

## FG-TRAN-QSFP+PLR-C

Fortinet® FG-TRAN-QSFP+PLR Compatible TAA 40GBase-PLR4 QSFP+ Transceiver (SMF, 1310nm, 10km, MPO, DOM)

### Features:

- SFF-8436 Compliance
- MPO Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



### Applications:

- 40GBase Ethernet
- Access and Enterprise

### Product Description

This Fortinet® FG-TRAN-QSFP+PLR compatible QSFP+ transceiver provides 40GBase-PLR4 throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an MPO connector. It is guaranteed to be 100% compatible with the equivalent Fortinet® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



### Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V <sub>CC</sub>	-0.5		4.0	V
Storage Temperature	T <sub>s</sub>	-40		85	°C
Operating Case Temperature	T <sub>c</sub>	0	25	70	°C
Relative Humidity	RH	5		95	%
Data Rate Per Channel			10.3125	11.2	Gb/s

### Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes	
Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V		
Module Supply Current	I <sub>CC</sub>			1100	mA		
Power Dissipation	P <sub>D</sub>			3500	mW		
<b>Transmitter</b>							
Input Differential Impedance	Z <sub>IN</sub>		100				
Differential Data Input Swing	V <sub>IN, P-P</sub>	180		900	mV <sub>P-P</sub>		
TX_FAULT	Transmitter Fault	VOH	2.0		V <sub>CCHOST</sub>	V	
	Normal Operation	VOL	0		0.8	V	
TX_DISABLE	Transmitter Disable	VIH	2.0		V <sub>CCHOST</sub>	V	
	Transmitter Enable	VIL	0		0.8	V	
<b>Receiver</b>							
Output Differential Impedance	Z <sub>O</sub>		100				
Differential Data Output Swing	V <sub>OUT, P-P</sub>	300		850	mV <sub>P-P</sub>	1	
Data Output Rise Time, Fall Time	t <sub>r</sub> , t <sub>f</sub>	28			ps	2	
RX_LOS	Loss of signal (LOS)	VOH	2.0		V <sub>CCHOST</sub>	V	3
	Normal Operation	VOL	0		0.8	V	3

#### Notes:

1. Internally AC coupled, but requires an external 100 differential load termination.
2. 20 – 80 %.
3. LOS is an open collector output. Should be pulled up with 4.7k on the host board.

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Launch Optical Power per lane	P <sub>o</sub>	-8.2		+0.5	dBm	1
Side Mode Suppression Ratio	SMSR	30			dB	
Center Wavelength Range	λ <sub>0</sub>	1260	1310	1355	nm	
Extinction Ratio	EX	3.5			dB	2
Optical Return Loss Tolerance	ORLT			12	dB	
Pout @TX-Disable Asserted	P <sub>off</sub>			-30	dBm	1
<b>Receiver</b>						
Center Wavelength	λ <sub>c</sub>	1260		1355	nm	
Receiver Sensitivity (OMA)	S			-12.6	dBm	3
Damage Threshold	P <sub>OL</sub>	1.5			dBm	3
LOS De-Assert	LOSD			-15	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

### Note:

1. The optical power is launched into SMF.
2. Measured with a PRBS  $2^{31}-1$  test pattern @10.3125Gbps.
3. Measured with PRBS  $2^{31}-1$  test pattern, 10.3125Gb/s, BER< $10^{-12}$ .

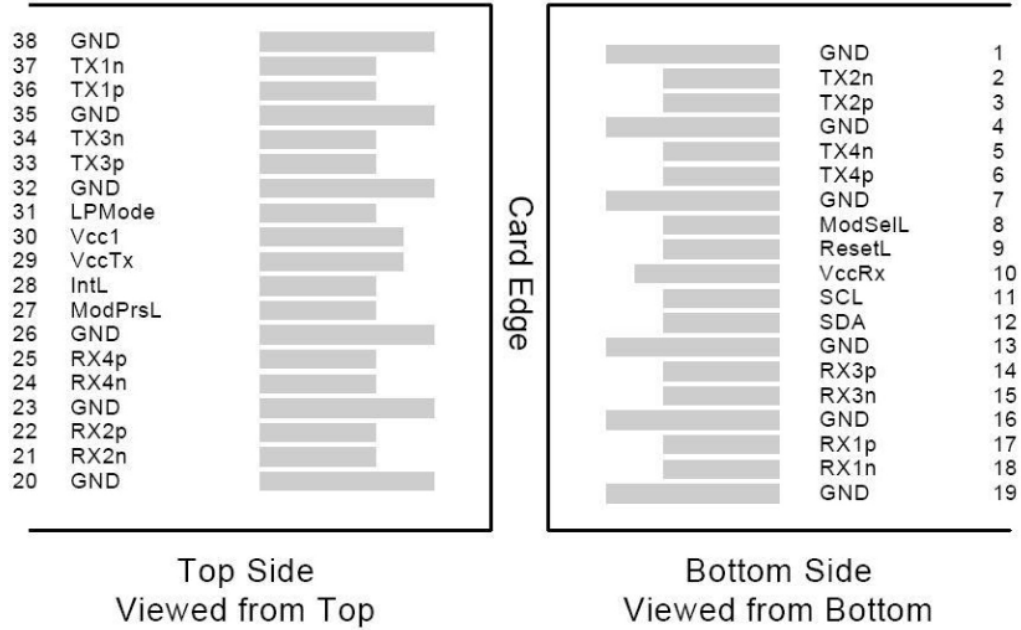
## Pin Descriptions

Pin	Logic	Symbol	Name/Descriptions	Ref.
1		GND	Module Ground	1
2	CML-I	Tx2-	Transmitter inverted data input	
3	CML-I	Tx2+	Transmitter non-inverted data input	
4		GND	Module Ground	1
5	CML-I	Tx4-	Transmitter inverted data input	
6	CML-I	Tx4+	Transmitter non-inverted data input	
7		GND	Module Ground	1
8	LVTTTL-I	MODSEIL	Module Select	2
9	LVTTTL-I	ResetL	Module Reset	2
10		VCCRx	+3.3v Receiver Power Supply	
11	LVCMOS-I	SCL	2-wire Serial interface clock	2
12	LVCMOS-I/O	SDA	2-wire Serial interface data	2
13		GND	Module Ground	1
14	CML-O	RX3+	Receiver non-inverted data output	
15	CML-O	RX3-	Receiver inverted data output	
16		GND	Module Ground	1
17	CML-O	RX1+	Receiver non-inverted data output	
18	CML-O	RX1-	Receiver inverted data output	
19		GND	Module Ground	1
20		GND	Module Ground	1
21	CML-O	RX2-	Receiver inverted data output	
22	CML-O	RX2+	Receiver non-inverted data output	
23		GND	Module Ground	1
24	CML-O	RX4-	Receiver inverted data output	
25	CML-O	RX4+	Receiver non-inverted data output	
26		GND	Module Ground	1
27	LVTTTL-O	ModPrsL	Module Present, internal pulled down to GND	
28	LVTTTL-O	IntL	Interrupt output should be pulled up on host board	2
29		VCCTx	+3.3v Transmitter Power Supply	
30		VCC1	+3.3v Power Supply	
31	LVTTTL-I	LPMode	Low Power Mode	2
32		GND	Module Ground	1
33	CML-I	Tx3+	Transmitter non-inverted data input	
34	CML-I	Tx3-	Transmitter inverted data input	
35		GND	Module Ground	1
36	CML-I	Tx1+	Transmitter non-inverted data input	
37	CML-I	Tx1-	Transmitter inverted data input	
38		GND	Module Ground	1

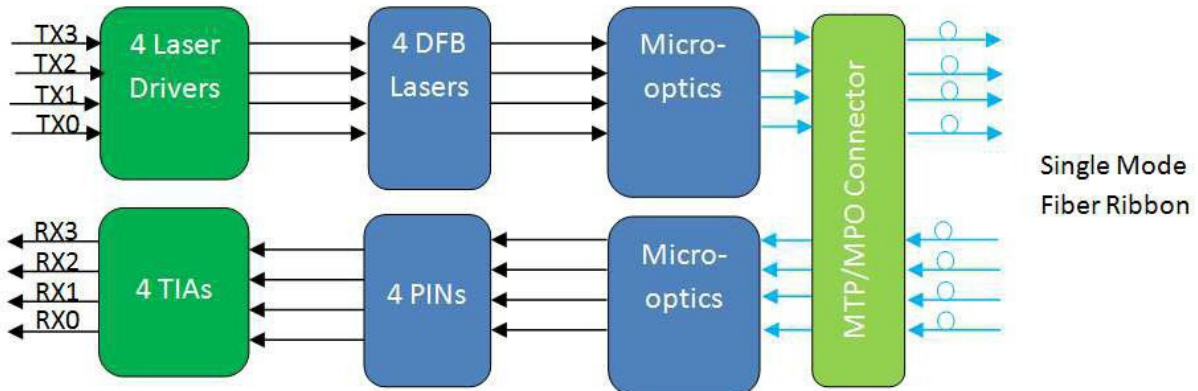
**Notes:**

1. Module circuit ground is isolated from module chassis ground with in the module.
2. Open collector; should be pulled up with 4.7k-10k ohms on host board to a voltage between 3.15V and 3.6V.

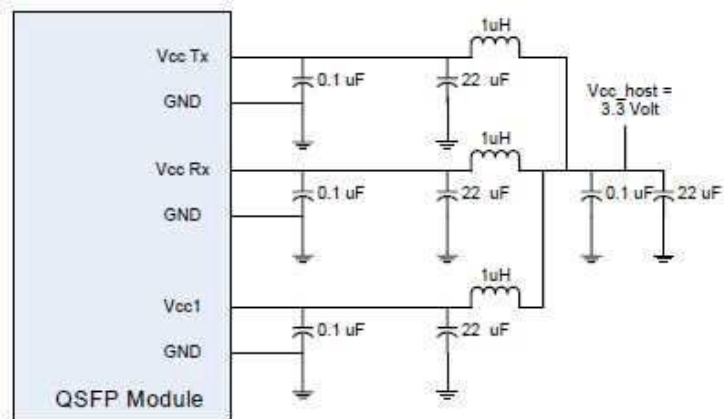
**Electrical Pin-out Details**



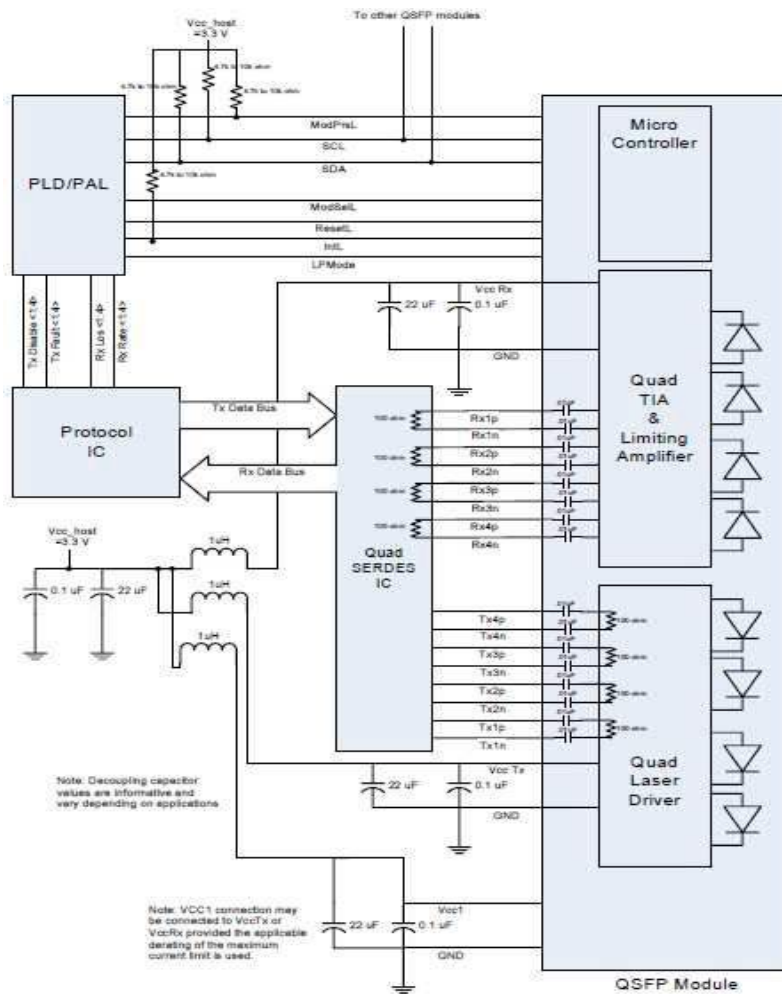
**Transceiver Diagram Block**



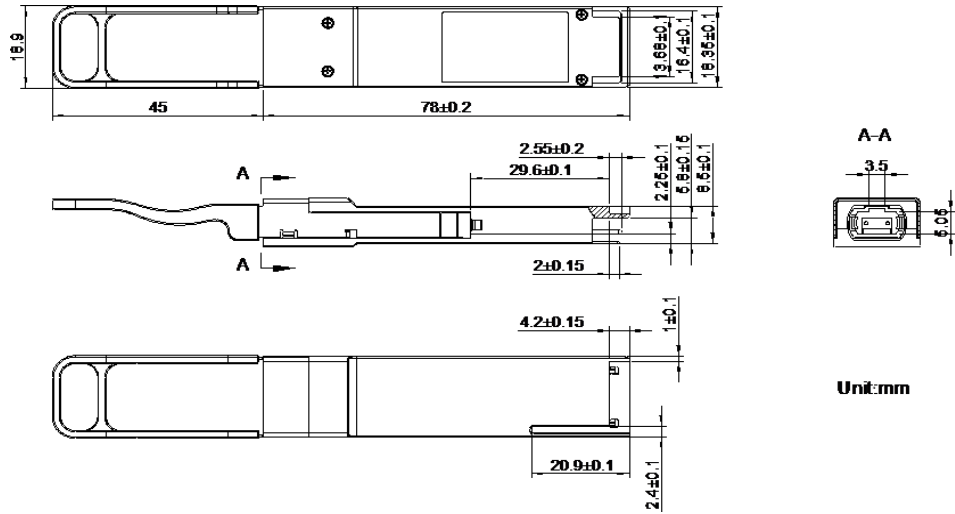
## Recommended Host Board Power Supply Filter Network



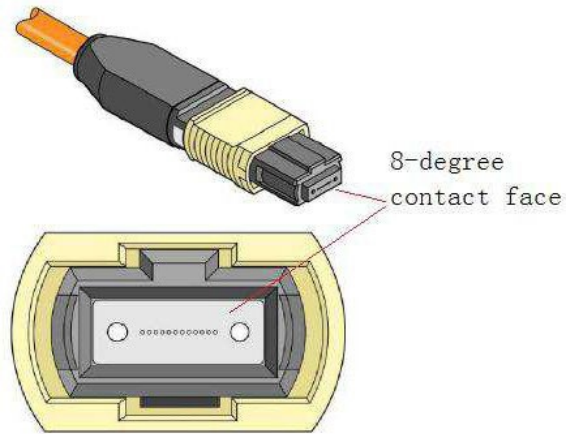
## Recommended Application Interface Block Diagram



## Mechanical Specifications



**Attention:** To minimize MPO connection induced reflections, an MPO receptacle with 8-degree angled end-face is utilized for this product. A female MPO connector with 8-degree end-face should be used with this product as illustrated in below Figure.



## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



## Contact Information

ProLabs US

Email: [sales@prolabs.com](mailto:sales@prolabs.com)

Telephone: 952-852-0252

ProLabs UK

Email: [salessupport@prolabs.com](mailto:salessupport@prolabs.com)

Telephone: +44 1285 719 600