

PRODUCT SPECIFICATION

Part No.:	AC-XP-Q1G10-40	
Description:	10G SFP+ Transceiver, SMF CWDM (1270-1450)nm 40km	
Release Date	Rev.	Revision Change Description
2017/06/07	A0	New Release
2020/12/28	A1	Template Update

Features

- ✧ Up to 11.1Gbps Data Links
- ✧ DFB Laser and PIN receiver
- ✧ Duplex LC receptacle optical interface compliant
- ✧ Single +3.3V power supply
- ✧ Power dissipation < 1.2 W
- ✧ Hot-pluggable
- ✧ Operating temperature range:
 - ✧ Commercial: 0℃~+70℃
 - ✧ Industry: -40℃~+85℃
- ✧ RoHS Compliant
- ✧ 2-wire interface with integrated Digital Diagnostic monitoring
- ✧ Up to 40km transmission distance over Single Mode Fiber(SMF)

Application

- ✧ 10GBASE-ER/EW & 10G Ethernet
- ✧ 10G Fiber Channel

Standard

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

Wavelength selection

Wavelength	xx	Clasp Color Code	Wavelength	xx	Clasp Color Code
1270 nm	27	Gray	1370 nm	37	Green
1290 nm	29	Gray	1390 nm	39	Yellow
1310 nm	31	Gray	1410 nm	41	Orange
1330 nm	33	Purple	1430 nm	43	Red
1350 nm	35	Blue	1450 nm	45	Brown

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage temperature	TS	-40	85	℃
Power Supply Voltage	Vcc3	-0.5	+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 (industry)	Tc	-40		85	℃
Power Supply Voltage	Vcc3	3.13	3.3	3.47	V
Supply Current	Icc3			360	mA
Data Rate			10.3125		Gbps
Fiber Length 9/125μm core SMF		-	40	-	km

Electrical Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter differential input voltage	Vin,pp	180		700	mW	
Receiver differential output Voltage	Vout,pp	300		850	mW	
Transmit Fault (TX_Fault)	Voh	2.4		Vdd3+0.3	V	LVTTL
	Vol	-0.3		0.4	V	LVTTL
Transmit disable voltage	VIH	Vcc-1.3		Vcc	v	LVTTL
Transmit enable voltage	VIL	Vee		Vee+0.8	v	LVTTL
Loss of Signal (LOS)	Voh	Vcc-1.3		Vcc	V	LVTTL
	Vol	Vee		Vee+0.8	V	LVTTL

Optical transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Launched Power (avg.)	P _{out}	0		5	dBm	
Operating Wavelength Range	λ_c	$\lambda-6.5$	λ	$\lambda+6.5$	nm	

Spectral Width	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	3.5			dB	2
Transmitter and Dispersion Penalty	TDP			3	dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Optical Rise/Fall Time	Tris/Tfall	30			PS	3
Optical Tx Output disable	P _{dis}			-30	dBm	
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			-15	dBm	4
Wavelength Range	λ_c	$\lambda-6.5$	λ	$\lambda+6.5$	nm	
Receiver Reflectance				-12	dB	
Optical Power Input Overload	P _{in-max}	0.5			dBm	4
LOS	Optical De-assert	P _d		-17	dBm	4
	Optical Assert	P _a	-30			
LOS hysteresis		0.5	1		dB	5

Notes:

- 1) The supply current is SFP+ module's working current.
- 2) For the measurements, the device was driven with 10.3125Gbps data pattern with 2³¹-1 PRBS payload.
- 3) Optical transition time is the time interval required for the rising or falling edge of an optical pulse to transition between the 20% and 80% amplitudes relative to the logical 1 and 0 levels.
- 4) Measured with a PRBS 2³¹-1 test pattern, @10.3125Gbps, ER=3.5dB, BER<10⁻¹².
- 5) The LOS Hysteresis minimizes 'chatter' on the output line. In principle, Hysteresis alone does not guarantee chatter-free operation.

Pin Descriptions

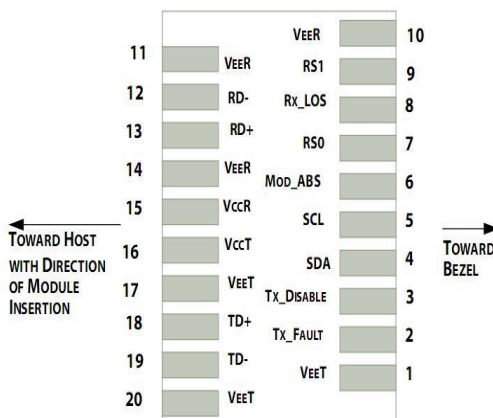


Figure 1 SFP+ Pad assignment Top View



Figure 2 SFP+ Module Contact Assignments

Pin Assignment

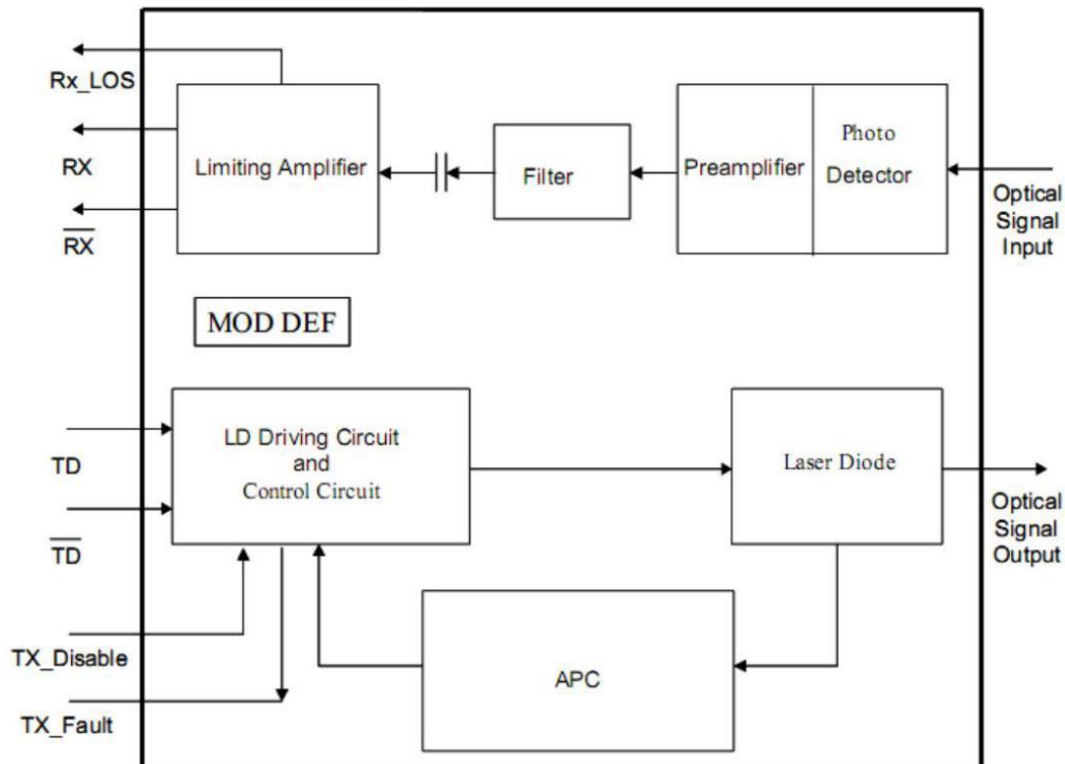
Pin	Power Seq.	Symbol	Description	Ref
1	1st	VeeT	Module Ground(Common with Receiver Ground)	1
2	3rd	TX_Fault	Transmitter Fault, Low: normal; High: abnormal	2
3	3rd	TX_Disable	Transmitter Disable High: Transmitter off Low: Transmitter on	3
4	3rd	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	4
5	3rd	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	4
6	3rd	Mod_ABS	Module Absent, Connect to VeeT or VeeR in Module	5
7	3rd	RS0	Rate Select 0, optionally controls SFP+ module receiver	6
8	3rd	RX_LOS	Receiver Loss of Signal indication High: loss of signal Low: signal detected	7
9	3rd	RS1	Rate Select 1, optionally controls SFP+ module transmitter	8
10	1st	VeeR	Receiver Ground	1
11	1st	VeeR	Receiver Ground	1
12	3rd	RD-	Receiver Inverted DATA out. AC Coupled. CML-O	9
13	3rd	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	9
14	1st	VeeR	Receiver Ground	1
15	2nd	VccR	Receiver Power Supply	10
16	2nd	VccT	Transmitter Power Supply	10
17	1st	VeeT	Transmitter Ground	1

18	3rd	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I	11
19	3rd	TD-	Transmitter Inverted DATA in. AC Coupled. CML-I	11
20	1st	SDA	Transmitter Ground	1

Notes:

- 1) The module signal ground contacts.
- 2) This pin is an open drain/collector and should be pulled up to Vcc-host in the host with a 4.7k~10k Ohm resistor.
- 3) This pin should be pulled up to Vcct with a 4.7k~10k Ohm resistor in modules.
- 4) SDA&SCL (IIC) are needed pull up 4.7k~10k Ohm resistors on host board.
- 5) Mod_ABS is connected to VeeT or VeeR in the SFP+ module.
- 6) Rate Select 0, Optionally controls SFP+ module receiver , High: RX input signaling rate > 4.25GBd and Low: RX input signaling rate ≤ 4.25GBd.
- 7) Module RX_Los of signal indication need pull up 4.7k~10k Ohm resistor on host board.
- 8) Rate Select 1, Optionally controls SFP+ module transmitter, High: Tx input signaling rate > 4.25GBd and Low : Tx input signaling rate ≤ 4.25GBd.
- 9) RD +/-: These are the differential receiver outputs. They are CML AC-coupled with 100 Ohm terminal resistor matching internal.
- 10) VccR and VccT are the receiver and transmitter power supplies.
- 11) TD +/-: These are the differential transmitter inputs. They are CML AC-coupled with 100 Ohm terminal resistor matching internal.

Block Diagram

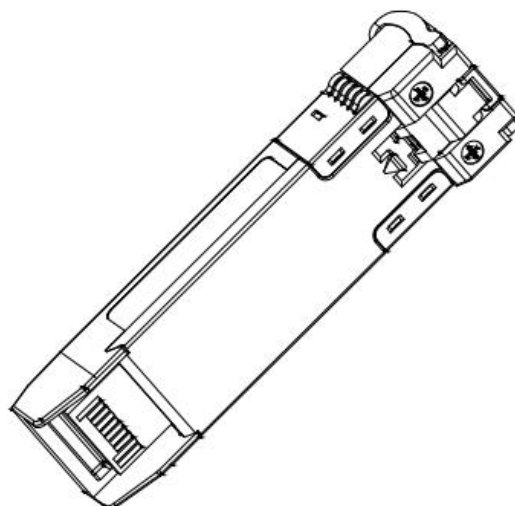
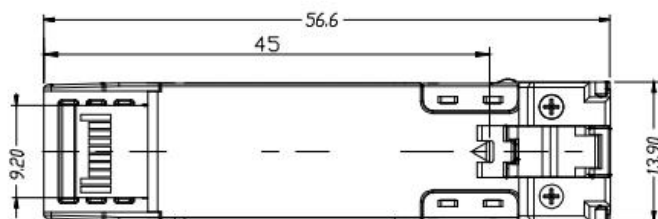
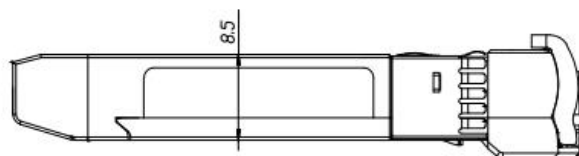
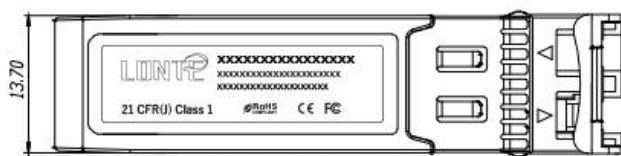


Digital Diagnostic Memory Map

2 wire address 1010000X (A0h)	2 wire address 1010001X (A2h)
0	0
Serial ID Defined by SFP MSA (96 bytes)	Alarm and Warning Thresholds (56 bytes)
95	55
Vendor Specific (32 bytes)	Cal Constants (40 bytes)
127	95
Reserved (128 bytes)	Real Time Diagnostic Interface (24 bytes)
255	119
	127
	Vendor Specific (8 ytes)
	User Writable EEPROM (120 bytes)
	247
	Vendor Specific (8 ytes)
	255

Package Outline

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



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, >2000Vfor 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 (°C)	Reach (km)	DDM
AC-XP-Q1G10-40	SFP+	10.3125	CWDM DFB	0~5	PIN	<-15	0~70	40	Y
AC-XP-Q1G10-40F	SFP+	10.3125	CWDM DFB	0~5	PIN	<-15	-40~85	40	Y