

## STM1 DAPD10 series Stabilized Temperature Module



### with Discrete Amplification Photon Detector

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Amplification Technologies Inc.'s STM1DAPD10 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 Stabilized Temperature Modules (STM) consists of a patented multichannel Discrete Amplification Photo Detector (wide spectral response DAPD10 series) packaged in a hermetically sealed TO-8 package with built-in thermoelectric cooler, a thermistor and a temperature controller circuit for stabilizing the temperature of the module. The module has an integrated power supply for biasing the photodetector and amplifier circuits. The design of the DAPD10 series photodetector offer wide and flat spectral wavelength sensitivity from UV to IR, high photon detection efficiency (PDE>30%) and high dynamic range and high voltage and thermal stability.

The STMDAPD10 series module output is switch selectable for either single electron response pulse 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 photodetector is kept at a constant temperature by monitoring the output of a thermistor mounted next to the photodiode and automatically regulating the current through the thermoelectric cooler. The STM1DAPD10 series module is available in four different active areas ranging from 0.18mm to 1.0mm. 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
- Lidar and environmental monitoring
- High energy physics
- Biological Sensors
- Confocal microscopy

# STM1DAPD10 Series Module

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

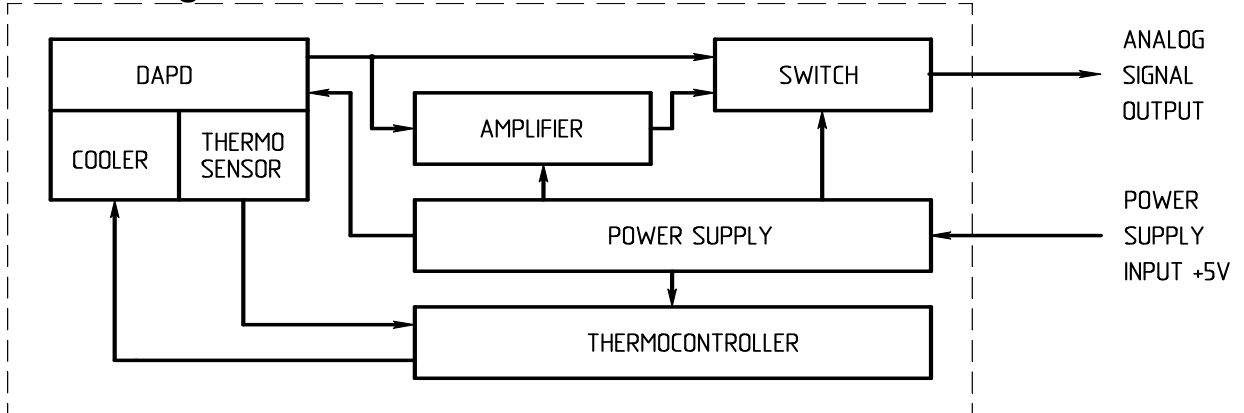
Parameter	STM1DAPD10 C018	STM1DAPD10 C030	STM1DAPD10 C050	STM1DAPD10 C100	Unit
Active area diameter	0.18	0.3	0.5	1	mm
Number of pixels	110	280	740	2900	-
Photon Detection Efficiency at 440 nm (PDE) <sup>1</sup>	30 - 40				%
Spectral response range (λ)	350 - 950				nm
Single Electron Response Pulse Width (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	0.03	0.05	0.07	0.14	electron
<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	1.2				A
Connectors	Output	SMA			
	Power	2.1/5.5 mm Barrel type power connector			
Dimensions	44 x 50 x 126				mm

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

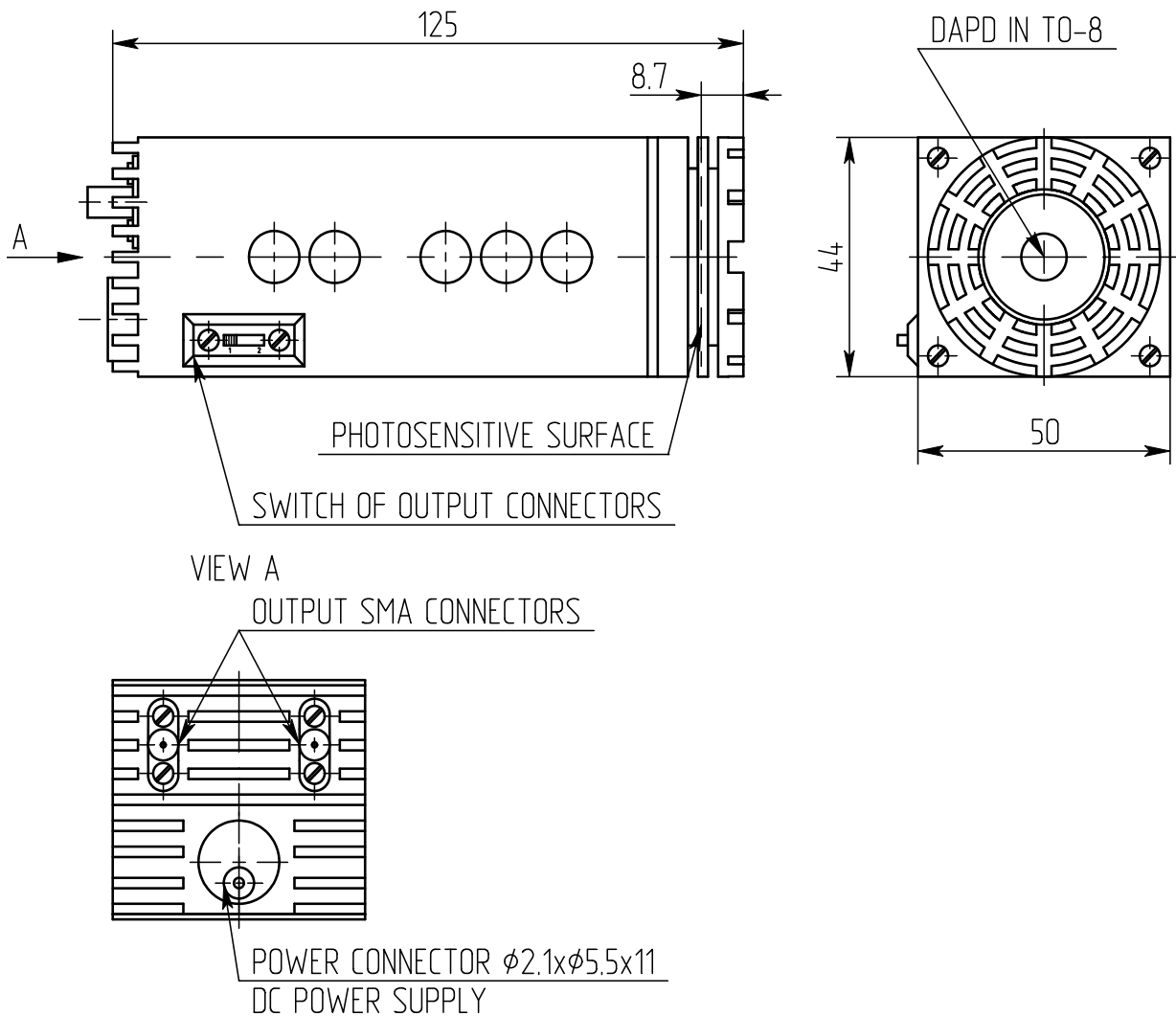
(2) Microwave Corporation HMC479MP86 (14dB, 4GHz, max output voltage 1.5V).

# STM1DAPD10 Series Module

## 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: STM1PD10C-XXXT08 where XXX corresponds to the photodetector chip active area. Example: STM1PD10C-018 corresponds to 0.18 mm diameter active area.

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

### Contact Information

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