



PICadvanced

10G/s 80km XFP DWDM Optical Transceiver

PA-XFP-Dxx10BZZC

Revision 2

Revision History

Revision nr.	Description	Date
2	Revision on the product	January 2019
1	Initial release	January 2016

Features

- Hot-pluggable
- Support 9.95Gb/s to 11.1Gb/s bit rates
- Below <1.6W power dissipation
- XFP MSA package with duplex LC connector
- Operating temperature range: 0°C to 70°C
- Very low EMI and excellent ESD protection
- Cooled DWDM EML laser and APD Receiver
- Up to 80km for single mode fiber
- DDMI function available
- No reference clock requirement

Applications

- 10G BASE-ZR/ZW Ethernet
- SONET OC-192/SDH STM-64 Other optical links

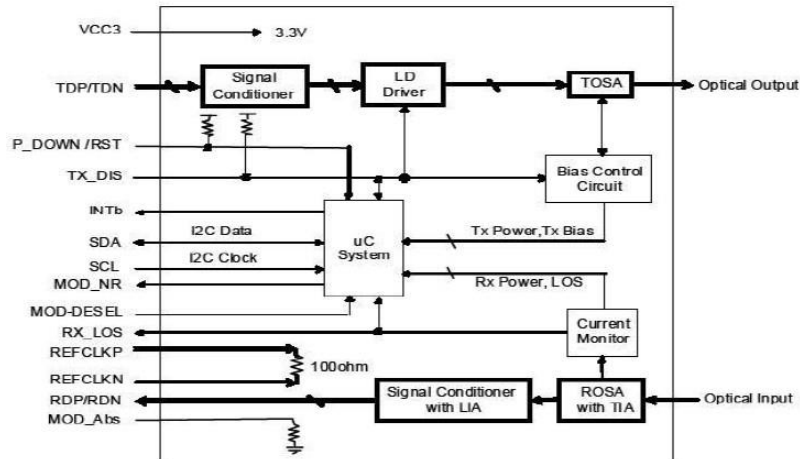
Standard

- XFP MSA Compliant
- SFF-8472 reversion 9.5 compliant
- IEEE802.3-2005 compliant
- Telcordia GR-468-CORE compliant
- FCC 47 CFR Part 15, Class B compliant
- FDA 21 CFR 1040.10 and 1040.11, Class1 compliant
- RoHS compliant

General

PA-XFP-Dxx10BZZC transceivers are designed for 10G Ethernet 10G BASE-ZR/ZW per 802.3ae and 10G SOI OC-192/SDH STM-64, and it can support data-rate from 9.953Gb/s to 11.1Gb/s. Digital diagnostics are available via I2C interface as specified in the XFP MSA. The transceiver designs are optimized for high performance and cost effective to supply customers the best solutions for datacom and telecom applications.

Functional Diagram



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	Vcc	-0.5	4	V
Storage Temperature	Tst	-40	+85	°C
Relative Humidity	RH		80	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Case Temperature	TC	0	-	70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Data Rate	Ethernet	-	10.3125	-	Gbps
	SDH/Sonet	-	9.953	-	
Supply Current	Icc	-	-	460	mA

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter differential input voltage		120	-	820	mVpp	1
Receiver differential output voltage		340	650	800	mVpp	3
Tx Disable input	VIH	2.0	-	Vcc+0.3	V	
	VIL	0	-	0.8	V	
Tx Fault output	VOH	2.0	-	Vcc+0.3	V	
	VOL	0	-	0.8	V	2
Rx Loss of Signal (LOS)	VOH	2.0	-	Vcc+0.3	V	2
	VOL	0	-	0.8	V	
Input Diff. Impedance	Zin		100		Ω	

1. TD+/- are internally AC coupled with 100Ω differential termination inside the module.
2. Tx Fault and Rx LOS are open collector outputs, which should be pulled up with 4.7k to 10kΩ resistors on the host board. Pull up voltage between 2.0V and Vcc+0.3V.
3. RD+/- outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

Optical Transmitter Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Optical Power	Pout	0		+5	dBm	1
Operating Wavelength Range	λ_c	λ_c-1	-	λ_c+1	nm	
Operating Wavelength Spacing			100		GHz	
Spectral Width	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	6			dB	1
Rise/fall time (20%-80%)	Tr/Tf			50	ps	2
Optical Modulation Amplitude	OMA	2			dBm	
Dispersion penalty				3	dB	
Output Eye Diagram	Complies with IEEE802.3-2005					

Optical Receiver Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Sensitivity	Psen			-23	dBm	3
Operating Wavelength	λ	1480		1580	nm	
Minimum Overload	Pimax	-7			dBm	
LOS	Optical De-assert	Pd		-24	dBm	
	Optical Assert	Pa	-37			
LOS hysteresis	Pd-Pa	0.5		4	dB	

1. Measured at 10.3125b/s with PRBS $2^{31} - 1$ NRZ test pattern.
2. 20%~80%
3. Under the ER worst case, measured at 10.3125 Gb/s with PRBS 231 - 1 NRZ test pattern for BER $<1 \times 10^{-12}$

Digital Diagnostic Monitor Accuracy

The XFP modules implement the 2-wire serial communication protocol as defined in the XFP MSA. The serial ID information of the XFP 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(A2h) is described in Table 3. For more details of the memory map and byte definitions, please refer to the SFF-8472 (Rev 9.3, Aug. 2002), "Digital Diagnostic Monitoring Interface for Optical Transceivers". The DDM parameters have been internally calibrated.

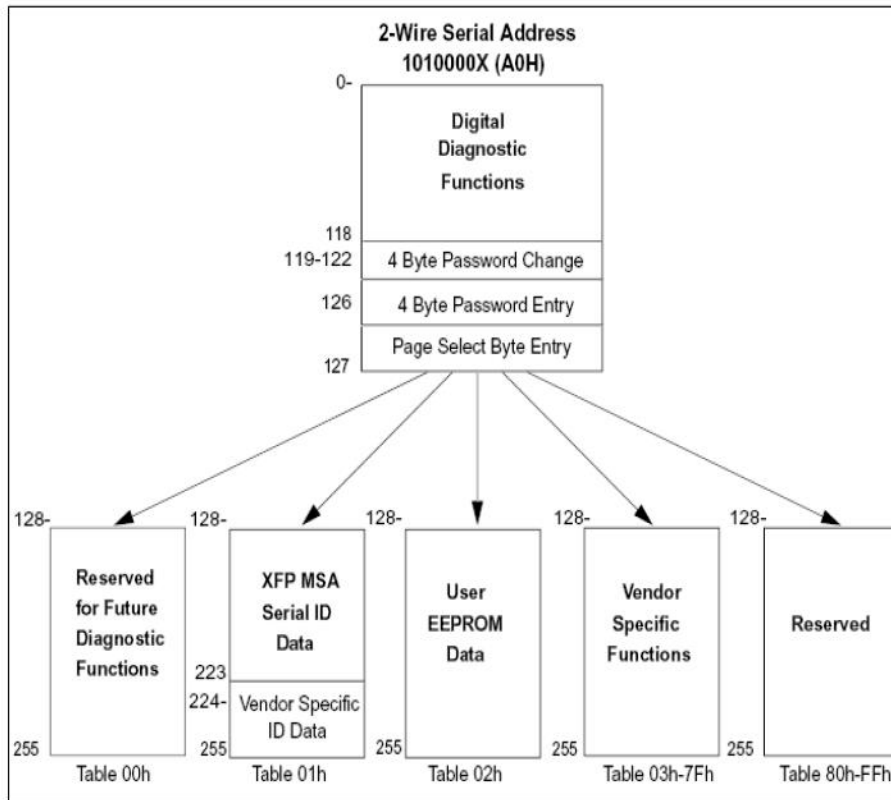
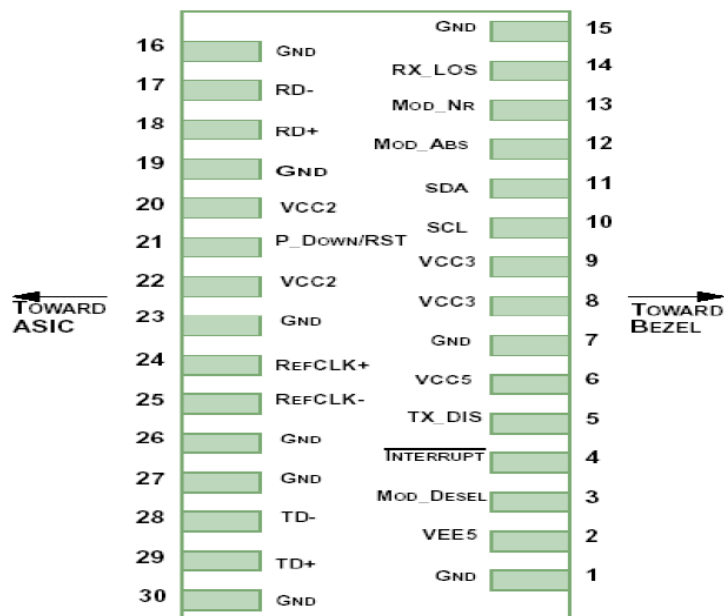


Figure 1. Digital Diagnostic memory map

PIN Description



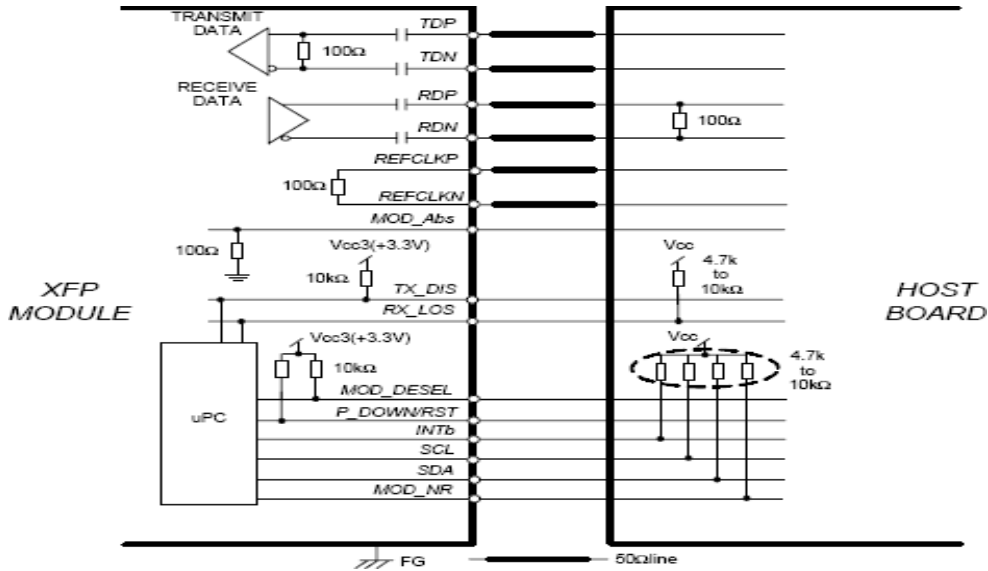
Pin#	Name	Function	Name/Description	Notes
1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply (Not required)	
3	LVTTTL-I	MOD_DESEL	Module De-select; When held low allows the module to respond to 2-wire serial interface	
4	LVTTTL-O	INTb	Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface	2
5	LVTTTL-I	TX_DIS	Transmitter Disable; Turns off transmitter laser output	
6		VCC5	+5V Power Supply (Not required)	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTTL-O	MOD_Abs	Indicates Module is not present. Grounded in the Module	2
13	LVTTTL-O	MOD_NR	Module Not Ready; Indicating Module Operational Fault	2
14	LVTTTL-O	RX_LOS	Receiver Loss of Signal Indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RDN	Receiver Inverted Data Output	
18	CML-O	RDP	Receiver Non-Inverted Data Output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply (Not required).	3
21	LVTTTL-I	P_DOWN/ RST	Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode.	
21	LVTTTL-I	P_DOWN/ RST	Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply (Not required)	3
23		GND	Module Ground	1
24	PECL-I	REFCLKP	Not used, internally terminated to 50ohm (100ohm diff)	4
25	PECL-I	REFCLKN	Not used, internally terminated to 50ohm (100ohm diff)	4
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TDN	Transmitter Inverted Data Input	
29	CML-I	TDP	Transmitter Non-Inverted Data Input	
30		GND	Module Ground	1

Notes:

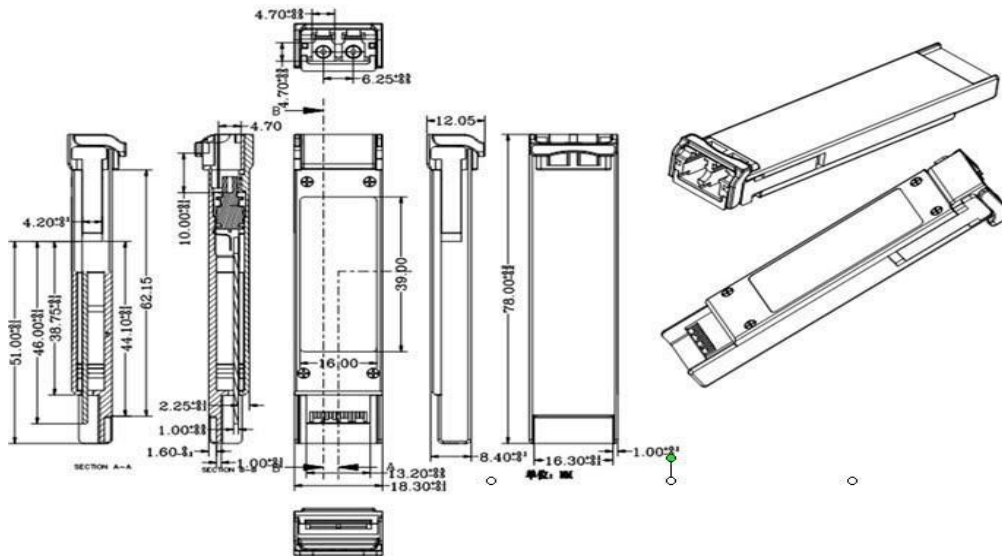
1. Module ground pins GND are isolated from the module case and chassis ground within the module.

2. Open collector; Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.6V on the host board.
3. The pins are open within module.
4. Reference Clock is not required.

Typical application circuit



Package Outline



Wavelength table

Code	Frequency (THz)	Center Wavelength(nm)	Code	Frequency (THz)	Center Wavelength(nm)
17	191.7	1563.86	40	194	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192	1561.42	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.75	50	195	1537.4
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.9
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33
37	193.7	1547.72	60	196	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12			

Notice

PICadvanced reserves the right to make changes to this product in this specification without notice, in order to improve product performance.

Order information

Please contact PICadvanced for ordering and quotation: global@picadvanced.com