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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



## Product Specification

### 10 Gbps 850nm PIN + Preamp LC ROSA Package

#### HFD6180-421

#### PRODUCT FEATURES

- High gain, non-inverting
- LC ROSA package
- High performance GaAs PIN photodiode with separate transimpedance 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 HFD6180-421 uses a high-performance GaAs PIN photo-detector packaged with a transimpedance 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 50mm or 62.5mm multi-mode fiber.

The HFD6180-421 is designed to be paired with Advanced Optical Components HFE6192 VCSEL 10Gbps TOSA products (see data sheets for HFE6192 products at [www.finisar.com/](http://www.finisar.com/)).

#### PRODUCT SELECTION

Part Number	Description
HFD6180-421	LC ROSA, with flex. High gain, non-inverting.

## 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	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 (Vcc =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	$\lambda_p$	830	850	870	nm	
Supply Voltage			2.97	3.3	3.63	V	
Supply Current	$P_R=0\mu W$ , $R_L=50\Omega$ AC coupled	$I_{CC}$		35	50	mA	
PD Bias Voltage		VPD_Bias	3	3.3	3.6	V	10
Photodiode Responsivity	$P_R = -12\text{dBm}$	Resp	0.45	0.5	0.6	A/W	10
Active Area (diameter)				40		$\mu\text{m}$	
Optical Return Loss	$P_R = -12\text{dBm}$	ORL	12			dB	
Differential Output Voltage Swing	$P_{R,OMA} = -12\text{Bm}$ , AC Coupled to $R_L=50\Omega$	$V_{o(pk-pk)}$	60	125	200	mV	2,3
Differential Responsivity	$P_{R,OMA} = -12\text{dBm}$ , AC Coupled to $R_L=50\Omega$	T	1000	2000	3000	V/W	2,3
-3dB Optical/Electrical Bandwidth	$P_{R,OMA} = -12\text{dBm}$ Temp = 25°C	BW	7.5	9	12.3	GHz	3,4
Low Frequency -3dB Cutoff	$P_{R,OMA} = -12\text{dBm}$	$BW_{LF}$			90	KHz	2,3
Output Impedance		$Z_{OUT}$	40	50	60	$\Omega$	
Sensitivity, OMA		S		-13.5	-12	dBm	5,9
Stressed Sensitivity	Per IEEE802.3ae	$S_{Stressed}$		-11.5	-9	dBm	6
Rise/Fall Time	$P_{R,OMA} = -12\text{dBm}$ , (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	$P_R = 0\mu W$ (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) where ER is the extinction ratio (linear) of the optical source.

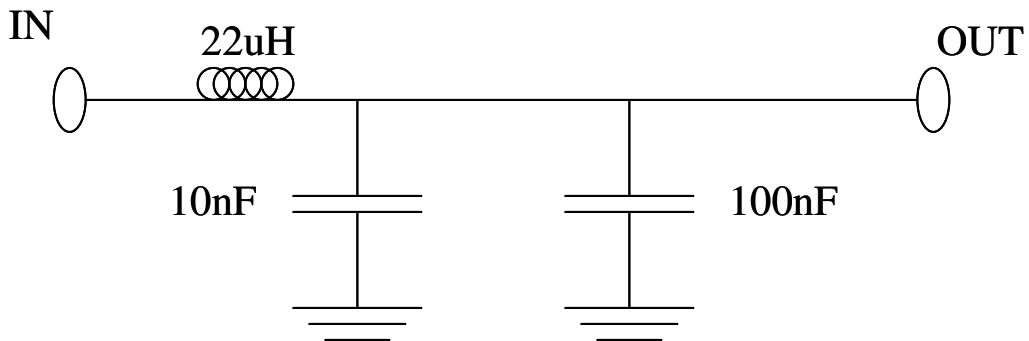
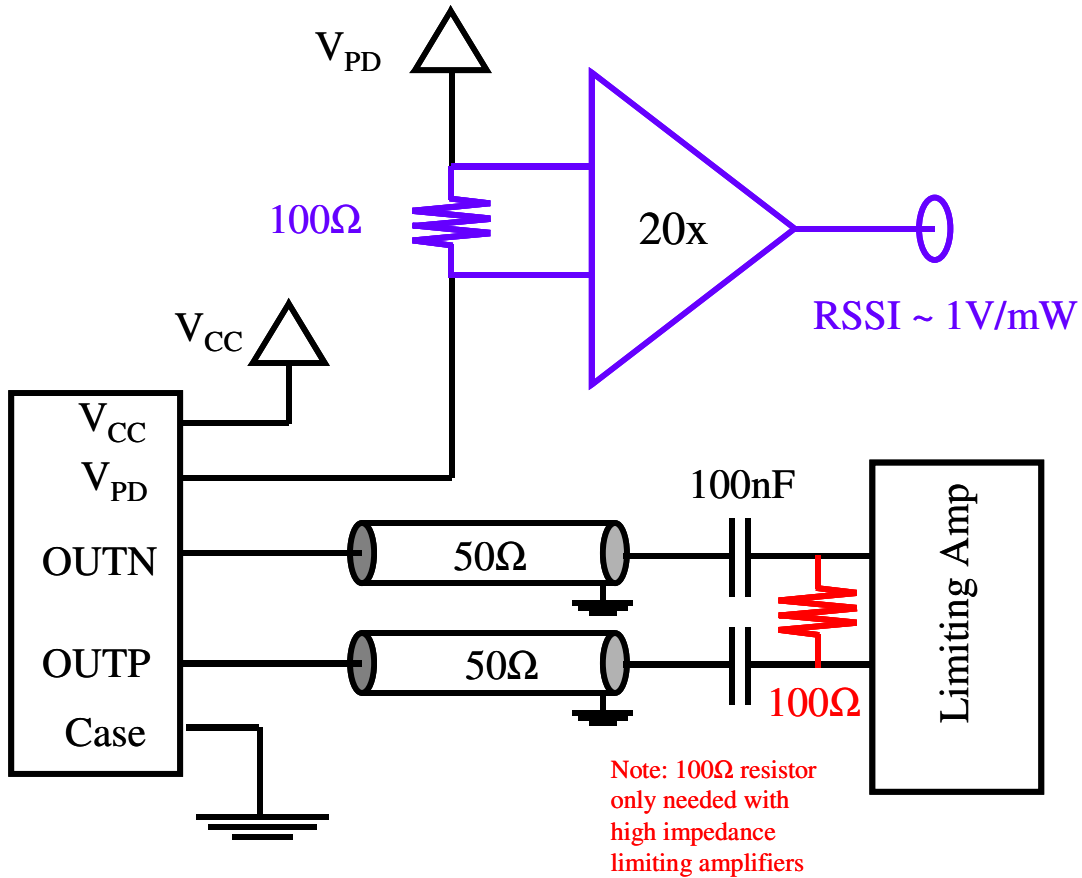
$$P_{R,OMA} = \frac{2P_R ER - 1}{ER + 1}$$

- 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 (intersymbol 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. Recommended interface circuit for the HFD6180-421**

Optional RSSI implementation is shown in blue.

Optional 100Ω differential termination for high impedance limiting amplifiers is shown in red.



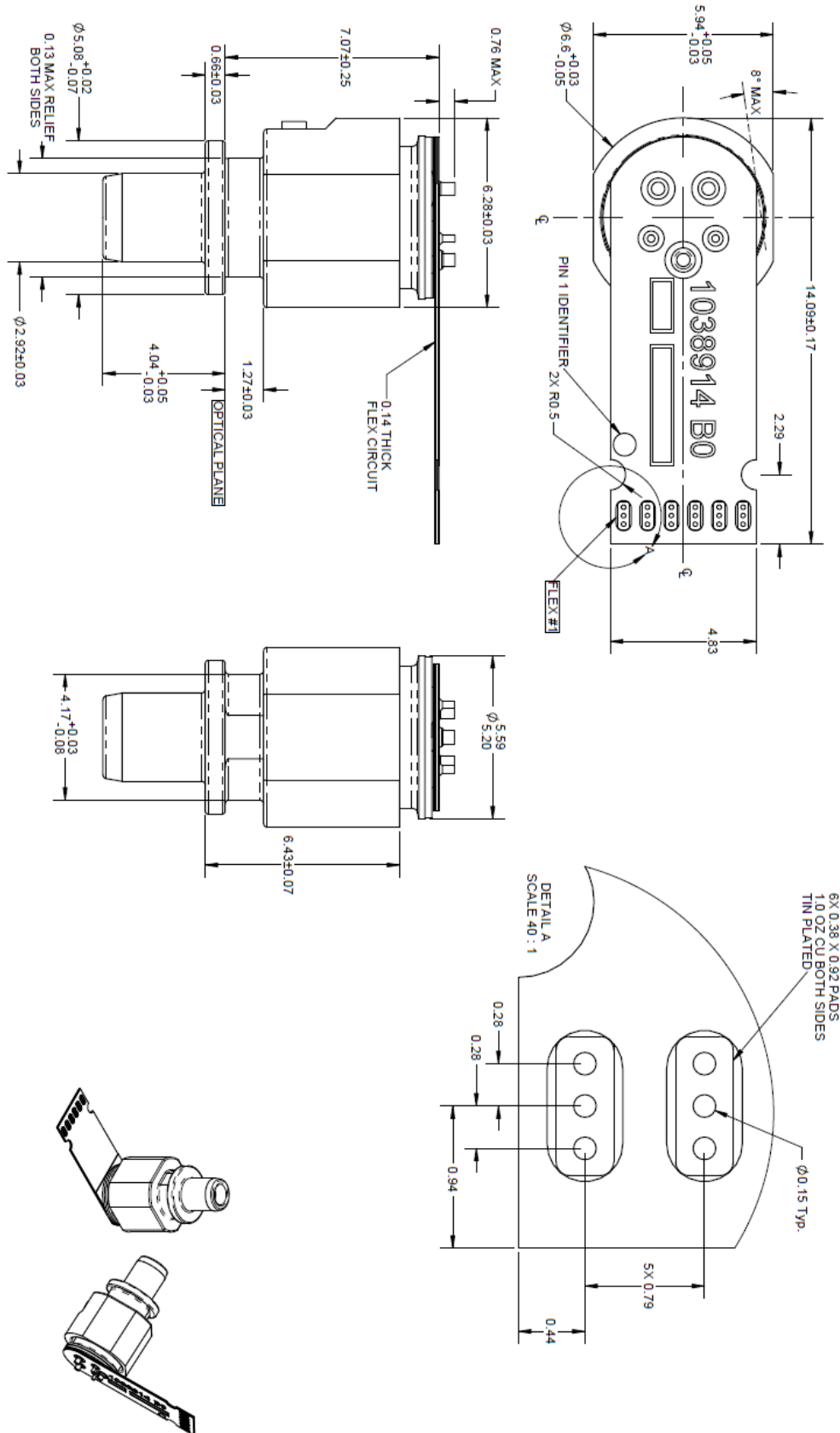
**IV. Environmental Specifications**

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Case Operating Temperature	T <sub>op</sub>	-20		95	°C	
Storage Temperature	T <sub>sto</sub>	-40		95	°C	

**V. Mechanical Specifications**

PIN	Description
1	V <sub>cc</sub>
2	CASE
3	OUTP
4	OUTN
5	CASE
6	V <sub>PD</sub>

Mounting Dimensions - LC ROSA with flex



**VI. Revision History**

<b>Revision</b>	<b>Date</b>	<b>Description</b>
B00	10/6/2014	• Changed to Standard Finisar Format.

**VII. For More Information**

Finisar Corporation  
1389 Moffett Park Drive  
Sunnyvale, CA 94089-1133  
Tel. 1-408-548-1000  
Fax 1-408-541-6138  
[sales@finisar.com](mailto:sales@finisar.com)  
[www.finisar.com](http://www.finisar.com)