

PRODUCT SPECIFICATION



GLXP-Dxx96-AOD(I)

10Gb/s Duplex LC, SMF,100GHz, C Band DWDM EML, APD, ZR 100km SFP+ Transceiver

FEATURES:

- ★ Support multi-protocol from 8.5Gb/s to 11.3Gb/s
- ★ Hot-Pluggable SFP+ footprint
- ★ 100GHz ITU Grid, C Band DWDM EML laser transmitter
- ★ ADP Receiver
- ★ Duplex LC connector
- ★ Up to 100 km on 9/125μm SMF
- ★ Single +3.3V Power Supply
- ★ Compliant with SFF-8431 SFF-8432 and IEE802.3ae
- ★ Low power dissipation <1.8W typically
- ★ Commercial operating temperature range: 0°C to 70°C
- ★ RoHS compliant



APPLICATIONS:

- ★ 10GBASE-ZR/ZW Ethernet
- ★ 100km 10G Fiber channel
- ★ SONET OC-192/SDH STM-64
- ★ DWDM Networks

DESCRIPTION:

GLight GLXP-Dxx96-AOD(I) transceivers are Enhanced Small Form Factor Pluggable SFP+ transceivers designed for use in 10-Gigabit multi-rate links up to 100km of G.652 single mode fiber. They are compliant with SFF-8431, SFF-8432 and 10GBASE ZR/ZW; support 4x, 8x and 10x Fibre Channel. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472. GLight GLXP-Dxx96-AOD(I) transceivers are RoHS compliant per Directive 2011/65/EU. The high performance cooled C band DWDM EML transmitter and high sensitivity APD receiver provide superior performance for Ethernet applications at up to 100km links.

■ Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T_s	-40		+85	°C
Supply Voltage	V_{CC}	-0.5		4	V
Relative Humidity	RH	0		85	%
Industrial	TC	-40		85	°C
Commercial	TC	0		70	°C

■ Electrical Characteristics ($T_{OP} = T_c$, $V_{CC} = 3.135$ to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	V_{CC}	3.14	3.30	3.47	V	
Supply Current	I_{CC}			450	mA	
Inrush Current	I_{surge}			$I_{CC}+30$	mA	
Maximum Power	P_{max}			1.8	W	
Transmitter Section:						
Input differential impedance	R_{in}		100		Ω	1
Tx Input Single Ended DC Voltage Tolerance (Ref VeeT)	V	-0.3		4	V	
Single ended data input swing	$V_{in PP}$	180		700	mVp-p	2
Transmit Disable Voltage	V_D	2		V_{CC}	V	3
Transmit Enable Voltage	V_{EN}	Vee		$V_{ee}+0.8$	V	
Transmit Disable Assert Time	$T_{dessert}$			10	us	
Receiver Section:						
Rx Output Diff Voltage	V_O	300		850	mV	3
Data output rise time	t_r	30			ps	4
Data output fall time	t_f	30			ps	4
LOS Fault	$V_{losfault}$	2		V_{CC_host}	V	5
LOS Normal	$V_{los norm}$	V_{ee}		$V_{ee}+0.8$	V	5

Note:

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Per SFF-8431 Rev 3.0
3. Into 100 ohms differential termination.
4. 20%~80%
5. LOS is an open collector output. It should be pulled up with 4.7k – 10k Ω on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V.

■ Optical Parameters($T_{OP} = T_c$, $VCC = 3.135$ to 3.465 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section:						
Optical Wavelength-End Of Life	λ_c	X-100	X	X+100	pm	
Optical Wavelength-Beginning Of Life	λ_c	X-25	X	X+25	pm	
Spectral Width	$\Delta \lambda$				nm	
Side Mode Suppression Ratio	SMSR				dB	
Optical Output Power	P_{out}	0		5	dBm	
Optical Power OMA	P_{OMA}				dBm	
Optical Rise/Fall Time	t_r / t_f			260	ps	
Laser Off Power	P_{off}			-30	dBm	
Extinction Ratio	ER	6			dB	
Transmitter Dispersion Penalty	TDP			3.0	dB	2
Relative Intensity Noise	RIN			-128	dB/Hz	3
Optical Return Loss Tolerance		20			dB	
Eye Mask for Optical Output	Compliant with IEEE802.3 z (class 1 laser safety)					
Receiver Section:						
Optical Input Wavelength		1480		1580	nm	
Receiver Overload	P_{ol}	-7			dBm	5
RX Sensitivity (OMA)	S_{en}			-25	dBm	4
Stressed Sensitivity (OMA)	S_{enST}			-21	dBm	4
RX_LOS Assert	LOS_A	-40			dBm	
RX_LOS Deassert	LOS_D			-24	dBm	
RX_LOS Hysteresis	LOS_H	0.5			dB	
Receiver Reflectance	R_{rx}			-12	dB	

Note:

1. Average power figures are informative only, per IEEE802.3ae.
2. TWDP figure requires the host board to be SFF-8431 compliant. TWDP is calculated using the Matlab code provided in clause 68.6.6.2 of IEEE802.3ae.
3. 12dB reflection.
4. Conditions of stressed receiver tests per IEEE802.3ae. CSRS testing requires the host board to be SFF-8431 compliant.
5. Receiver overload specified in OMA and under the worst comprehensive stressed condition.

Pin Assignment

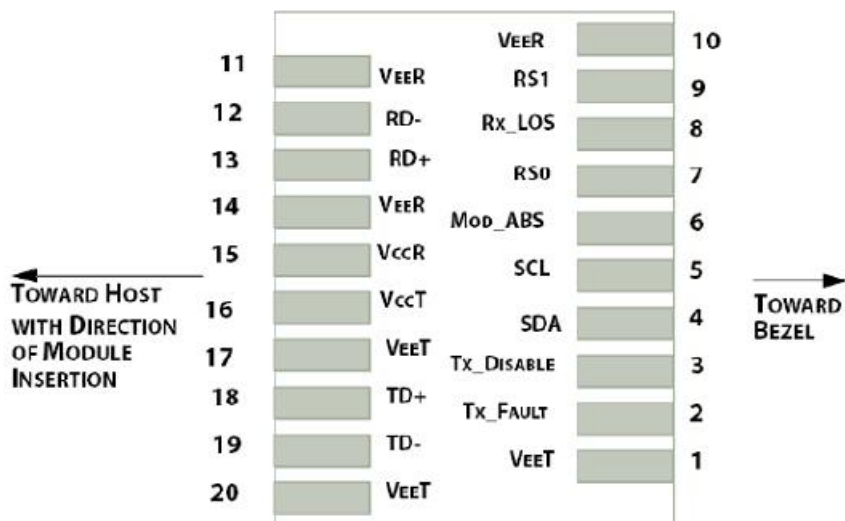


Figure2:Diagram of Host Board Connector Block Pin Numbers and Names

Pin Description

Pin No	Name	Function	Notes
1	VeeT	Transmitter Ground	1
2	TX Fault	Transmitter Fault Indication	2
3	TX Disable	Transmitter Disable	3
4	SDL	2 wire serial interface data input/output (SDA)	
5	SCL	2 wire serial interface clock input (SCL)	
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate select0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/ s; when low, input data rate <=4.5Gb/s	
8	LOS	Loss of Signal	4
9	RS1	Rate select0, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inv. Received Data Out	
13	RD+	Received Data Out	

14	VeeR	Receiver Ground	1
15	VccR	Receiver Power	
16	VccT	Transmitter Power	
17	VeeT	Transmitter Ground	1
18	TD+	Transmit Data In	
19	TD-	Inv. Transmit In	
20	VeeT	Transmitter Ground	1

Notes:

1. The module ground pins shall be isolated from the module case.
2. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.
3. This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.
4. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.

■ SFP Module EEPROM Information and Management

The SFP modules implement the 2-wire serial communication protocol as defined in the SFP-8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I²C interface at address A0h and A2h.

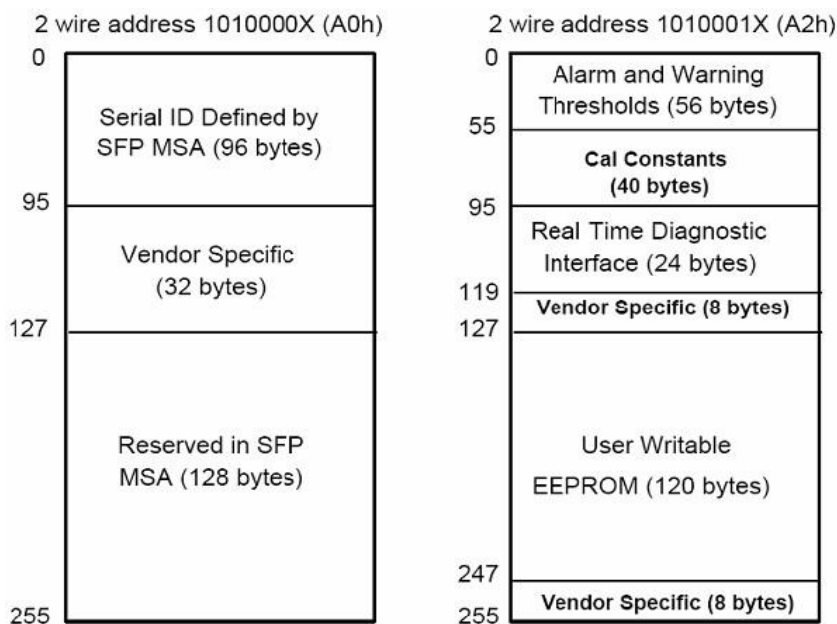
The memory is mapped in Table 1.

Detailed ID information (A0h) is listed in Table 2.

And the DDM specification at address A2h.

For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)



■ EEPROM Serial ID Memory Contents (A0h)

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	10G Base-ZR
11	1	Encoding	64B/66B
12	1	BR,Nominal	Nominal baud rate, unit of 100Mbps
13	1	Reserved	(0000h)
14	1	Length(9um,km)	Link length supported for 9/125um fiber, units of km
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name:
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: "xxxxxxx" (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-61	2	Wavelength	Laser wavelength

62	1	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented(001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	Manufacturing date code
92	1	Diagnostic Type	Diagnostics
93	1	Enhanced Options	Diagnostics
94	1	SFF-8472	Diagnostics
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	Vendor specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

■ Digital Diagnostic Monitor Characteristics

Data Address	Parameter	Accuracy	Unit	Calibraton
96-97	Transceiver Internal Temperature	±3.0	°C	internal
98-99	VCC3 Internal Supply Voltage	±5.0	%	internal
100-101	Laser Bias Current	±10	%	internal
102-103	Tx Output Power	±3.0	dBm	internal
104-105	Rx Input Power	±3.0	dBm	internal

■ Regulatory Compliance

The transceiver complies with international Electromagnetic Compatibility (EMC) and international safety requirements and standards (see details in Table following).

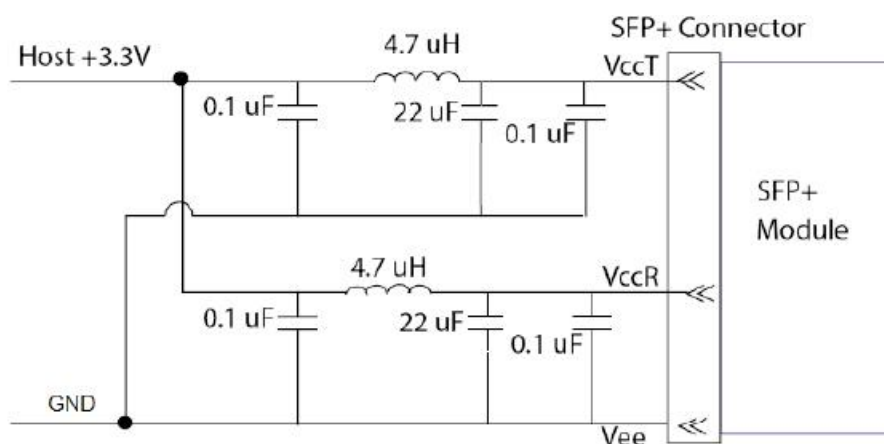
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards

Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product.
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■ References

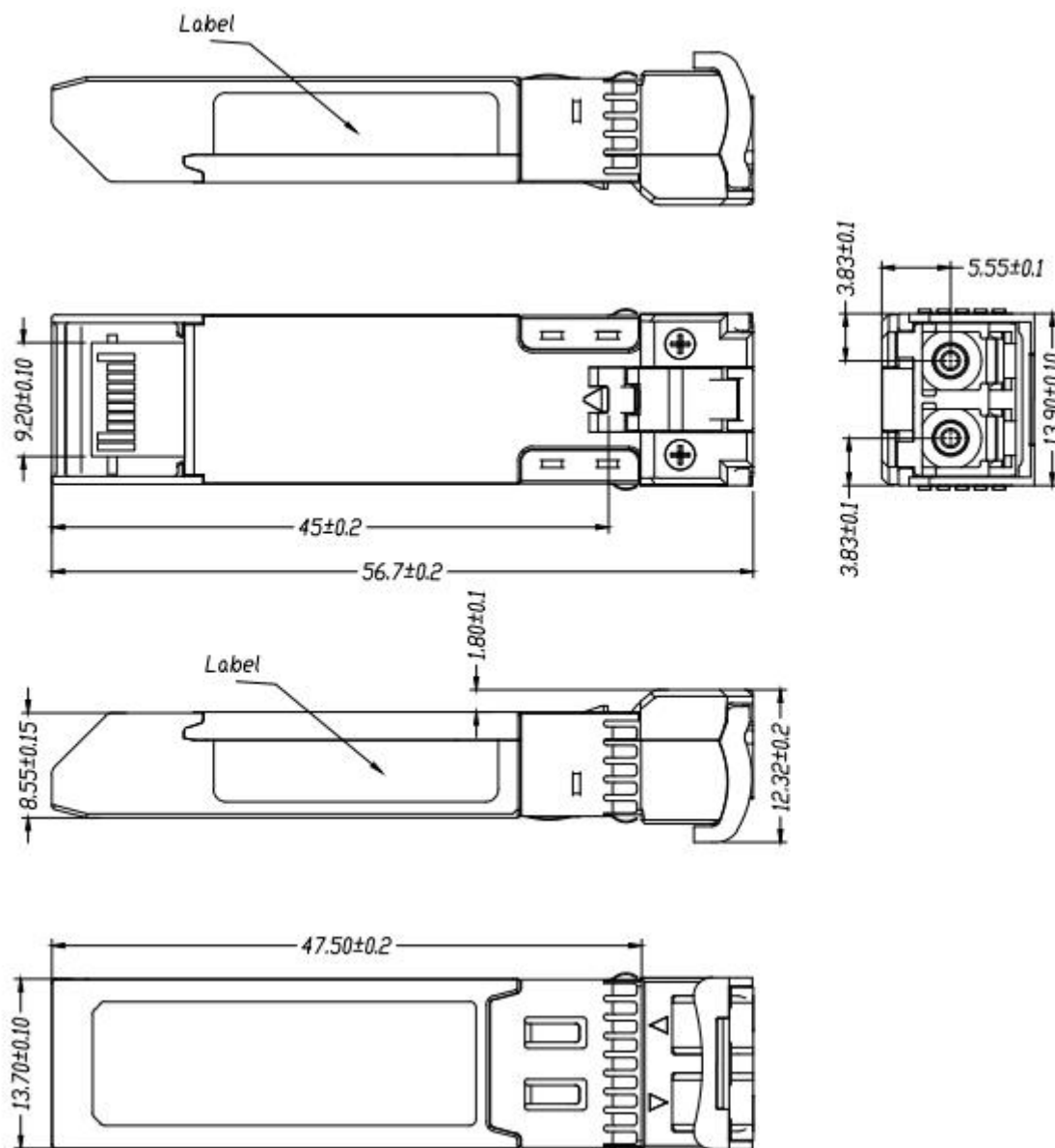
1. IEEE Std 802.3, 2002 Edition, Clause 38, PMD Type 1000BASE-LX. IEEE Standards Department, 2002.
2. “Fibre Channel Physical and Signaling Interface (FC-PH, FC-PH2, FC-PH3)”. American National Standard for Information Systems.
3. “Fibre Channel Draft Physical Interface Specification (FC-PI 13.0)”. American National Standard for Information Systems.
4. Small Form-factor Pluggable (SFP) Transceiver Multi-source Agreement (MSA) September 14, 2000.

■ Recommended Circuit:



Recommended Host Board Power Supply Circuit

■ Mechanical Dimensions



Mechanical Drawing

Order Information

XX of Part Number GLXP-Dxx96-AOD(I)	Central Wavelength(nm) C band	Frequency (THZ)
61	1528.77	196.1
60	1529.55	196
59	1530.33	195.9
58	1531.12	195.8
57	1531.90	195.7
56	1532.68	195.6
55	1533.47	195.5

54	1534.25	195.4
53	1535.04	195.3
52	1535.82	195.2
51	1536.61	195.1
50	1537.40	195
49	1538.19	194.9
48	1538.98	194.8
47	1539.77	194.7
46	1540.56	194.6
45	1541.35	194.5
44	1542.14	194.4
43	1542.94	194.3
42	1543.73	194.2
41	1544.53	194.1
40	1545.32	194
39	1546.12	193.9
38	1546.92	193.8
37	1547.72	193.7
36	1548.51	193.6
35	1549.32	193.5
34	1550.12	193.4
33	1550.92	193.3
32	1551.72	193.2
31	1552.52	193.1
30	1553.33	193
29	1554.13	192.9
28	1554.94	192.8
27	1555.75	192.7
26	1556.55	192.6
25	1557.36	192.5
24	1558.17	192.4
23	1558.98	192.3
22	1559.79	192.2
21	1560.61	192.1
20	1561.42	192
19	1562.23	191.9
18	1563.05	191.8
17	1563.86	191.7

Shenzhen GLight Communication Technology Co., Ltd.

5F, Building 3, Chao Hui Lou Industrial Park, No.119 Da Lang Hua Ting Road
Longhua district, Shenzhen, Guangdong, China 518000

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