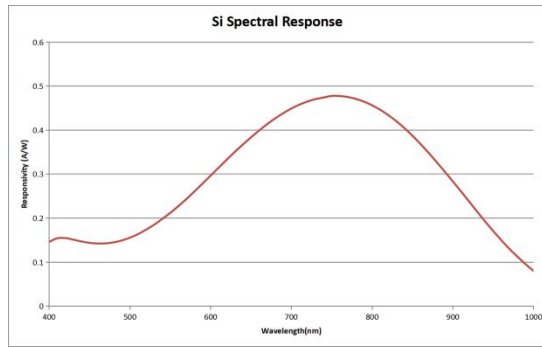
Params	Detector Common Parameters
Operating voltage	9V
Operating Current	<200mA
Output Impedance	50Ω
Output coupling mode	DC
Output connector	SMA female
Operating temperature	-10~65°C
Storage temperature	-40~85°C

Remarks:

a For 50Ω loads

b For high resistance loads

5. Response curve



Note: Response curves are typical values for reference only.

6. Gain adjustment (optional)

There is a potentiometer knob on the rear end of the enclosure that can be adjusted clockwise to increase the gain, and the factory default is maximum gain.

7. Mechanical dimensions

