

### DAPDNIR Series Discrete Amplification Photon Detector



Amplification Technologies DAPDNIR series photodetector is a near infrared spectral range high-speed photodetector designed for the detection of extremely low-level light signals (from one photon to several hundred photons).

The DAPDNIR series takes advantage of the breakthrough Discrete Amplification (DA) method of amplifying low level electrical signal using multi-channel amplification, developed and patented by Amplification Technologies Inc. Use of DA technology in a photodetector for internal amplification allows the detection of low light signal with very high gain ( $>1E5$ ), fast response ( $< 0.5$  ns rise time) and negligible excess noise factor ( $< 1.05$ ).

The design of the DAPDNIR series photodetector was developed to provide both high Photon Detection Efficiency and a wide dynamic range.

The NIRDAP series photodetector is packaged in a hermetically sealed TO-5(39) package and is available in different active areas ranging from  $50\mu\text{m}$  to  $210\mu\text{m}$ .

## Key Features

### Electro-optical

- Near infrared spectral response from 1000 to 1700 nm
- Fast response
- High voltage and thermal stability
- High gain
- Low noise-factor

### Applications

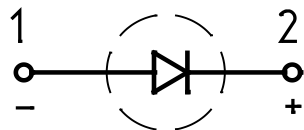
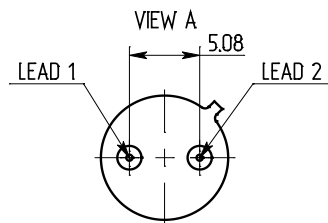
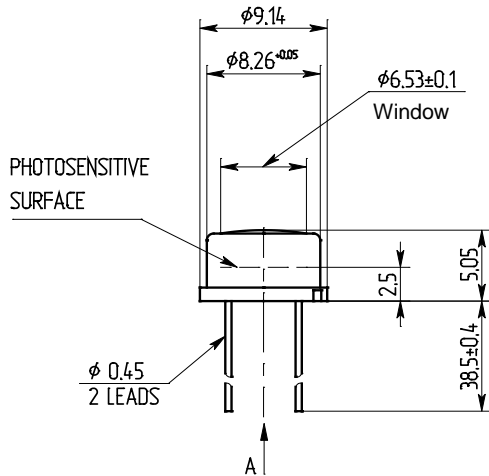
- Fluorescence detection
- Spectroscopy and Instrumentation
- Lidar and environmental monitoring
- 3D Imaging
- Homeland security
- Biological Sensors
- Quantum Communications
- Night Vision

## Specifications (at an ambient temperature of 25°C)

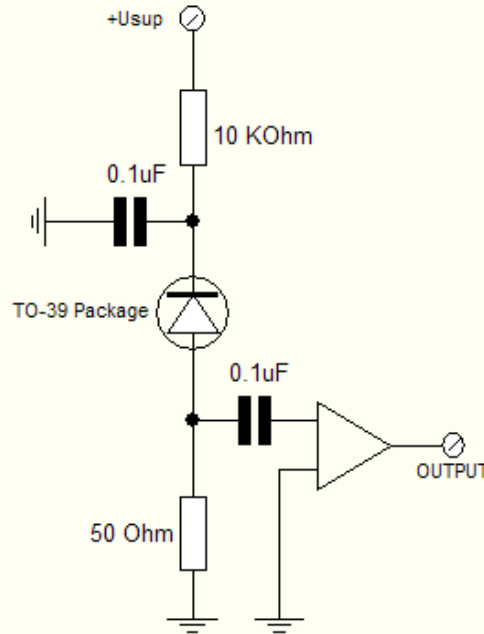
| Parameter   | DAPDNIR series  |      | Unit            |
|---|-----------------|------|-----------------|
|   | -80             | -200 |                 |
| Chip size   | 700 x 700       |      | $\mu\text{m}^2$ |
| Active area diameter                                    | 80              | 200  | $\mu\text{m}$   |
| Photon Detection Efficiency @1550 nm (PDE) <sup>1</sup> | 8 – 16          |      | %               |
| Spectral response range ( $\lambda$ )                   | 900 – 1700      |      | nm              |
| Single Electron Response pulse width (FWHM)             | 0.6             | 0.7  | ns              |
| Typical gain (M)  | $2 \times 10^5$ |      | -               |
| Excess Noise Factor                                     | < 1.05          |      | -               |
| Typical time resolution (FWHM)                          | 300 – 500       |      | ps              |
| Typical dark count rate                                 | 10-60           |      | Mcps            |
| Operating bias  | 50 – 60         |      | V               |

(1) Photon detection efficiency includes cross-talk and afterpulsing.

**Package Dimensions (unit: mm)**  
**DAPDNIR**  
**-080/-200 – TO-5(39)**



**Basic Connection Diagram for**  
**DAPDNIR Series**



### Precautions for Use

Use of grounding straps, anti-static mats and other standard electrostatic discharge protective equipment and methods are recommended when handling or testing these devices.

### Quality Vision

Amplification Technologies Inc is committed to providing products with the highest levels of quality and reliability using best available manufacturing processes. Our top priority is total customer satisfaction. Amplification Technologies Inc maintains a strict quality control program to ensure that all products meet or surpass published specifications.

### Ordering Information

When ordering, please specify the following information: DAPDNIR-XXX where XXX corresponds to the photodetector chip active area. Please call for other custom options such as custom chip active area, custom optical windows, etc.

#### **Contact Information:**

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