

Product Specification

10 Gbps 850nm PIN + Preamp

MFD6180-421

PRODUCT FEATURES

- High gain, non-inverting
- High performance GaAs PIN photodiode with separate trans-impedance amplifier
- Low electrical parasitic TO46 package
- Data rates up to 10.7Gbps
- Separate detector bias pin can be used for receive power monitoring
- Low power dissipation
- Can drive SERDES directly
- Flex circuit interface fits all 10GB MSAs
- RoHS compliant (EU Directive on Restrictions of Hazardous Substances, 2002/95/EC)



The MFD6180-421 uses a high-performance GaAs PIN photo-detector packaged with a trans-impedance amplifier designed to meet performance requirements for 10Gbps 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
MFD6180-421	LC, with flex. High gain, non-inverting.

I. Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	-40 to +85°C
Case Operating Temperature	-40 to +85°C
Lead Solder Temperature	260°C, 10 sec.
Power Supply Voltage	-0.5V to 4V
PIN Voltage	10V
Incident Optical Power	0 dBm average, +4 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 (V_{cc} = 3.3V, AC coupled to 50W (100W differential), -20°C < TA < 95°C unless otherwise specified)

Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Data Rate		DR			10.7	GBd	1
Input Optical Wavelength	0°C to 70°C	λ_p	830	850	870	nm	
Supply Voltage			2.97	3.3	3.63	V	
Supply Current	P _R = 0μW, R _L = 50Ω AC coupled	I _{CC}		35	50	mA	
PD Bias Voltage		VPD_Bias	3	3.3	3.6	V	10
Photodiode Responsivity	P _R = -12dBm	Resp	0.45	0.5	0.6	A/W	10
Active Area (diameter)				40		μm	
Optical Return Loss	P _R = -12dBm	ORL	12			dB	
Differential Output Voltage Swing	P _{R,OMA} = -12dBm, AC Coupled to R _L = 50Ω	V _{o(pk-pk)}	60	125	200	mV	2,3
Differential Responsivity	P _{R,OMA} = -12dBm, AC Coupled to R _L = 50Ω	T	1000	2000	3000	V/W	2,3
-3dB Optical/Electrical Bandwidth	P _{R,OMA} = -12dBm Temp = 25°C	BW	7.5	9	12.3	GHz	3,4
Low Frequency -3dB Cutoff	P _{R,OMA} = -12dBm	BW _{LF}			90	KHz	2,3
Output Impedance		Z _{OUT}	40	50	60	Ω	
Sensitivity, OMA		S		-13.5	-12	dBm	5,9
Stressed Sensitivity	Per IEEE802.3ae	S _{Stressed}		-11.5	-9	dBm	6
Rise/Fall Time	P _{R,OMA} = -12dBm, (20%-80%)	T _R /T _F		30	50	ps	3,7
Group Delay	Measured from IS211 Phase	GVD	-50		50	ps	
Overload Power		POVLD AVE	0			dBm	
		POVLD OMA	2				
Power Supply Rejection Ratio	P _R = 0μW (Dark), Freq = 1000MHz	PSRR		30		dB	2,8

Notes:

- The data rate can be increased to 12.5Gbps, but the sensitivity will be decreased by approximately 3dB
- P_R is the average optical power at the fiber face.
- P_{R,OMA} is the peak to peak optical power at the fiber face (Optical Modulation Amplitude)

$$P_{R,OMA} = \frac{2P_E(ER-1)}{ER+1}$$
 where ER is the extinction ratio (linear) of the optical source.
- Bandwidth and Low Frequency Cutoff are measured with a small signal sinusoidal light source with 10dBm average power
- Sensitivity is measured with an optical source with an extinction ratio of 3dB.
- Stressed receiver sensitivity is measured with 3.5dB vertical eye closure (inter-symbol interference) and with 0.3UI of jitter added. The measurement technique is defined in IEEE 802.3ae.
- Rise/Fall times are corrected for optical source Rise/Fall times. The corrected value is calculated as the square root of the difference of the squares of the measured differential detector output and the source.
- Value shown is with external power supply filtering.
- For best sensitivity, a limiting amplifier may be required for operation.
- The PD voltage must be connected to a positive 3.3V power supply (nominal). Maximum

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	V _{CC}
2	Case
3	OUTP
4	OUTN
5	Case
6	V _{PD}

