ภาคผนวก ก

รายละเอียดของหัววัดแสงชนิดซิลิกอนแอมพลิไฟด์

(THORLABS, PDA8A)

PDA8A Operating Manual - Silicon Amplified Detector

The PDA8A is a wideband amplified, silicon detector designed for detection of light signals from DC to 50 MHz. A buffered output drives a 50 Ω input impedance up to 1.8 volts. The ultra-low noise design includes an active low-pass filter to prevent aliasing effects and to suppress out of band noise effectively.

The PDA8A housing includes a removable threaded coupler that is compatible with any number of Thorlabs 1" and ½" threaded accessories. This allows convenient mounting of external optics, light filters and apertures, as well as providing an easy mounting mechanism using the Thorlabs cage assembly accessories. The PDA8A has three 8-32 (M4 for /M-version) tapped mounting hole with a 0.25" mounting depth and includes a power supply.

Specifications:

Electrical	
Detecto	Silicon
Active	Ø0.8mm (0.5 mm²)
Respons	320 – 1000 nm
Peak	0.56 A/W @ 820 nm
Small Signal	DC – 50 MHz
NEP	6.5 pW/√Hz
Noise	1.8 mV
Dark	±10 mV (max.)
Output Voltage Hi-Z 50Ω	 0 to 3.6V 0 to 1.8V
Transimpedance Gain Hi-Z 50Ω	 100 kV/A 50 kV/A

General	
On / Off Switch	Slide
Output	BNC
Optical Head Size	2.8" x 1.9" x 0.83" 70mm x 48 mm x 21mm
Weight	60 grams
Storage Temp	-25 to 70°C
Operating Temp	10 to 50
AC Power Supply	AC – DC Converter
Input Power	100-120VAC; 220-240VAC 50-60 Hz, 5W

1. The small signal bandwidth was measured with output amplitude of 200mV and a dc offset of 200mV, driving a 50Ω load termination.
2. All measurements performed with 50Ω load unless stated otherwise.

Setup

- Unpack the optical head, install a Thorlabs TR-series ½" diameter post into one of the 8-32 (M4 on - Metric version) tapped holes, located on the bottom and side of the sensor, and mount into a PH- series post holder.
- Switch the power supply to your local main voltage (100-120 VAC or 220 V-240 VAC)

Figure 1: *Switchable power supply for 115 V and 230 V*

- Connect the power supply 3-pin plug into the mating receptacle on the PDA8A.
- Plug the power supply into a outlet
- Attach a 50Ω coax cable (i.e. RG-58U) to the output of the PDA. When running cable lengths longer than 12" we recommend terminating the opposite end of the coax with a 50Ω resistor (Thorlabs p/n T4119) for maximum performance.

Operation

- The PDA8A is switched on by the ‘POWER’ Slide switch, located on the side wall of the optical sensor.
- The light to voltage conversion can be estimated by factoring the wavelength-dependent responsivity of the Silicon detector with the transimpedance gain as shown below:

output (V/W) = transimpedance gain (V/A) x responsivity (A/W)

- The maximum output of the PDA8A is 3.6V for high impedance loads (1.8V for 50Ω loads). The output signal should be below the maximum output voltage to avoid saturation. If necessary, use external neutral density filters to reduce the input light level.
- For maximum linearity performance when measuring focused beams, fiber outputs, or small diameter beams, do not exceed a maximum intensity of 10mW/cm².
- Because of the finite gain-bandwidth performance common to all amplifier circuits, the bandwidth of the PDA8A decreases with increased output signal levels.

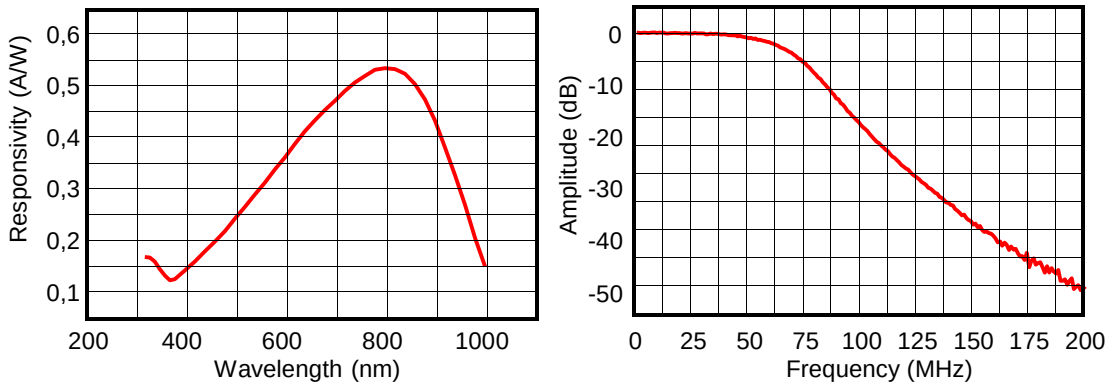

Figure 2: *PDA8A Spectral Responsivity and Frequency Response*