Fiber Coupled Bias Photodetector – Mini Package

Silicon, GaAs, PIN, up to 1GHz, Rugged for Harsh Environment

DATASHEET

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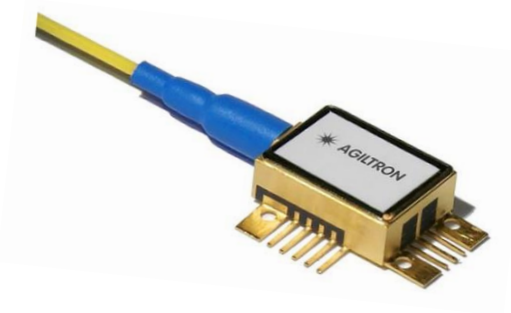

The FBPI Fiber Coupled Linear Photoreceiver is designed for high-speed, high-sensitivity analog and digital applications with bandwidths exceeding 1 GHz. It features a compact, ruggedized metal package with bias and RF pins for easy system integration and an ESD-protected metal enclosure for reliable handling and assembly. The device is rated for operation in harsh environments from –50°C to +85°C and under vibration. Both silicon and GaAs PIN detector versions are available to meet diverse application requirements. Unlike amplified detectors, which can distort signals due to internal amplification circuitry—the FBPI operates with a low-noise DC bias, avoiding such distortion. This makes it ideal for measuring fast optical transients while maintaining a linear response to incident light. The photoreceiver operates in photoconductive mode, using reverse bias from an external DC power supply through the bias pins, where incoming light generates a photocurrent. A parallel resistor may be added at the RF output to convert the photocurrent into a voltage signal, optimizing response. For fast transient measurements, a 50 Ω termination should be used; for laser signals longer than 500 ns, a parallel resistor between 1 kΩ and 10 kΩ is recommended.

Features

- Vibration Insensitive
- –50°C to +85°C Operation
- 1 GHz Bandwidth
- Low Signal Distortion
- Metal ESD Protection Package
- PCB Mountable

Applications

- High Sensitivity Analog Detection
- High Fidelity Pulse Detection
- Linear Receiver up to 1 GHz
- Analog RFoF Link

Specifications

Parameter	Min	Typical	Max	Unit
Wavelength Response	1000 500		1700 1000	nm
Peak Response [1]		0.9		A/W
Capacitance		0.3		pF
Rise/Fall Time [2]		0.3		ns
Bandwidth [3]	DC	800	1	GHz
NEP [1]		$2x10^{-15}$		$W/Hz^{1/2}$
Dark Current		1.5		nA
Optical Damage Threshold	50			mW
Operating Temperature	-50		85	°C

Notes:

[1]. @1550nm and room temperature

[2]. 80/20 %

[3]. Defined as the boundary at which the output is 3dB below the normal output

Rev 10/29/25

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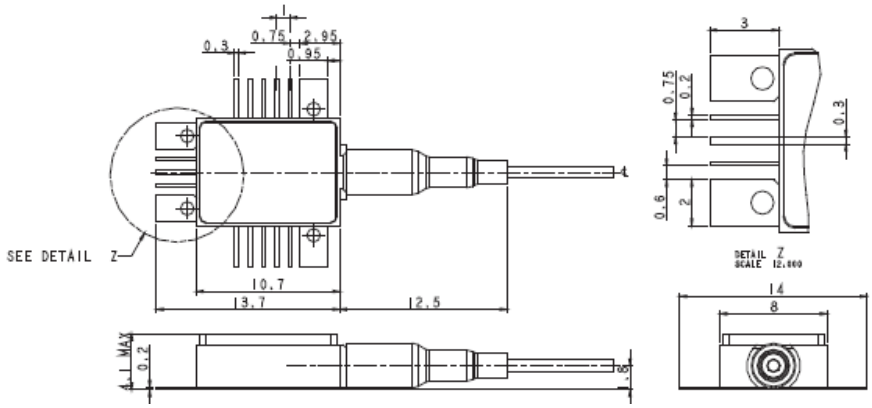
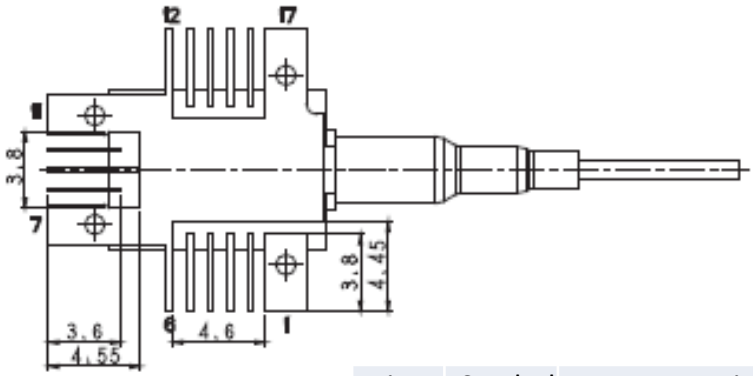
Dimensions (mm)



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Pin Definition



Pin #	Symbol	Function
1	NC	Case ground
2	V_{pd}	PD bias voltage
3	NC	No connection
4	NC	No connection
5	NC	No connection
6	GND	Case ground
7	GND	Case RF ground
8	Out	RF output
9	GND	Case ground

Application Notes

Electrostatic discharge (ESD) will cause permanent damage to the product. Please avoid any ESD to the input pins or output connector. Use standard ESD protective equipment when handling this product.

Temperature and fiber restrictions are as follows: Lead soldering: 250°C for no more than 10 seconds Fiber feed-through tube:

- 120°C
- Fiber pull force: 4.9 N
- Fiber bending radius: 1 inch or less

Exceeding these conditions can cause permanent damage to the device.

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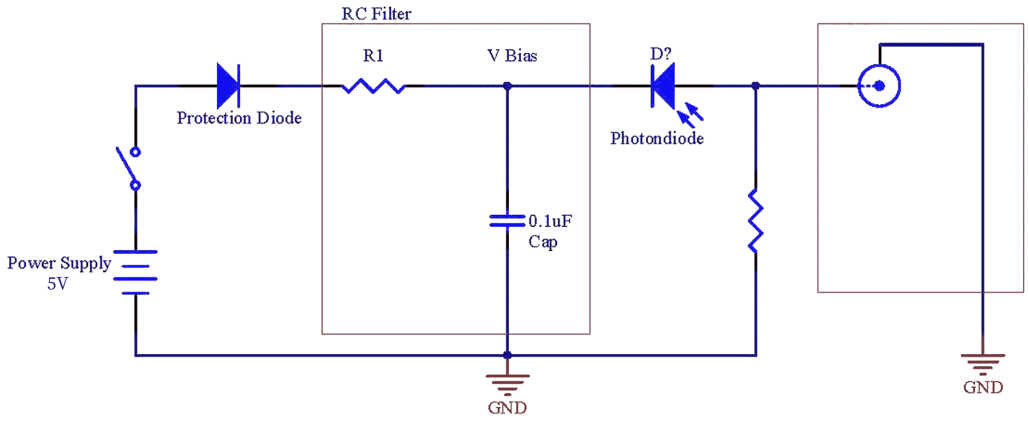
Functional Diagram



The photodiode consists of a PN junction that generates a photocurrent when light with energy (wavelength) matching the semiconductor's band gap illuminates in the region of the junction. In operation, a reverse external bias is applied to enhance the responsibility by increasing the width of the depletion junction and decreasing junction capacitance. The measured output current is linearly proportional to the input optical power. This type of directly biased photodiode is attractive for its fast response with little distortion. It is a challenge to produce high bandwidth photodetector with an amplifier that often distorts the true transit profile of a fast optical signal. Consequently, a biased photodetector without an amplifier is the choice for high-speed measurement. The bandwidth is inversely proportional to the active detector area. The bias voltage also generates a leakage current, called dark current, which increases with temperature. Dark current approximately doubles every 10°C increase in temperature. Applying a higher bias will decrease the junction capacitance but will also increase the dark current.

Ordering Information

	1	☐	01	☐	☐	☐☐	☐
Prefix	**Detector Type**	**Wavelength Range**	**Bandwidth**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**
FBPI-	PIN = 1 APD = 2	1000-1600nm = 1 500-1000nm = 2	1GHz = 01	SMF-28 = 1 50/125 = 2 105/125 = 3 62.5/125 = 4 PM1550 = 5	Bare fiber = 1 900 µm tube = 2 3mm jacket = 3 2mm jacket = 4 1.6mm jacket = 5	0.5m = 05 1.0m = 10 1.5m = 15 2m = 20	None = 0 FC/APC = 1 FC/PC = 2 SC/APC = 3 SC/PC = 4 ST = 5 LC/UPC = 6 LC/APC = 7

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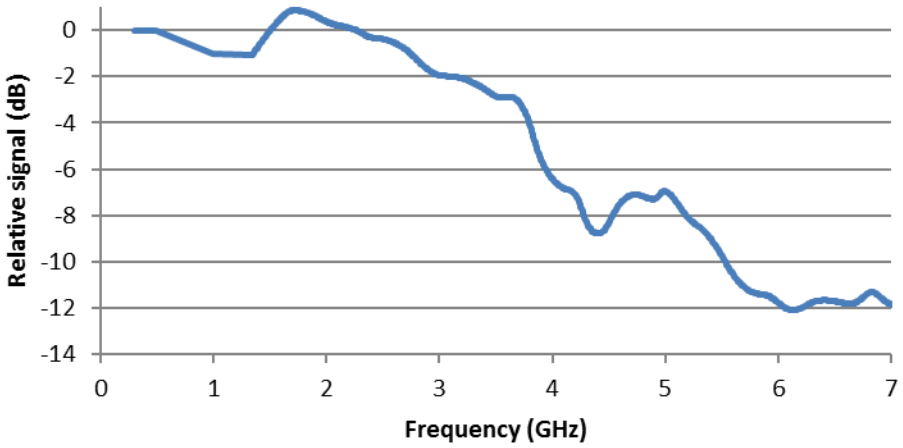
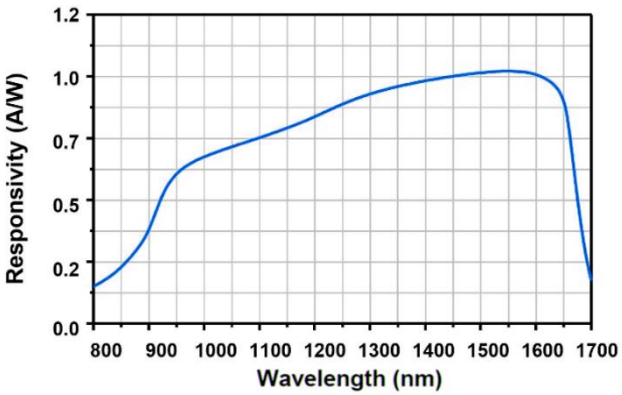
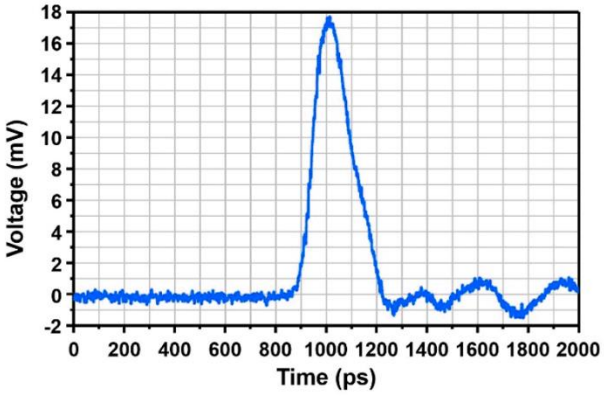
Frequency Response (typical)



Spectral Response (typical)



Pulse Response (typical)



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