Product Specification

8 Gbps 850nm PIN + Preamp

MFD7180-001

PRODUCT FEATURES

- High performance GaAs PIN photodiode with separate transimpedance amplifier
- Low electrical parasitic TO46 package
- Data rates up to 8.5Gbps
- Separate detector bias pinpower monitoring
- Low power dissipation
- Can drive SERDES directly
- RoHS compliant (EU Directive on Restrictions of Hazardous Substances, 2002/95/EC)

The MFD7180-001 uses a high-performance GaAs PIN photo-detector packaged with a trans impedance amplifier designed to meet performance requirements for 8Gbps data communication over multi-mode optical fiber at 850nm. Applications include Ethernet, Fiber Channel and ATM protocols. The optical assembly is designed to interface either 50um or 62.5um multi-mode fiber.

PRODUCT SELECTION

Part Number	Description
MFD7180-001	LC, with separate PD bias

I. Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-40 to +95°C
Case Operating Temperature	-20 to +95°C
Lead Solder Temperature	260°C, 10 sec.
Power Supply Voltage	-0.3V to 3.6V
PIN Voltage	10V
Incident Optical Power	+3 dBm average,+6 dBm peak
ESD Exposure (Human Body Model)	225V

Notice

Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operations section for extended periods of time may affect reliability.

Notice

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product

II. Electro-Optical Characteristics (Vcc =3.3V, AC coupled to 50W (100W differential), -20oC < TA <95oC unless otherwise specified)

Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Data Rate		DR			8.5	uW	1
Input Optical Wavelength	0 ºC to 70 ºC	λ_P	830	850	870	nm	
Supply Voltage			2.79	3.3	3.63	V	
Supply Current	P_R =0uW, R_L=50W AC coupled	I_{CC}		35	50	mA	
PD Bias Voltage		VPD_Bias	3	3.3	3.6	V	
Photodiode Responsivity	P_R =-12dBm	Resp	0.45	0.5	0.6	A/W	
Active Area (diameter)				40		um	
Optical Return Loss	P_R =-12dBm	ORL	12			dB	
Differential Output Voltage Swing	$P_{R,OMA}$= -12Bm, AC Coupled to R_L=50W	$V_{o(pk-pk)}$	150	260	330	mV	2,3
Differential Responsivity	$P_{R,OMA}$ = -12dBm, AC Coupled to R_L=50W	T	2300	3000	5300	V/W	2,3
3dB Optical/Electrical Bandwidth	$P_{R,OMA}$ =-12dBm Temp = 25 ºC	BW	6	7.5	11	GHz	2,3
Low Frequency –3dB Cutoff	$P_{R,OMA}$ =-12dBm	BW_{LF}			90	KHz	2,3
Output Impedance		Z_{OUT}	40	50	60	W	
Sensitivity, OMA	DR = 2.125Gbps DR = 4.25Gbps DR = 8.5Gbps	S		-19 -18 -15	-16 -15 -13	dBm	4
Rise/Fall Time	$P_{R,OMA}$ =-12dBm, (20%-80%)	T_R/T_F		-0.2	50	ps	2,5
Group Delay	Measured from |S21| Phase	GVD	-50	30	50	ps	7
Power Supply Rejection Ratio	P_R =0uW (Dark), Freq = 1000MHz	PSRR	20			dB	1,6
Deterministic Jitter	$P_{R,OMA}$=-12dBm RL=50 W AC	DJTIA	100	20	40	ps	8
Random Jitter	$P_{R,OMA}$=-12dBm R_L=50 W AC	RJTIA		3	5	ps	9

Notes:

1. P_R is the average optical power at the fiber face.
2. $P_{R,OMA}$ is the peak to peak optical power at the fiber face (Optical Modulation Amplitude)

   $P_{R,OMA} = \frac{2P_R(ER-1)}{ER+1}$ where ER is the extinction ratio (linear) of the optical source.
3. Bandwidth and Low Frequency Cutoff are measured with a small signal sinusoidal light source with –10dBm average power

4. Sensitivity is measured with an optical source with an extinction ratio of 3dB. For sensitivity measurements at 2 and 4Gbps, bandwidth limiting of the TIA is assumed to be implemented at the front end of the post amplifier.
5. Rise/Fall times are corrected for optical source Rise/Fall times. $T^2_{TIA} = T^2_{MEASURED} - T^2_{OPTICAL}$
6. Value shown is with no external power supply filtering.
7. Group delay is a sensitive measurement to package interface, and includes the effects of PD, TIA and package. Measurement is made with TO leads as short as possible.
8. DJTIA is specified as contributed DJ by the TIA, obtained from $DJ^2_{tia} = DJ^2_{total} - DJ^2_{optical}$
9. RJTIA is specified as contributed DJ by the TIA, obtained from $RJ^2_{tia} = RJ^2_{total} - RJ^2_{optical}$
10. The electrical performance of the ROSA is dependent upon the quality of the electrical connection between the TO can and the circuit board. AOC cannot guarantee all performance specifications for parts without the flex circuit attached.

III. Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Case Operating Temperature	T_{op}	-20		95	°C	
Storage Temperature	T_{sto}	-40		95	°C	

IV. Mechanical Specifications

(Dimensions are in mm)

PIN	Description
1	Case
2	OUTN
3	Vcc
4	V_{PD}
5	OUTP