

## **Discrete Amplification Photon Detector Room Temperature Module**

Amplification Technologies RTM1DAPD10 series photodetector module is a wide spectral response high-speed module designed for the analog detection of extremely low-level light signals (from one photon to several thousand photons).

The Room Temperature Modules (RTM) consists of a patented DA Photo Detector (wide spectral response DAPD10 series) packaged in a hermetically sealed TO-5 package. The design of the DAPD10 series photodetector offer wide and flat spectral wavelength sensitivity from UV to near IR, high photon detection efficiency (PDE>30%) and high dynamic range and high voltage and thermal stability. The RTM1DAPD10 series module is available in four different active areas ranging from 0.18mm to 1.0mm.

The RTMDAPD10 series module output is switch selectable for either an internally amplified or a direct signal option taking advantage of the full analog dynamic range of DAPD. The internal amplifier used is a wide-bandwidth amplifier (14dB, 4GHz). The module includes a power supply circuit for biasing the photodetector and electronic circuits from a single 5V power supply. The module uses a standard optical input to accept optical signals from a uniform illumination source or as an option, it can be produced with a variety of industry standard fiber optic cable or connectors with specified fiber core and cladding diameters.

### **Key Features**

#### **Electro-optical**

- Wide and flat spectral response from UV to near IR
- High PDE at wide dynamic range
- Fast response (< 0.5 ns rise time and < 1.5 ns SER pulse width)

#### **Applications**

- Fluorescence detection
- Spectroscopy and Instrumentation
- Homeland security
- Lidar and environmental monitoring
- High energy physics
- Biological Sensors
- Confocal microscopy

#### **Packaging**

- Free space optical signal input, or fiber input with or with out a connector

# RTM1DAPD10 Series

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

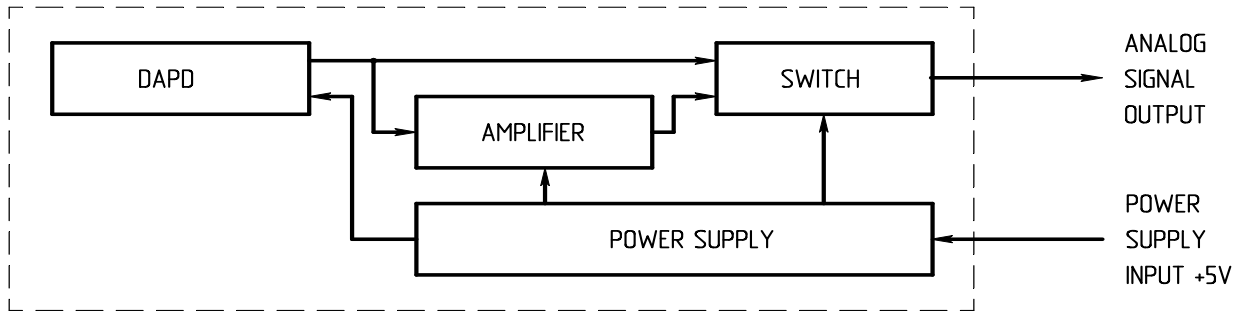
| Parameter  | RTM1DAPD10<br>C018 | RTM1DAPD10<br>C030                     | RTM1DAPD10<br>C050 | RTM1DAPD10<br>C100 | Unit           |
|--|--------------------|--|--------------------|--------------------|----------------|
| Active area diameter   | 0.18               | 0.3                                    | 0.5                | 1                  | mm             |
| Number of pixels   | 110                | 280                                    | 740                | 2900               | -              |
| Photon Detection Efficiency at 440 nm (PDE) <sup>1</sup>                 | 30 - 40            |  |                    |                    | %              |
| Spectral response range  | 350 - 950          |  |                    |                    | nm             |
| Single Electron Response Pulse Width (FWHM)                              | 0.6                | 0.7                                    | 0.8                | 1.2                | ns             |
| Excess Noise Factor  | < 1.05             |  |                    |                    | -              |
| Typical time resolution (FWHM)   | 300                | 300 - 400                              |                    |                    | ps             |
| Typical dark count equivalent noise @5 ns gate, rms                      | 0.1                | 0.2                                    | 0.3                | 0.5                | e <sup>-</sup> |
| <b>With internal RF amplifier<sup>2</sup></b>                            |                    |  |                    |                    |                |
| Single Electron Response output voltage                                  | 10 - 20            | 7 - 15                                 | 5 - 10             | 3 - 8              | mV             |
| Max Output voltage   | 0.9 - 1.5          | 1.5                                    | 1.5                | 1.5                | V              |
| <b>Without internal amplifier (direct output from the photodetector)</b> |                    |  |                    |                    |                |
| Single Electron Response output voltage                                  | 2 - 4              | 1.5 - 3                                | 1 - 2              | 0.5 - 1.5          | mV             |
| Max Output voltage   | 0.2 - 0.5          | 0.4 - 1                                | 0.6 - 1.8          | 1.2 - 5            | V              |
| Terminal capacitance   | 3                  | 5                                      | 7                  | 16                 | pF             |
| Output impedance   | 50                 |  |                    |                    | Ω              |
| Supply voltage   | +5                 |  |                    |                    | V              |
| Supply current   | 0.25               |  |                    |                    | A              |
| Connectors   | Output             | SMA                                    |                    |                    |                |
|  | Power              | 2.1/5.5 mm Barrel type power connector |                    |                    |                |
| Dimensions   | 22 x 38 x 55       |  |                    |                    | mm             |

(1) Photon detection efficiency includes crosstalk and after pulsing.

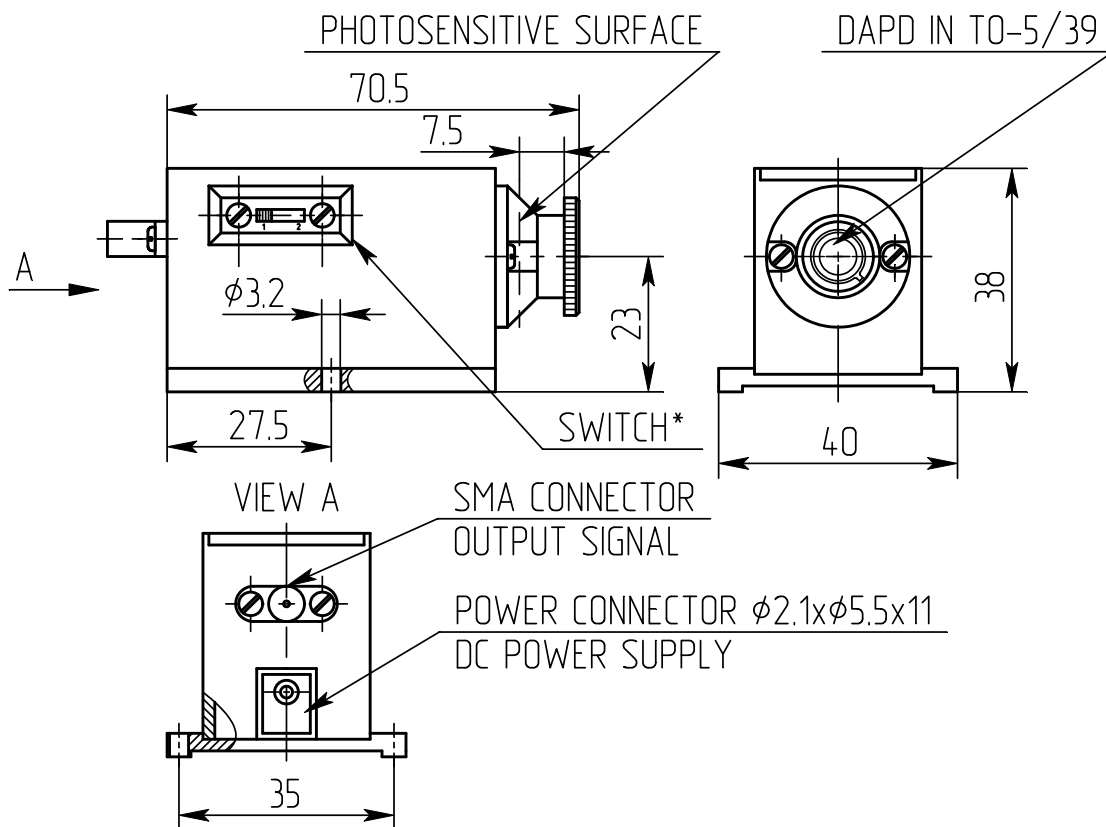
(2) Microwave Corporation HMC479MP86 (14dB, 4GHz, max output voltage 1.5V).

# RTM1DAPD10 Series

## Block Diagram



## Module Dimensions (unit: mm)



### 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 module with the following information: RTM1PD10C-XXXTO5 where XXX corresponds to the photodetector chip active area. Example: RTM1DAPD10C-018 corresponds to 0.18 mm diameter active area.

Please call for other custom options such as fiber coupling, custom chip active areas and custom optical windows etc.

#### **Contact Information**

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