

PRODUCT SPECIFICATION

Part No.:	AC-XP-Q2G10-80	
Description:	10G SFP+ Transceiver, DWDM 80km	
Release Date	Rev.	Revision Change Description
2017/06/07	A0	New Release
2020/12/28	A1	Template Update

Features

- ✧ Up to 11.3Gbps Data Links
- ✧ DWDM EML transmitter and APD receiver
- ✧ Metal enclosure, for lower EMI
- ✧ Single +3.3V power supply
- ✧ Hot-pluggable
- ✧ Compliant with SFP+ MSA with LC connector
- ✧ Operating temperature range:
 - ✧ Commercial: 0℃~+70℃
 - ✧ Industry: -40℃~+85℃
- ✧ RoHS Compliant
- ✧ 2-wire interface with integrated Digital Diagnostic monitoring
- ✧ Up to 80km transmission distance over Single Mode Fiber(SMF)
- ✧ Low power dissipation:
 - ✧ AC-XP-Q2G10-80: 1.4W power dissipation without CDR for Commercial temperature
 - ✧ AC-XP-Q2G10-80C: 1.6W power dissipation with CDR for Commercial temperature

Application

- ✧ 10GBASE-ZR/ZW
- ✧ 10G Ethernet
- ✧ SDH STM64

Standard

- ✧ Compliant with MSA SFP+ specification(SFF-8431)
- ✧ Compliant with SFF-8472
- ✧ Compliant with SFP+ MSA
- ✧ Compliant to IEEE 802.3ae

Wavelength Selection

Channel	Wavelength (nm)	Frequency(THZ)	Channel	Wavelength (nm)	Frequency(THZ)
C17	1563.86	191.70	C39	1546.12	193.90
C18	1563.05	191.80	C40	1545.32	194.00
C19	1562.23	191.90	C41	1544.53	194.10
C20	1561.42	192.00	C42	1543.73	194.20
C21	1560.61	192.10	C43	1542.94	194.30
C22	1559.79	192.20	C44	1542.14	194.40
C23	1558.98	192.30	C45	1541.35	194.50
C24	1558.17	192.40	C46	1540.56	194.60
C25	1557.36	192.50	C47	1539.77	194.70
C26	1556.55	192.60	C48	1538.98	194.80
C27	1555.75	192.70	C49	1538.19	194.90
C28	1554.94	192.80	C50	1537.40	195.00
C29	1554.13	192.90	C51	1536.61	195.10
C30	1553.33	193.00	C52	1535.82	195.20
C31	1552.52	193.10	C53	1535.04	195.30
C32	1551.72	193.20	C54	1534.25	195.40
C33	1550.92	193.30	C55	1533.47	195.50
C34	1550.12	193.40	C56	1532.68	195.60
C35	1549.32	193.50	C57	1531.90	195.70
C36	1548.51	193.60	C58	1531.12	195.80
C37	1547.72	193.70	C59	1530.33	195.90
C38	1546.92	193.80	C60	1529.55	196.00
Non-ITU	Peak wavelength between 1528.77nm-1563.86		C61	1528.77	196.10

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage temperature	TS	-40	85	℃
Power Supply Voltage	Vcc3	-0.3	+4	V
Relative Humidity	RH	5	95	%
Signal Input Voltage		Vcc-0.3	Vcc+0.3	V

Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature (Commercial)	Tc	0		70	℃

Operating Case Temperature (industrial)	T _c	-40		85	°C
Power Supply Voltage	V _{cc3}	3.13	3.3	3.47	V
Supply Current	I _{cc3}	430		460	mA
Data Rate			10.3125		Gbps
Fiber Length 9/125μm core SMF		-	80	-	km

Electrical Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter differential input voltage	V _{in,pp}	180		700	m V	
Receiver differential output Voltage	V _{out,pp}	400		800	m V	
Input differential impedance	R _{in}		100		Ω	1
LOS Fault	V _{LOS fault}	2.0		V _{ccHost}	V	2
LOS Normal	V _{LOS norm}	V _{ee}		V _{ee} +0.8	V	2
Transmit disable voltage	V _{IH}	2.0		V _{cc}	V	
Transmit enable voltage	V _{IL}	V _{ee}		V _{ee} +0.8	V	
Data output rise time	T _r	28			ps	
Data output fall time	T _f	28			ps	
Transmit Disable Assert Time				10	us	
Power Supply Rejection	PSR	100			mVpp	3

Notes:

- 1) Connected directly to TX data input pins. AC coupled thereafter.
- 2) Loss Of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
- 3) Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Launched Power (avg.)	P _{out}	-1		4	dBm	1
Operating Wavelength Range	λ _c	λ-0.1		λ+0.1	nm	2
Center Wavelength Spacing			100		GHZ	
Spectral Width(-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter OFF Output Power	P _{Off}			-30	dB	
Extinction Ratio	ER	8.2			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	
Output Eye Diagram	Compliant with ITU-T G.691 eye mask and IEEE802.3ae eye mask					

Optical receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver Sensitivity	S			-23	dBm	3
Wavelength Range	λ_c	1270		1610	nm	
Optical Power Input Overload	P_{in-max}	-6			dBm	
Receiver Reflectance	R_{rx}			-27	dB	
LOS	Optical De-assert	P_d		-26	dBm	
	Optical Assert	P_a	-35			
LOS hysteresis	P_{phys}	0.5			dB	

Notes:

- 4) Launched power (avg.) is power coupled into a single mode fiber with master connector. (Before of Life) .
- 5) λ_c refer to wavelength selection, and corresponds to approximately 0.8 nm.
- 6) Receiver Reflectance Measured with a PRBS $2^{31}-1$ test pattern, @10.3125Gbps, ER=8.2dB, BER<10⁻¹².

Pin Description

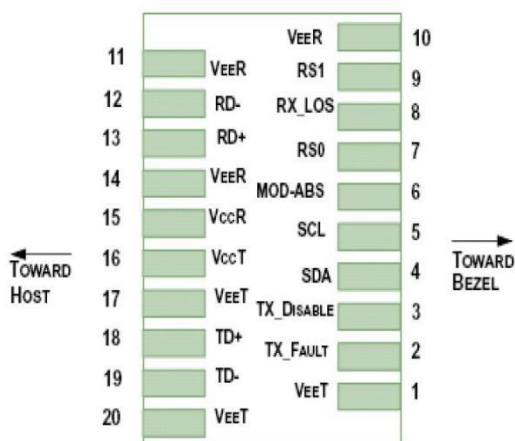


Figure 1 SFP+ Pad assignment Top View

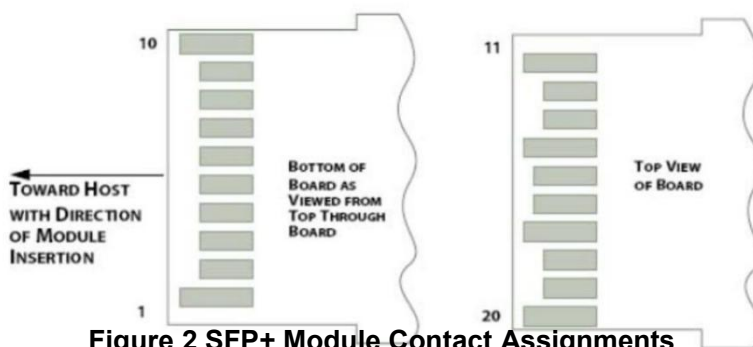


Figure 2 SFP+ Module Contact Assignments

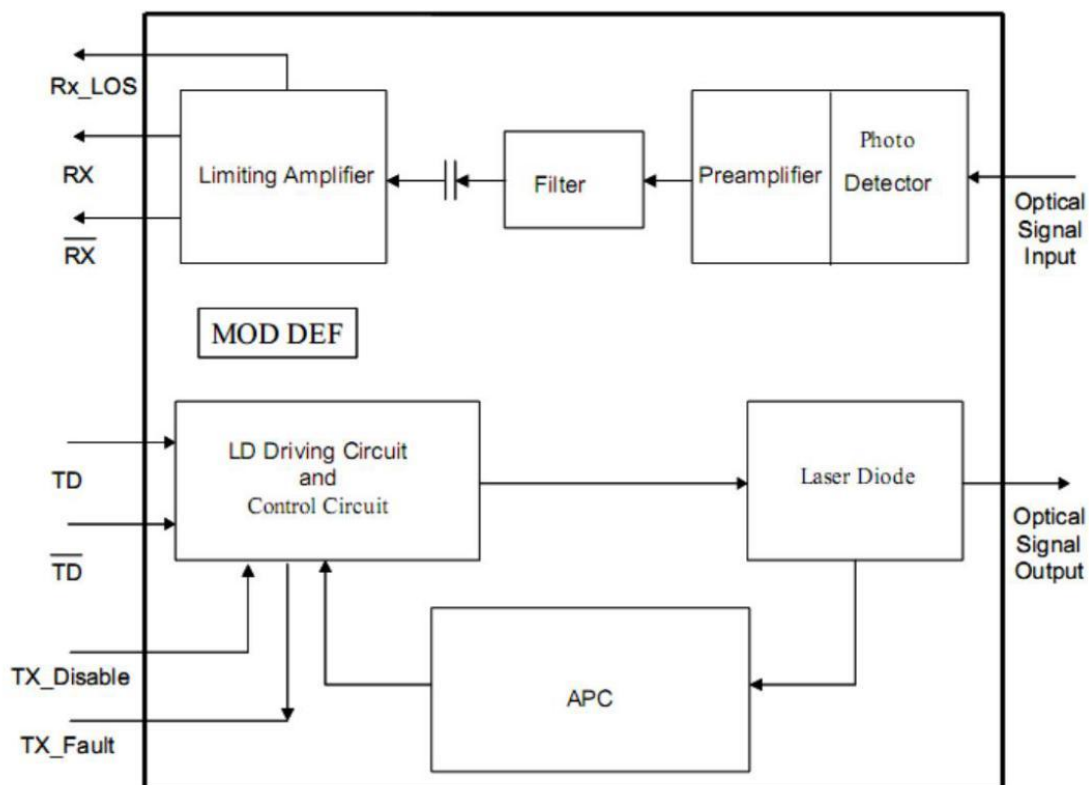
Pin Assignment

Pin	Symbol	Description	Notes
1	VeeT	Module Ground(Common with Receiver Ground)	1
2	TX_Fault	Transmitter Fault, Low: normal; High: abnormal	2
3	TX_Disable	Transmitter Disable High: Transmitter off Low: Transmitter on	3
4	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	4
5	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	4
6	Mod_ABS	Module Absent, Connect to VeeT or VeeR in Module	4
7	RS0	no connection	
8	RX_LOS	Receiver Loss of Signal indication High: loss of signal Low: signal detected	5
9	RS1	No connection required	1
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I	
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-I	
20	SDA	Transmitter Ground	1

Notes:

- 1) Circuit ground is internally isolated from chassis ground.
- 2) TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
- 3) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- 4) Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
- 5) LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Block Diagram



Digital Diagnostic Memory Map

2 wire address 1010000X (A0h)

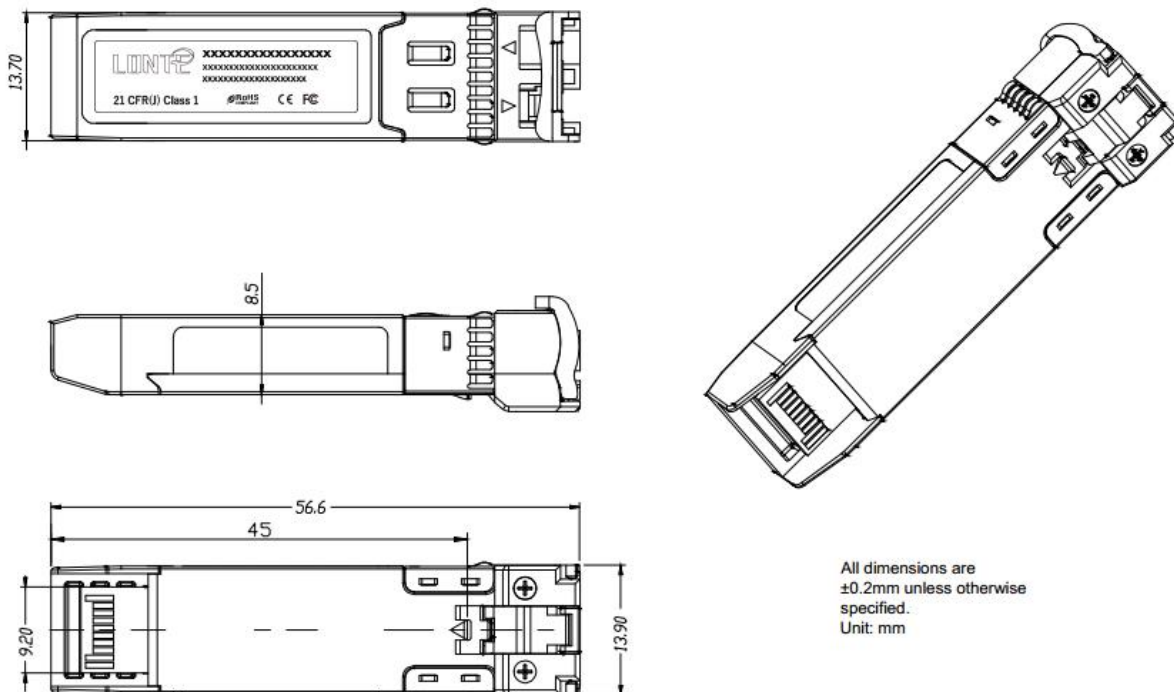
0	Serial ID Defined by SFP MSA (96 bytes)
95	
127	
127	Vendor Specific (32 bytes)
255	Reserved (128 bytes)

2 wire address 1010001X (A2h)

0	Alarm and Warning Thresholds (56 bytes)
55	
95	Cal Constants (40 bytes)
119	Real Time Diagnostic Interface (24 bytes)
127	Vendor Specific (8 bytes)
247	User Writable EEPROM (120 bytes)
255	Vendor Specific (8 bytes)

Package Outline

Dimensions are in millimeters. All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified. (Unit: mm)



Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000V for other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard
Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compatible with Class I laser Product

Ordering information

Part. No	Specifications									
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX	Sen (dBm)	Temp (℃)	Reach (km)	DDM	CDR
AC-XP-Q2G10-80	SFP+	10.3125	DWDM EML	-1~4	APD	<-23	0~70	80	Y	N
AC-XP-Q2G10-80C	SFP+	10.3125	DWDM EML	-1~4	APD	<-23	0~70	80	Y	Y
AC-XP-Q2G10-80F	SFP+	10.3125	DWDM EML	-1~4	APD	<-23	-40~85	80	Y	N
AC-XP-Q2G10-80CF	SFP+	10.3125	DWDM EML	-1~4	APD	<-23	-40~85	80	Y	Y