

40Gb/s QSFP+ PSM4 10KM Optical Transceiver

Product Features

- Compliant with QSFP+ MSA (SFF-8436)
- Up to 11.2 Gbps data rate per channel
- MPO optical connector (IEC61754-7-1)
- Low power consumption of 2 Watt (max.)
- Operating case temperature (0°C~70°C)
- Transmission length up to 10km
- RoHS 6 compliant

Applications

- Datacenter and enterprise networking
- Switch Router and HBAs
- 40G Ethernet
- Infiniband QDR, DDR and SDR
- High-performance backplane

The AC-F-Q40PL4-xx is a Four-Channel, Pluggable, Parallel, Fiber-Optic QSFP+ Transceiver. The QSFP full-duplex optical module offers 4 independent transmit and receive channels, each capable of 10.3Gbps operation for an aggregate data rate of 40Gbps 10km using single mode fiber. These modules are designed to operate over single mode fiber systems using 1310nm FP laser array. An optical fiber ribbon cable with an MPO/MTP™ connector can be plugged into the QSFP module receptacle. QSFP+ PSM LR4 is one kind of parallel transceiver which provides increased port density and total system cost savings.

Ordering Information

Part Number	Description
AC-F-Q40PL4-xx	QSFP+ PSM4 10km optical transceiver with full real-time digital diagnostic monitoring and pull tab

Regulatory Compliance

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022:2010, Class B	Compatible with standards
Electromagnetic susceptibility (EMS)	EN 55024:2010	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class I laser product

Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Operating Case Temperature	TOP	0	70	°C	
Power Supply Voltage	V _{CC}	0	3.8	V	
Relative Humidity (non-condensation)	RH	0	85	%	
Supply Current	I _{CC}		600	mA	

Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	°C	
Power Supply Voltage	V _{CC}	3.15	3.3	3.45	V	
Power Consumption				2	W	
Data Rate, each Lane	DR		10.3125		Gb/s	
Data Speed Tolerance	ΔDR	-100		+100	ppm	
Link Distance with G.652	D	0		10	km	

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Differential input impedance		90	100	110	Ω	
Differential input Swing		200	100	110	mV	
TP1/TP1a Interface		Compliant to IEEE 802.3ba XLPP1				
Receiver						
Differential Output impedance		90	100	110	Ω	
Differential Output Swing		400	600	850	mV	
TP4 Interface		Compliant to IEEE 802.3ba XLPP1				

Transmitter Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Center Wavelength each lane	λ_C	1260	1310	1360	nm	
Side-mode Suppression Ratio	SMSR	30			dB	
Average Launch Power, each lane	PAVG	-8.2		+0.5	dBm	
Optical Modulation Amplitude (OMA) each lane	POMA	-5.2		+2.0	dBm	
Difference in Launch Power between any two lanes	Ptx,diff			5.0	dB	
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane	OMA-TDP	-9.7			dBm	
Average Launch Power of OFF Transmitter, each lane	Poff			-30	dBm	
Extinction ratio	ER	3.5			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Optical Return Loss Tolerance	TOL			12	dB	
Transmitter Eye Mask Margin	EMM	5			%	

Receiver Characteristics

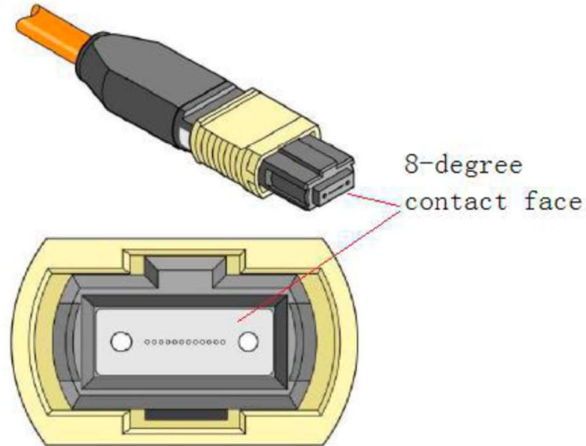
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Center Wavelength	λ_C	1260	1310	1360	nm	
Damage Threshold	THd	+3			dBm	
Overload, each lane	OVL	+0.5			dBm	
Receiver Sensitivity in OMA, each Lane	SEN			-12.6	dBm	
Signal Loss Assert Threshold	LOSA	-30			dBm	
Signal Loss Deassert Threshold	LOSD			-15	dBm	
LOS Hysteresis	LOSH	0.5		6	dB	

Digital Diagnostic Functions

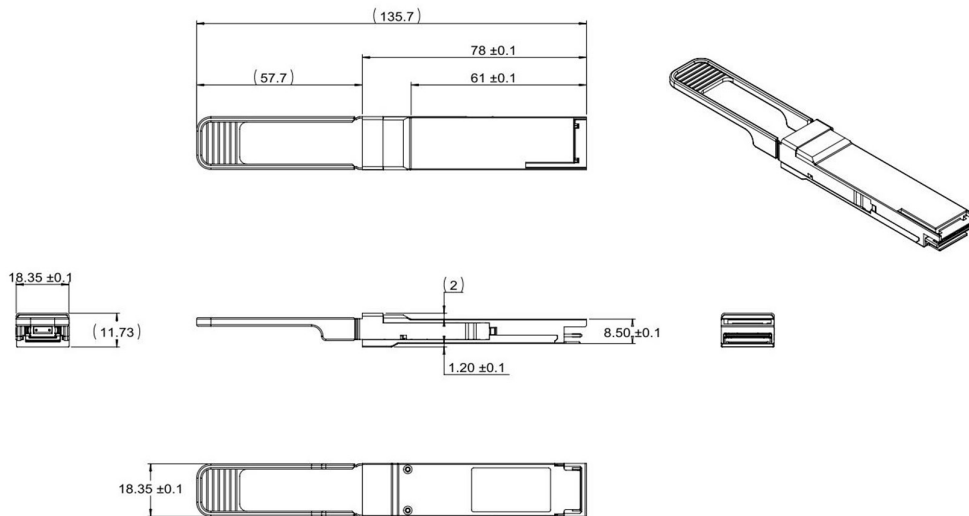
Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	°C	Over operating temperature range
Supply voltage monitor absolute error	DMI_VCC	-0.1	+0.1	V	Over full operating range
Channel RX power monitor absolute error	DMI_RX_Ch	-3	+3	dB	
Channel Bias current monitor	DMI_Ibias_Ch	-10%	+10%	mA	
Channel TX power monitor absolute error	DMI_TX_Ch	-3	+3	dB	

Optical Interface Lanes and Assignment

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.



Mechanical Dimensions



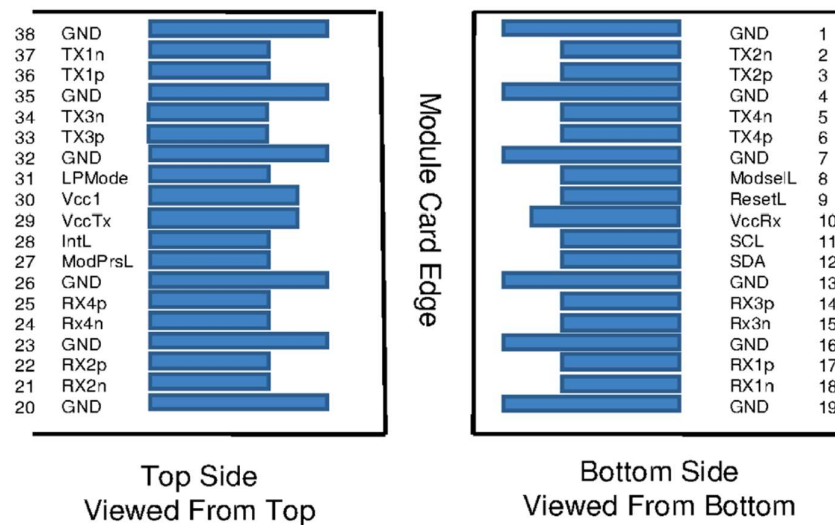
ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

Pin Assignment and Description



Pin Assignment

PIN #	Logic	Symbol	Description	Notes
1		GND	Ground	
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	
8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10		VccRx	+3.3V Power Supply Receiver	
11	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVC MOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	

14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	
20		GND	Ground	
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3 V Power Supply transmitter	
30		Vcc1	+3.3 V Power Supply	
31	LVTTL-I	LPMODE	Low Power Mode	
32		GND	Ground	
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	