

DETECTOR-FILTER COMBINATION SERIES

PLANAR DIFFUSED SILICON PHOTODIODES



The Detector-Filter combination series incorporates a filter with a photodiode to achieve a tailored spectral response. UDT Sensors offers a multitude of standard and custom combinations. Upon request, all detector-filter combinations can be provided with a NIST traceable calibration data specified in terms of Amps/Watt, Amps/lumen, Amps/lux or Amps/ footcandle.

Among many possible custom combinations, following are a few standard devices available as standard devices.

PIN-10DF - is a 1 cm² active area, BNC package detector-filter combination, optimized to achieve a flat responsivity, from 450 to 950 nm. This is the spectral response required for radiometric measurements. This type of detector has several advantages over thermopile, such as sensitivity, which is about a thousand times higher, as well as 10 times more stability.

PIN-10AP - is a 1 cm² active area, BNC package detector- filter combination which duplicates the response of the most commonly available optical aid; the human eye. The eye senses both brightness and color, with response varying as a function of the wavelength. This response curve is commonly known as the CIE curve. The AP filters accurately match the CIE curve to within $\pm 2\%$ of area.

PIN-555AP - has the same optical characteristics as the PIN 10-AP, with an additional operational amplifier in the same package. The package and the op-amp combination is identical to UDT-555D detector- amplifier combination (PhotopsTM).

PIN-005E-550F - uses a low cost broad bandpass filter with peak transmission at 550nm to mimic the CIE curve for photometric applications. The pass band is similar to the CIE curve, but the actual slope of the spectral response curve is quite different. This device can also be used to block the near IR portion of the spectral range, 700 nm and above.

PIN-005D-254F - is a 6 mm² active area, UV enhanced photodiode-filter combination which utilizes a narrow bandpass filter peaking at 254 nm.

CUSTOMIZED CAPABILITIES

Current existing standard photodiodes can be modified by adding various optical filter(s), to match your specific spectral requirements. The filters can ei-

APPLICATIONS

- Analytical Chemistry
- Spectrophotometry
- Densitometers
- Photometry/Radiometry
- Spectroradiometry
- Medical Instrumentation
- Liquid Chromatography

FEATURES

- CIE Match (AP series)
- Flat Band Response (DF)
- 254 Narrow Bandpass
- w/ Amplifier Hybrid
- BNC Packages

ther replace the standard glass windows or be used in conjunction with the glass window, depending on the specific requirement and / or nature of the filter. Customer furnished optical filters can also be incorporated in the package. The following are among a few of the optical filter types available. These colored glass filters are grouped into four major categories: Shortpass Filters, Longpass Filters, Bandpass Filters, and Neutral Density Filters.

Shortpass Filters provide transmission of light in the shorter wavelengths of the spectral band in question. In general, shortpass filters have less steep cut-off slopes than the longpass filters, therefore, careful evaluation of the sensitivity of the detector should be taken into account.

Longpass Filters provide a cut-on filter performance by absorbing photons in the lower wavelengths and passing them in the higher wavelengths.

Bandpass Filters combine the cut-on performance of the longpass filters with the cut-off performance of the shortpass filters. They define a range in the wavelength spectrum, which allows the transmission of photons. The rest of the spectrum is blocked.

Neutral Density Filters provide a fairly flat response across the visible spectrum. These filters are used to attenuate the light so that the amount of passed energy is reduced. The reduction is in uniform amounts. In these filters the transmittance can also be defined as Optical Density, i.e. $OD = \log(1/T)$ where OD is the optical density and T is the transmittance.

Custom Thin Film Coatings can be applied to either or both surfaces of the filter glass to improve the performance of the glass absorption filter. The most common coatings applied are anti-reflective, neutral density, cut-on and cut-off coatings.

Anti-reflective Coatings can reduce the surface reflection loss from an average of 4% to as low as 0.25%, or less. This will raise the filter's transmittance values in the coatings performance range.

Cut-on and Cut-off Filter Coatings can be applied to glass absorption filters to attain a more defined bandpass than is normally achieved by combining filters.

ALL PHOTODIODES WITH OR WITHOUT FILTERS CAN BE CALIBRATED IN HOUSE FOR RESPONSIVITY FROM 200 NM TO 1100 NM IN 10 NM STEPS AS WELL AS SINGLE POINT CALIBRATION. ALL OPTICAL CALIBRATIONS ARE NIST TRACEABLE.

Model No.	Active Area		Typical Responsivity @ 550 nm		Spectral Match	Capacitance (pF)	Rise Time (μs)	Shunt Resistance (MΩ)	NEP (W/√ Hz)	Temp Range (°C)		Package Style ¶			
	Area (mm ²)	Dimension (mm)				0 V	0 V 550 nm	-10 mV	0 V 550 nm	Operating	Storage				
			A/W	mA/Lum		typ	typ	typ	typ						
PIN-10DF	100	11.28 ϕ	0.15	---	± 7% *	1550	1.0	20	1.9e-13	0 ~ +70	-25 ~ +85	13 / BNC			
PIN-10AP			0.27	0.4	± 2% *				1.1e-13			32 / Special			
PIN-555AP §															
PIN-005E-550F	5.7	2.4 sq.	0.23	---	---	200	0.15	500	2.5e-14			5 / TO-5			
PIN-005D-254F			0.025***	---	---	100	0.10**	300	3.0e-13***			18 / TO-5			

* Point by point from 450 to 950 nm

** Area

*** $\lambda = 254\text{nm}$

§ PIN-555AP is a detector/opamp hybrid. For op-amp specifications please refer to page 51.

For MECHANICAL DRAWINGS Click Here

