

ADVANCED PHOTONIX, INC.®

LARGE AREA AVALANCHE PHOTODIODES

... 631 and 641 Series Cooled Modules

API's solid state Large Area Avalanche Photodiodes (LAAPD) are available in easy to operate integrated modules. API's 631 AC coupled and 641 DC coupled series Cooled Modules incorporate our innovative 571 Series thermo-electrically cooled (TEC) LAAPD detectors with a built-in high voltage power supply, T.E.C. controller and low noise, high speed transimpedance amplifier.

Designed for flexibility and maximum performance, the 631 and 641 Series Modules can accommodate any of the 571 Series cooled devices. These solid state hermetically sealed detectors integrate an on-board TEC and thermistor ensuring stable operation over a wide ambient temperature range allowing for stable operating gain up to 300 while minimizing noise and dark current. The devices are available in 5, 10 and 16 mm diameters with peak quantum efficiency exceeding 80% and spectral response tailored to your choice of UV, Blue, or Red/IR spectral regions.

The 631 and 641 Series Cooled Modules are optimally designed for low light level detection and are ideally suited for a wide variety of applications including:

- Spectroscopy
- Flow Cytometry
- Colorimetry
- High Energy Physics

- Semiconductor Inspection
- Environmental Monitoring
- Scintillation Detection

- Nuclear Medicine
- Solid Surface Analysis
- HPLC
- In-Vitro Assay

Features

- 5, 10, and 16 mm diameters
- Choice of AC or DC coupled low noise, high-speed amplifier
- Precision, adjustable high voltage power supply
- High voltage monitor
- LAAPD temperature stabilized at 0°C

Supply Requirements

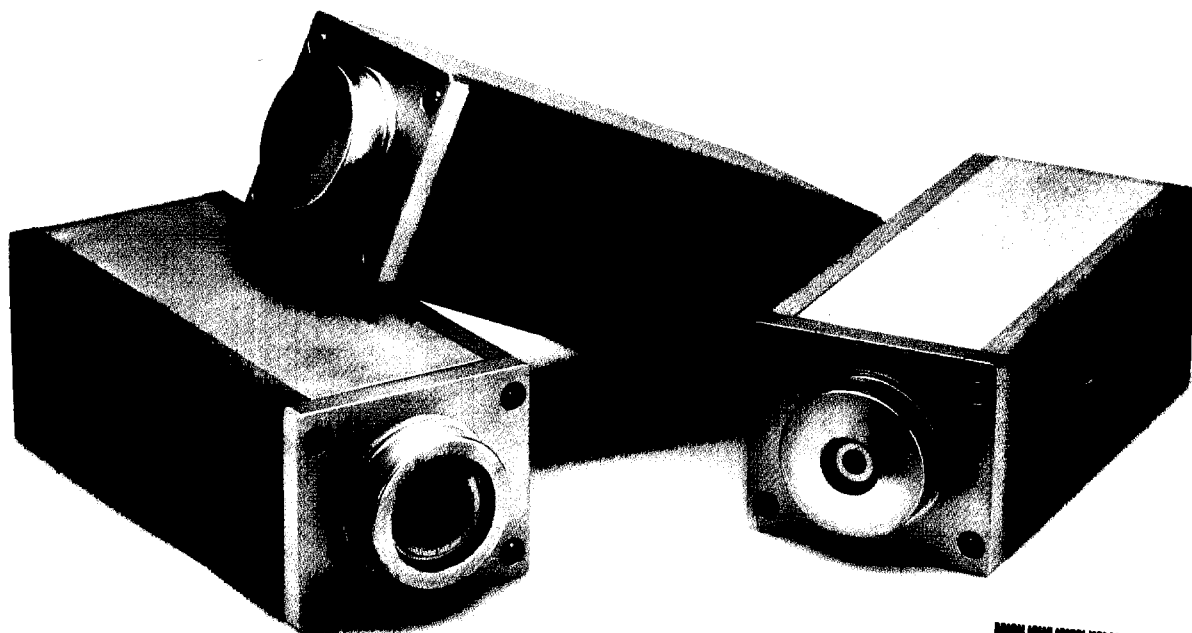
- +12V and -12V
- TEC Supply +5V

Monitor Output

- Built-in 1000:1 high voltage divider
- Temperature monitor set to 1 VDC with LAAPD at 0°C

Output

- Negative signal polarity



★ADPIS00007★

Electro-Optical Characteristics for 631 AC Coupled Series and 641 DC Coupled Series

Specifications apply when APD is at 0°C with a gain of 300 and a load resistance of 50 ohms on the preamplifier output.

Part Number	APD Active Diameter	APD Spectral Enhancement	Sensitivity at 1 MHz Typical**	NEP at 1 MHz Typical**		-631 Frequency			-641 Frequency	
				-631	-641	Low Cutoff Typical	High Cutoff Typ		High Cutoff Min	
	(mm)		(10 ⁵ V/W)	(fW/√Hz)	(fW/√Hz)	(Hz)	(MHz)	(MHz)	(MHz)	(MHz)
197-70-73-6X1*	5	UV	5.5	25	22	1000	18	13	16	13
197-70-74-6X1*		Blue	9.5	15	13					
197-70-72-6X1*		Red/IR	13.5	10	9					
394-70-73-6X1*	10	UV	5.5	28	26		16	12	14	12
394-70-74-6X1*		Blue	9.5	16	15					
394-70-72-6X1*		Red/IR	13.5	12	11					
630-70-73-6X1*	16	UV	5.5	50	45		6.5	5.0	5.0	4.0
630-70-74-6X1*		Blue	9.5	30	27					
630-70-72-6X1*		Red/IR	13.5	20	18					

*Substitute a "3" for an AC coupled and a "4" for a DC coupled preamplifier for the X designator in the part number.

**Sensitivity and NEP for UV, Blue, and Red/IR specified at wavelengths of 350nm, 500nm, and 750nm respectively.

Feedback Resistance	Output Impedance	Linear Output Swing	Output Stability At Gain 200 Typical	Current Consumption of Supplies						-641 Output Offset Voltage	
				+12V±1V		-12V±1V		+5V***			
				Typ	Max	Typ	Max	Typ	Max	Typ	max
K(Ω)	(Ω)	(V)	(%/°C)	(mA)	(mA)	(mA)	(mA)	(A)	(A)	(mV)	(mV)
20±1%	50	-1.0	±0.2	150	250	40	90	0.5	0.8	±2.0	±5.0
								0.7	2.0		
								0.9	2.0		

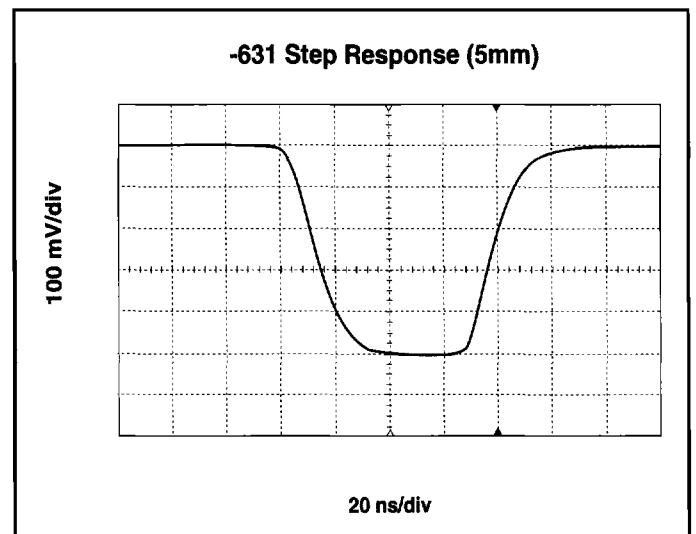
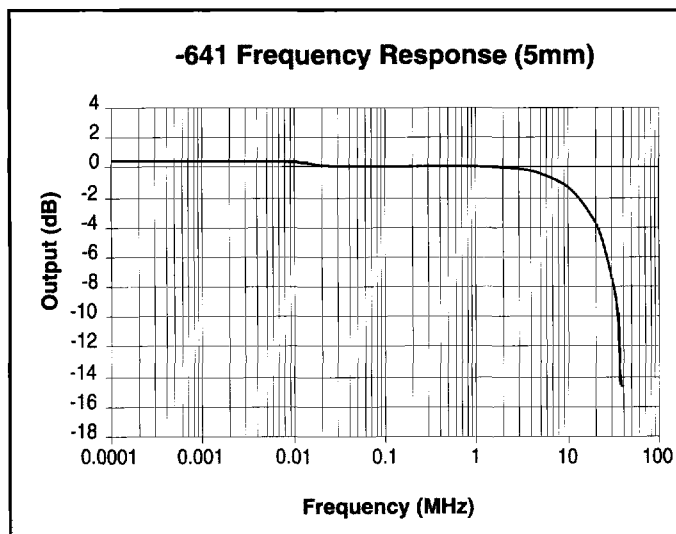
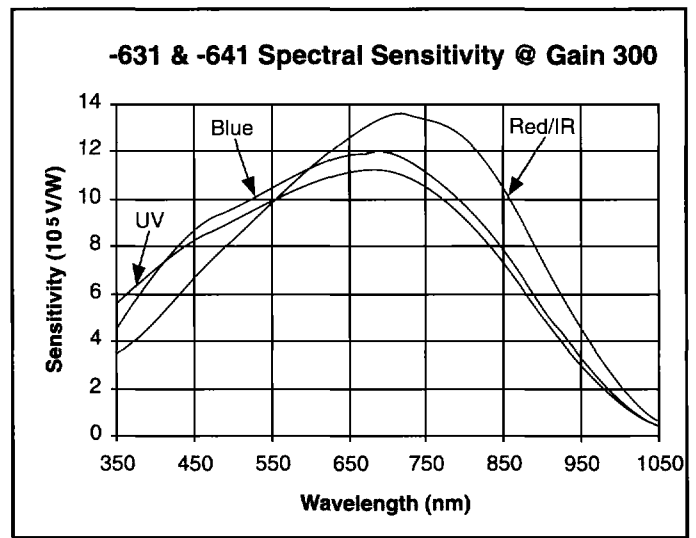
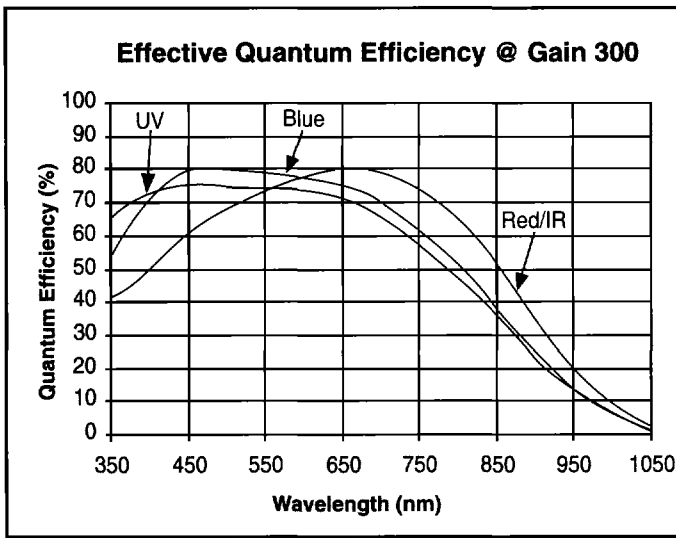
***+5 volt supply current consumption specified in order of size for 5, 10, and 16 mm diameters.

Absolute Maximum Ratings

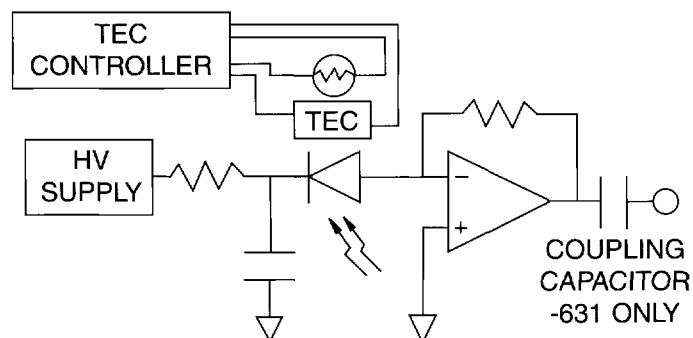
APD Active Diameter	Continuous Incident Light Intensity APD gain=300 λ=675nm	Ambient Operating Temp.	Storage Temp.	Supply Voltage
(mm)	(μW)	(°C)	(°C)	(V)
5	0.75	0 to +40	-40 to +70	±13
10	1.5			
16	2.0	0 to +35		

Modules can be modified or customized by Advanced Photonix, Inc.® to suit specific customer requirements.

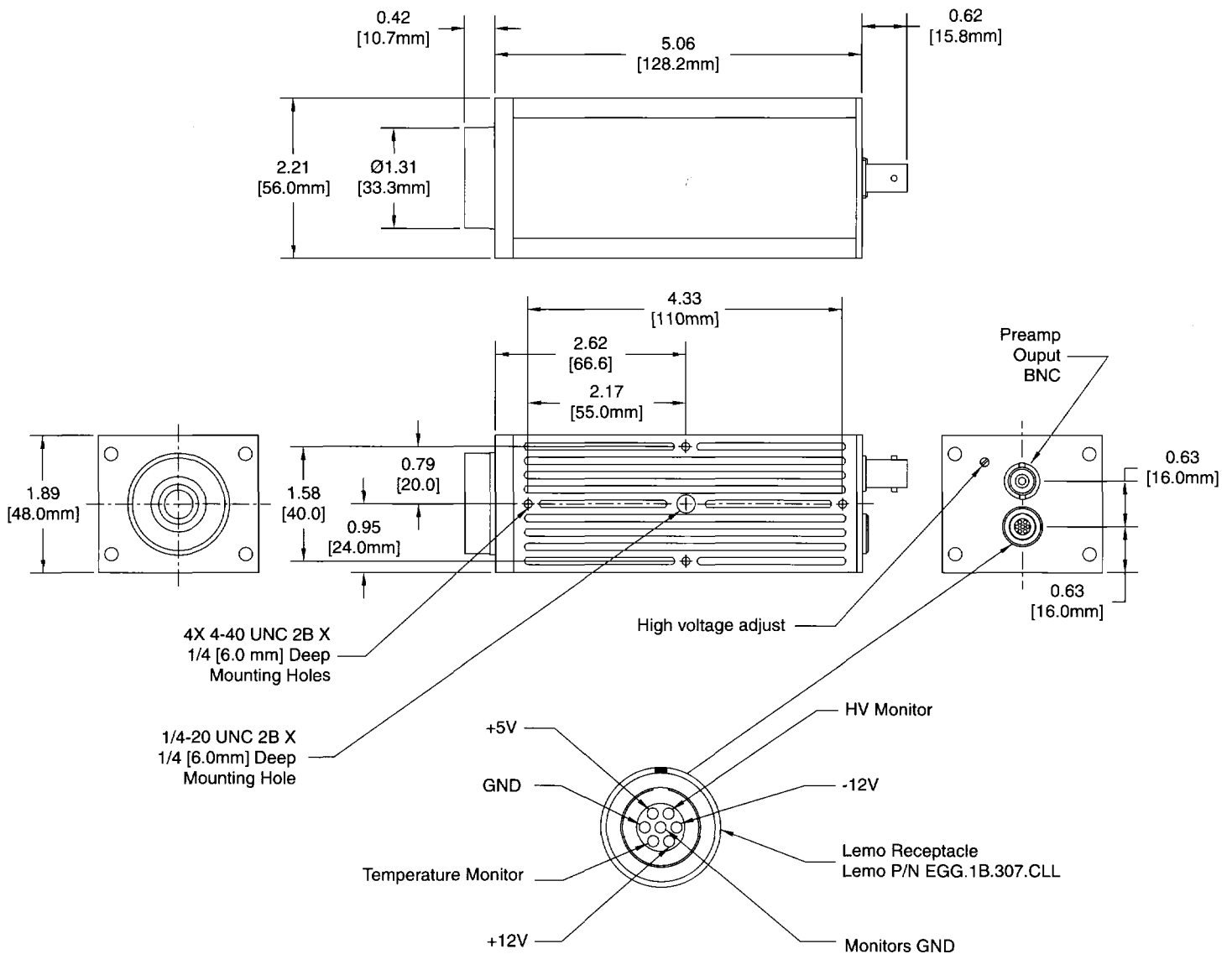
Typical Performance Graphs



Simplified Schematic



Mechanical and Electrical Connection Diagrams



Cable Assembly (Included)

API P/N 129-10-631

Cable assembly has a 3.0-foot cable connected to a mating Lemo connector.

CABLE ASSEMBLY WIRING TABLE

WIRE COLOR	ITEM
Red	+12V
Blue	-12V
Orange	+5V
Black/White and Black	GND
White	Temperature Monitor
Green	HV Monitor
Red/Black	Monitors GND



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