43Gb/s Balance Photoreceiver Module

Analog up to 38 GHz bandwidth

DATASHEET

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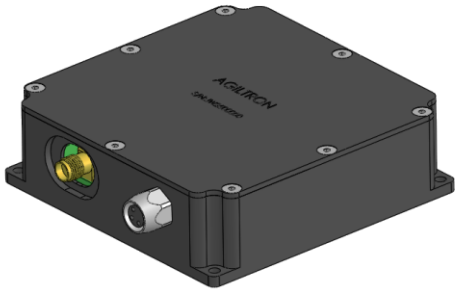

The BPRM is a turnkey High Speed Balanced Photoreceiver is designed for high-speed analog and digital light detection, offering exceptional performance with a differential gain of approximately 2800 V/W and a bandwidth of up to 40 GHz. It features two waveguide-integrated PIN photodiodes and a limiting delivers a differential output voltage swing of approximately 600 mV. The BPRM achieves excellent electrical and optical phase propagation with a total skew of less than 5 ps between balanced signal paths and 10 ps total skew for all fiber pairs. Each amplifier path includes a threshold control at the linear amplification stage to optimize the differential output signal. The BPRM includes a low-noise power supply for simple, plug-and-play operation. This photoreceiver is ideal for applications requiring high sensitivity and high-speed balanced detection.

Features

- 100kHz to 35 GHz Bandwidth
- Contains 2 Balanced PIN/LA
- Hermetically Sealed Package
- Very Low Skew
- Dual Optical Fiber Inputs with Length Matched
- AC-Coupled output with Threshold Control

Applications

- High Speed Sensing
- Transponder Linear Receiver up to 30 GHz
- 30 GHz Analog RFoF Link

Specifications

Parameter		Min	Typical	Max	Unit
Wavelength Range		1480		1620	nm
Optical Input Power for Each Input [1], [8], [9]				10	mW mean
Bandwidth (3 dB) [1], [11]		37	42		GHz
Pulse Width [1], [11]			11	12	ps
CMRR [1], [2]			15		dB
DC Responsivity (R) [1], [3]		0.5	0.6		A/W
Imbalance of Responsivity [4]			1.5	4.5	%
Polarization Dependent Loss [1], [5], [6]	Standard/Low Skew		0.4	0.8	dB
	Low PDL (&Low Skew)		0.2	0.3	dB
Dark Current [7]			5	200	nA
Optical Return Loss [1]		24	28		dB
Optical Path Length Difference [6]	Standard/Low PDL			1	mm
	Low Skew (&Low PDL)			0.5	
Skew [6]	Standard/Low PDL			5	ps
	Low Skew (&Low PDL)			2	
Optical input power				20	mW mean
Optical input power				50	mW peak
Output voltage PD1				+1.0	V peak
Output voltage PD2				-1.0	V peak
Operating Temperature [10]		0		+70	°C
Storage Temperature		-40		+85	°C

Notes:

[1]. λ = 1550 nm, V_{bias} = ± 2.8 V, T = 25°C

[2]. Imbalance set to zero; CMRR defined in the rf domain as note [4], but excluding influence of different delays between the two inputs

[3]. For each diode

[4]. Imbalance of responsivity = abs (R_{PD1} - R_{PD2}) / (R_{PD1} + R_{PD2}) x 100%

[5]. Low PDL (&Low Skew) available upon request

[6]. For further details please refer to the ordering information section

[7]. Vbias = ± 2.8 V, T = 25°C, BoL

[8]. Change in pulse width is less than 10 %

[9]. Measured using a pulse source (1ps pulse width, repetition rate 50 MHz) and a Tektronix CSA 8000s oscilloscope with a 80E01 sampling head

[10]. Target values, to be confirmed

[11]. Limited bandwidth of version with GPPO-connection

Rev 03/18/25

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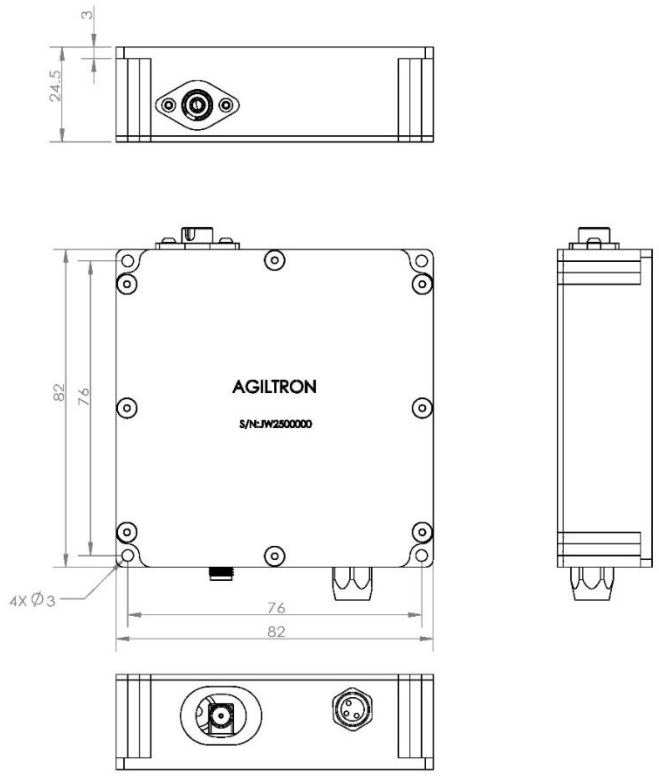
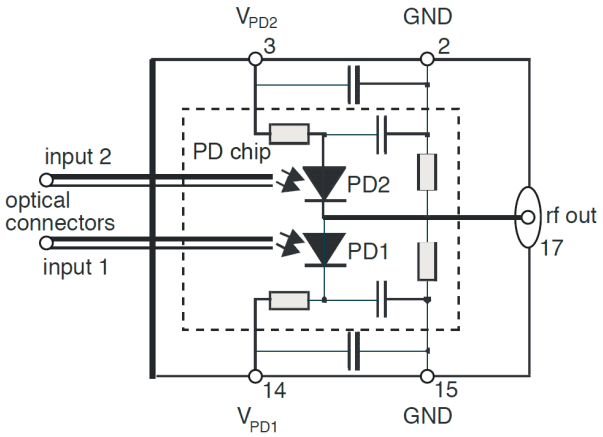
Mechanical Dimensions (mm)



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

Block Diagram



Pin	Description	Comment
3	V_{PD2}	PD2 Supply Input 2; typ. -2.8 V
2 / 15	GND	Ground = case ground
14	V_{PD1}	PD1 Supply Input 1; typ. +2.8 V
17	OUT	rf output V Connector® or GPPO™ Connector

Note: Other pins N/C

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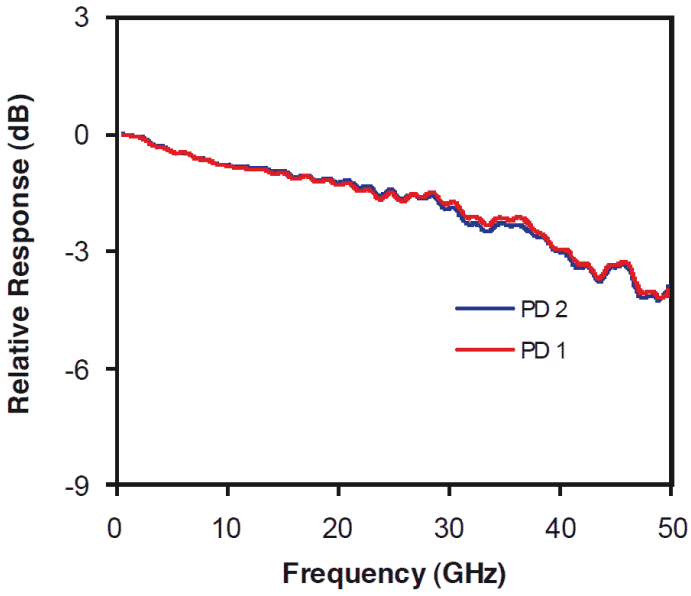
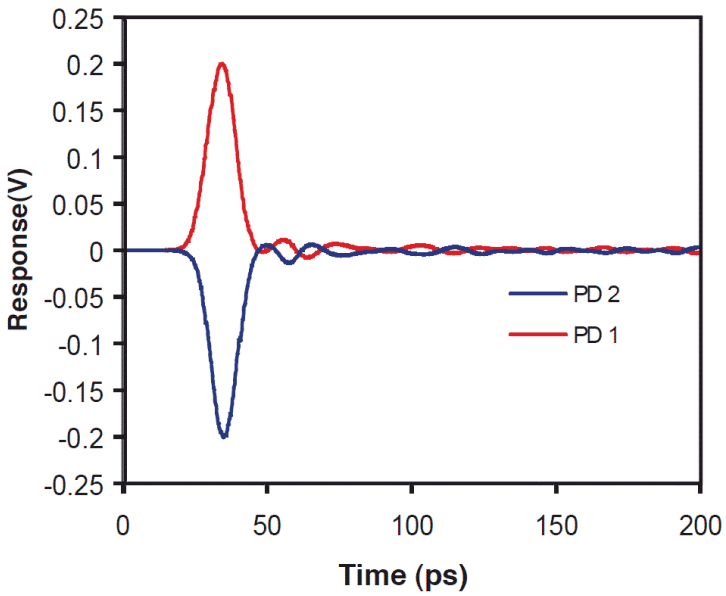
Typical Performance

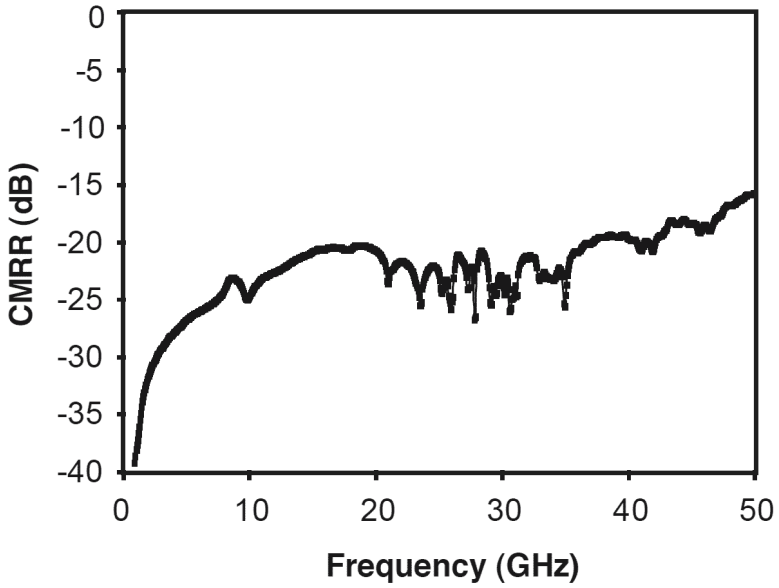
Frequency Response



Pulse Response



Common Mode Rejection Ratio



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Ordering Information

	1	1	38	1	2	22	3
Prefix	**Detector Type**	**Wavelength Range**	**Bandwidth**	**Coupling**	**Module ***	**Configuration**	**Connector**
BPRM-	PIN = 1 APD = 2	1200-1600nm = 1	38GH = 38	DC = 1 AC = 2	Non = 1 Yes = 2	Balance = 22	FC/APC = 3 Special = 0

* Module contains driver and power supply.

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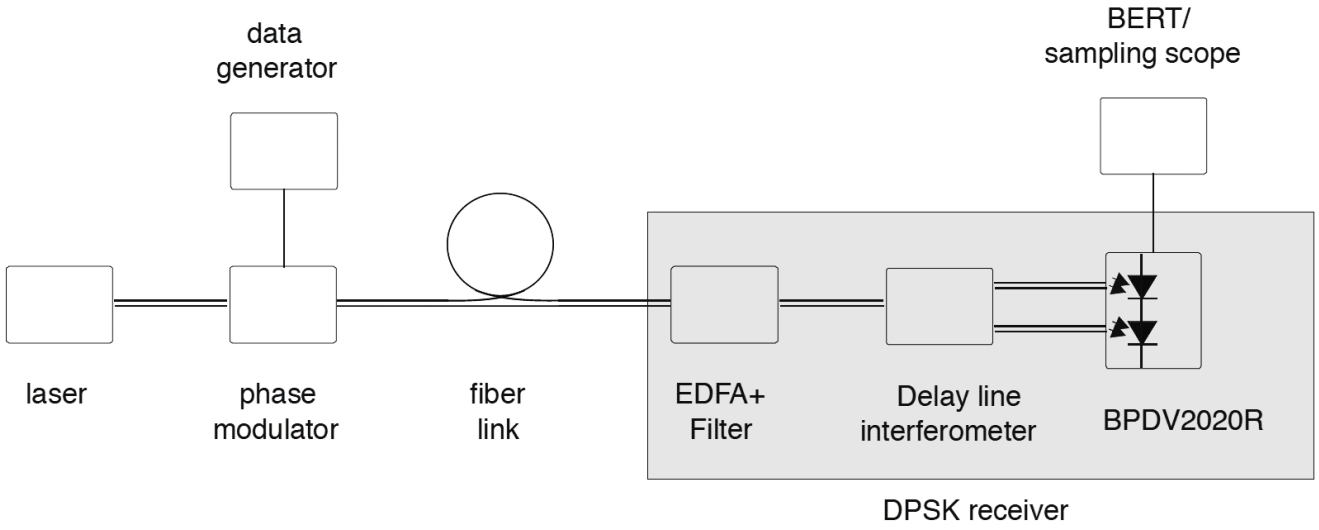
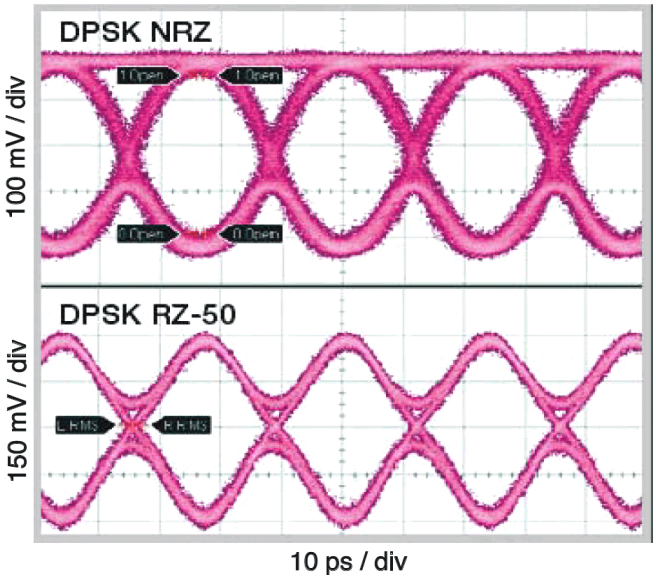
Applications

DPSK (Differential Phase Shift Keying) modulation has two advantages compared to conventional amplitude modulation: Higher sensitivity and better spectral efficiency.

Typical DPSK Set-up



43 Gbit/s DPSK Eye Diagram



by courtesy of W. Idler, Alcatel

Notes:
I_{PD} = 3 mA
22 dB OSNR
(0.1 nm, BER 10^{-9}, PRBS 2^{23}-1)

Notes:
I_{PD} = 3 mA
18 dB OSNR
(0.1 nm, BER 10^{-9}, PRBS 2^{23}-1)

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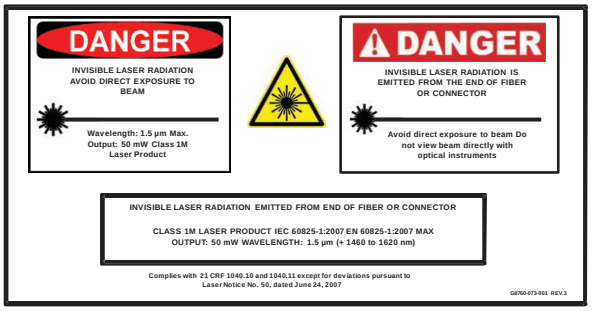
Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1M laser product. This device has been classified with the FDA/CDRH under accession number 0220191. All versions of this laser are Class 1M laser products, tested according to IEC 60825-1:2007 / EN 60825-1:2007. An additional warning for Class 1M laser products. For diverging beams, this warning shall state that viewing the laser output with certain optical instruments (for example eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. For collimated beams, this warning shall state that viewing the laser output with certain instruments designed for use at a distance (for example telescopes and binoculars) may pose an eye hazard.

Wavelength = 1.3/1.5 µm.

Maximum power = 30 mW.



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