

STM1DAPD09 series Stabilized Temperature Module



with Discrete Amplification Photon Detector

Amplification Technologies Inc.'s STM1DAPD09 series photodetector module is a red wavelength sensitivity high-speed module designed for both photon counting and the analog detection of extremely low-level light signals (from one photon to several hundred photons). The STM1DAPD09 series module has high sensitivity, low dark count rate (~100 cps), high dynamic range in counting mode and high voltage and thermal stability.

The Stabilized Temperature Modules (STM) consists of a patented multichannel Discrete Amplification Photo Detector (red wavelength sensitivity DAPD09 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 STM1DAPD09 series module output is switch selectable for digital output (TTL) or analog output with a wide-bandwidth amplifier (14dB, 4GHz). The module also has a switch to select either the amplified output (TTL or analog) or a direct output from the photodiode. 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 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

- Photon counting and proportional detection modes
- High sensitivity in both modes
- Low dark count (~100 cps)
- Wide dynamic range in counting mode (up to 108 cps)
- Fast response (~ 0.3 ns rise/fall time of SER pulse in analog mode)

Applications

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

Packaging

- Free space optical signal input, or fiber input with or without a connector

Specifications (at an ambient temperature of 25°C)

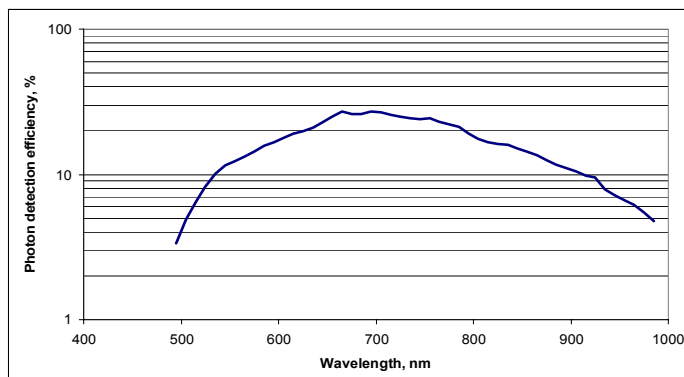
Parameter		STM1DAPDR C018	Unit
General parameters			
Active area diameter		0.18	mm
Number of pixels		160	-
Spectral response range (λ)		500 - 950	nm
Peak sensitivity		710	nm
Photon Detection Efficiency at 710 nm (PDE) ¹		25	%
Analog output (analog² + photon counting modes)			
Single Electron Response Amplitude		8 – 12	mV
Single Electron Response Pulse Width (FWHM)		0.6	ns
Rise/fall time		< 0.4	ns
Pulse pair resolution		< 1	ns
Typical time resolution ³ (FWHM)		250	ps
Typical dark count rate		100	cps
Maximal count rate (constant illumination)		10 ⁸	cps
Excess Noise Factor		< 1.05	-
TTL output (photon counting mode)			
TTL output pulse amplitude		2.8	V
TTL pulse width (FWHM)		20	ns
Dead time after TTL pulse		5	ns
Pulse pair resolution		25	ns
Maximal count rate		4·10 ⁷	cps
Typical time resolution (FWHM)		250	ps
Other parameters			
Supply voltage		+5	V
Supply current		0.3 - 0.4	A
Output impedance		50	Ω
Max Output voltage		0.2 - 0.5	V
Connectors	Analog Output	SMA	
	TTL output	SMA	
	Power	NP-118A Barrel type power connector	
Dimensions		110 x 50 x 44	Mm

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

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

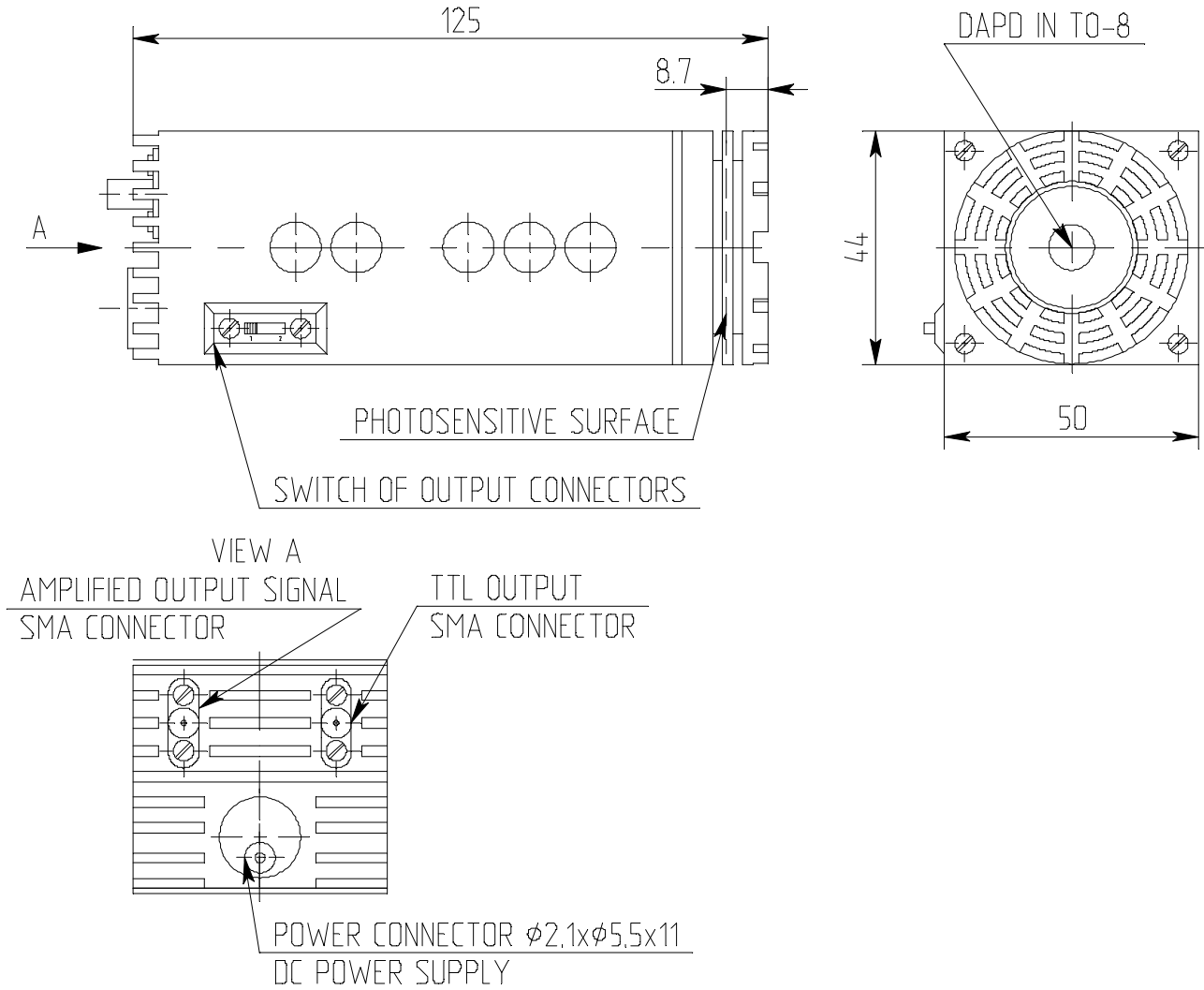
(3) Pulse front jitter, measured at 0.5 of single-electron-response (SER) level

Spectral response dependence

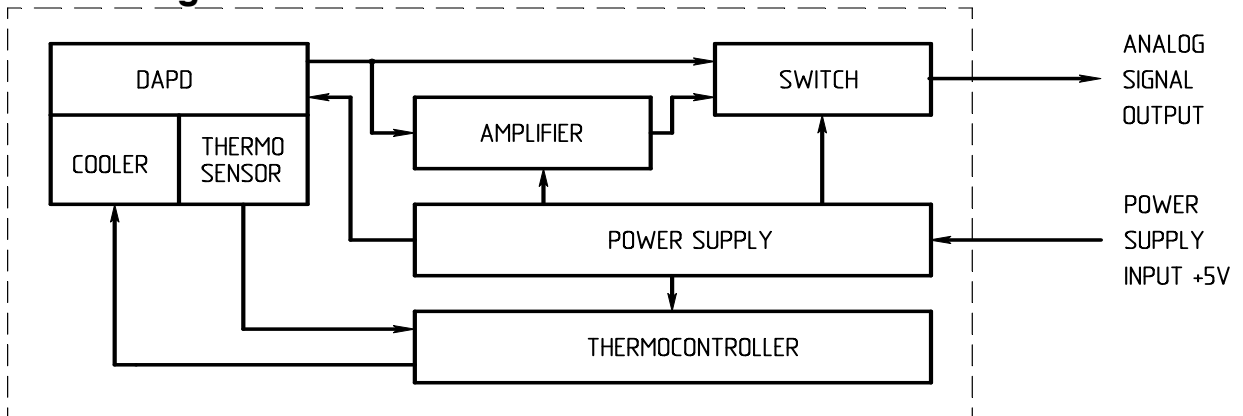


STM1DAPD09 Series Module

Module Dimensions (unit: mm)



Block Diagram



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

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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