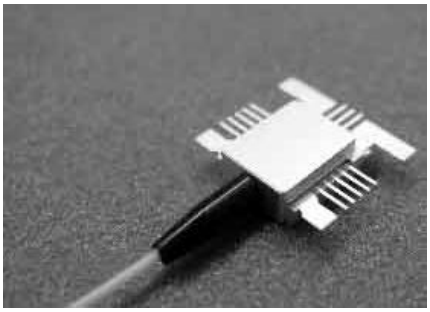
Preliminary

SUMITOMO ELECTRIC INDUSTRIES, LTD.



Features

- Bit rate: ~10Gb/s
- Power supply: +3.3V/-5.2V
- Packaging: small size and high performance butterfly package
- Light wavelength:1.31µm/1.55µm
- Optical pigtail: 9µm/125µm SM fiber
- Back-illuminated GaInAs/InP pin-photodiode with monolithic lens
- Low noise preamplifier IC
- High sensitivity: ~-19dBm
- Differential output

Applications

- High-speed optical transmission systems for OC-192/STM-64 (10Gb/s) and measurement instruments

Functional Description

This PIN-preamplifier module is a low-cost capable receiver module with a miniature size for use in the 10Gb/s SONET/SDH systems. A Back-illuminated pin-photodiode has a monolithic lens optimized for SM fiber at the InP substrate and achieves high responsivity, wide-tolerance and high-speed. The component of a high-speed and low-noise preamplifier and the photodiode obtains high sensitivity and a stable operation. The high performance butterfly package was developed for a high-speed operation, small dimension and low cost.

The module is applicable for 1.31µm/1.55µm optical fiber communication systems for OC-192/STM-64, typically showing a high sensitivity of -19dBm.

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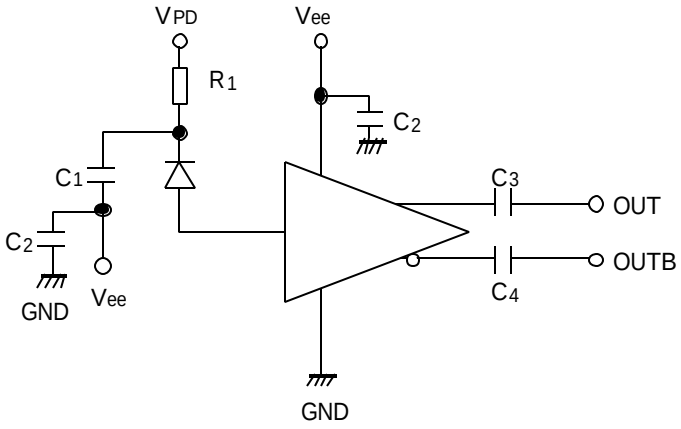
Block Diagram



PD diameter : 30μmϕ
R1=50Ω
C1=100pF
C2=400pF
C3=C4=0.1μF

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Power Supply	VPD	0	+10	V
Power Supply	Vee	-6	+0.5	V
Maximum Optical Input Power	Pin	-	+3	dBm
Operating Temperature	Ta	-40	+85	deg
Storage Temperature	Tstg	-40	+85	deg

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply	VPD	3.1	+3.3	+5.25	V
Power Supply	Vee	-5.5	-5.2	-4.9	V
Operating Temperature	Ta	-40	25	+85	deg

Electrical Characteristics

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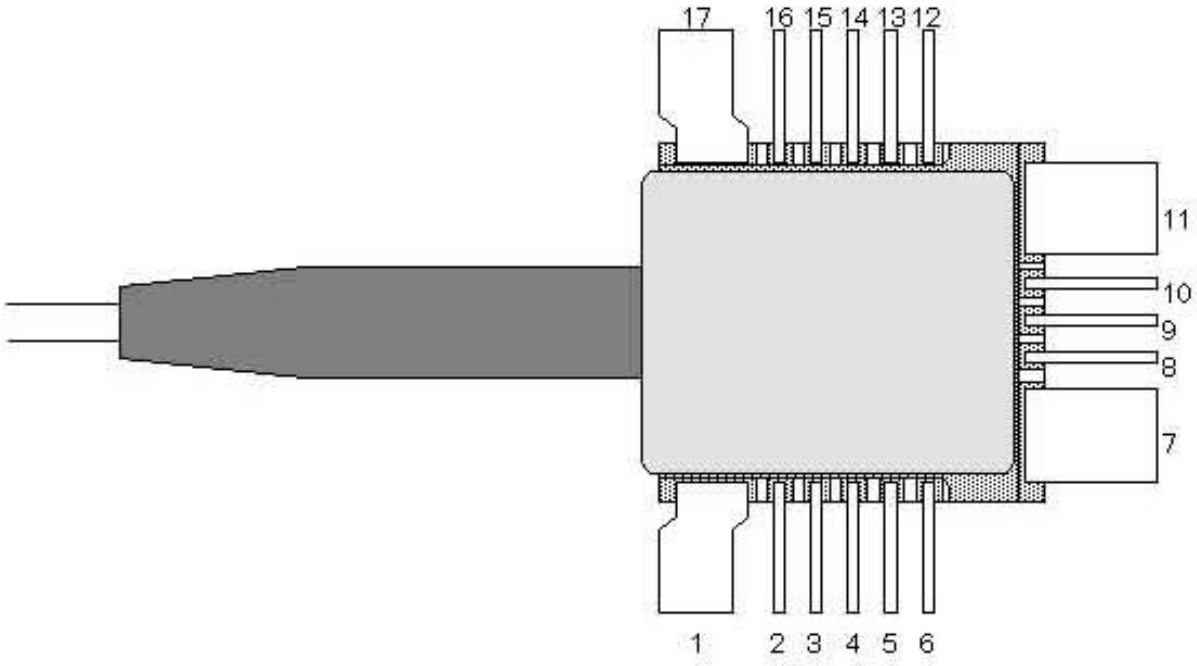
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Current	I_{SS}		-	70	90	mA
Optical Return Loss	ORL	λ=1.31/1.55μm	-	-35	-27	dB
Optical Wavelength	λ		1290	-	1565	nm
Responsivity	R_{1310}	λ=1.31μm, Vpd=3.3V	0.7	0.9	-	A/W
	R_{1550}	λ=1.55μm, Vpd=3.3V	0.8	1.0	-	A/W
Transimpedance	Zt	f=1GHz, single-ended	550	700	825	Ω
Bandwidth	BW-3dB	3dB down	7.5	10	-	GHz
Low frequency –3dB Cutoff	BW_{LF}	3dB down	-	25	40	kHz
Input Noise Current Density	I_{noise}		-	TBD	-	$pA/\sqrt{Hz}$
Sensitivity	$P_{in}min$	λ=1.55μm, Vpd=3.3V	-	-19	-14	dBm
Overload	$P_{in}max$	λ=1.55μm, Vpd=3.3V	0	1	-	dBm
Output Return Loss	S_{22}	f=100MHz-7GHz	-	-10	-6	dB

Pin Configuration



Connection Table

No.	Symbol	Parameter	No.	Symbol	Parameter
1	GND	Ground (0.0V)	10	OUT	Positive Output
2	VPD	Power Supply (+3.3V)	11	GND	Ground (0.0V)
3	NC	No Connection	12	GND	Ground (0.0V)
4	Vee	Power Supply (-5.2V)	13	NC	No Connection
5	NC	No Connection	14	NC	No Connection
6	GND	Ground (0.0V)	15	NC	No Connection
7	GND	Ground (0.0V)	16	NC	No Connection
8	OUTB	Negative Output	17	GND	Ground (0.0V)
9	GND	Ground (0.0V)			

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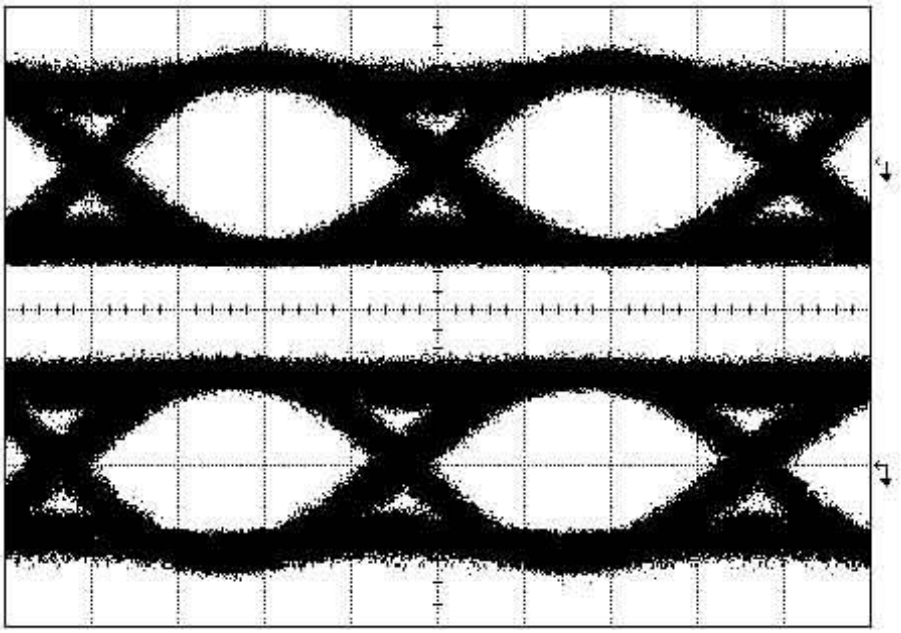
Typical AC Characteristics

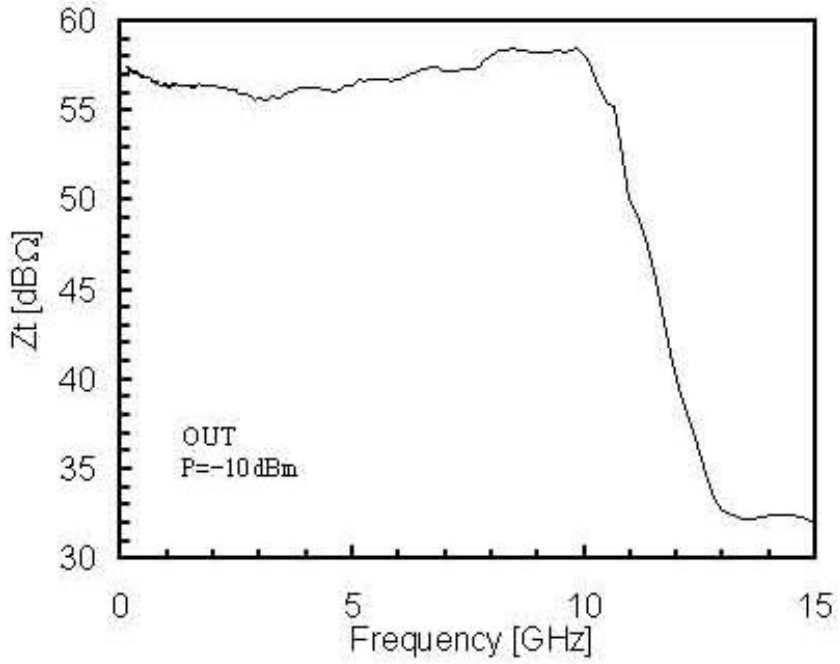
(1) Eye Diagrams (Ta=25deg, 50Ω load)

Average Optical Input Power: -14dBm(λ=1.55μm, 9.95328Gb/s, NRZ, PRBS2^{31}-1)



(2) Frequency Response (λ=1.31μm)

Average Optical Input Power: -10dBm



(3) Bit Error Rate Curve (λ=1.55μm, 9.95328Gb/s, NRZ, PRBS2^{31}-1)

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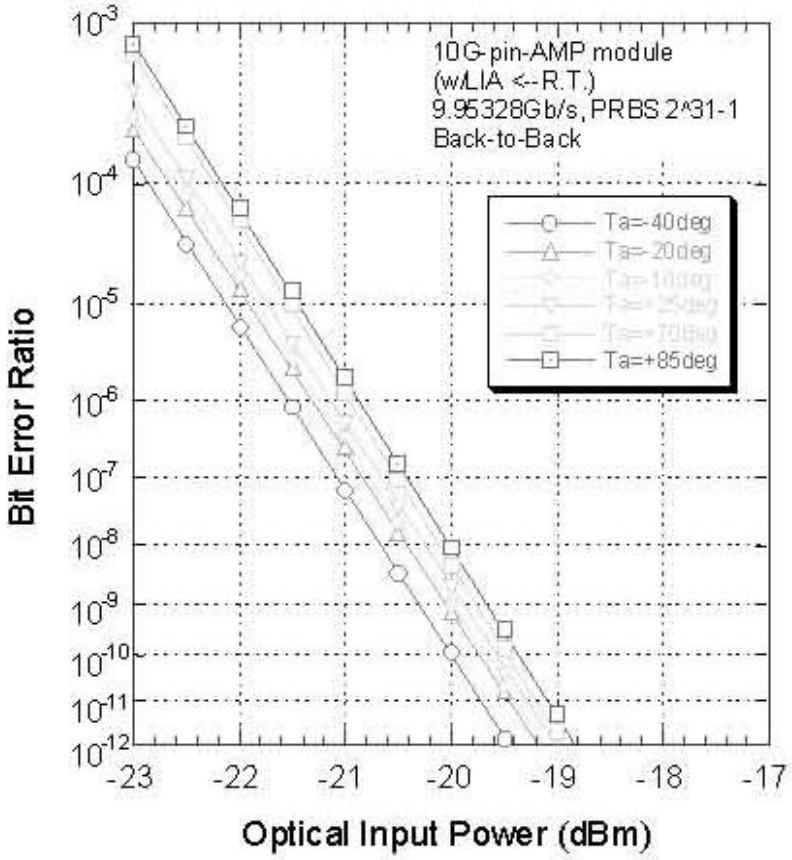

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Packaging