

QSF-502-SWDM4-OPC

Gigamon Systems® QSF-502-SWDM4 Compatible TAA 40GBase-SWDM4 QSFP+ Transceiver (MMF, 850nm, 300m, LC, DOM)

Features

- SFF-8436 Compliance
- Duplex LC Connector
- Multi-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 Gigamon Systems® compatible QSFP+ transceiver provides 40GBase-SWDM4 throughput up to 300m over multi-mode fiber (MMF) using a wavelength of 850nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Gigamon Systems® 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.

Characteristics

Parameter	Value	Unit	Notes
Module Form Factor	QSFP+		
Maximum Aggregate Data Rate	41.2	Gb/s	
Maximum Data Rate per Lane	10.3	Gb/s	
Protocols Supported	40G Ethernet		
Electrical Interface and Pin-out	38-pin edge connector		Pin-out as defined by QSFP+ MSA
Maximum Power Consumption	2.5	Watts	
Management Interface	Serial, I2C-based, 400 kHz maximum frequency		As defined by the QSFP+ MSA

Data Rate Specifications

Parameter	Symbol	Min	Typ	Max	Units	Notes
Bit Rate per Lane	BR			10.3125	Mb/sec	1
Bit Error Ratio	BER			10 ⁻¹²		2
Link distance on OM3	d	0		240	meters	
Link distance on OM4	d	0		350	meters	

Notes:

1. Compliant with XLPPI per IEEE 802.3ba.
2. Tested with a PRBS 2³¹-1 test pattern.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Maximum Supply Voltage	V _{cc1} , V _{ccTx} , V _{ccRx}	-0.5		3.6	V	
Storage Temperature	T _s	-40		85	°C	
Case Operating Temperature	TOP	0		70	°C	
Relative Humidity (non-condensing)	RH	0		85	%	
Damage Threshold, per Lane	DT	4			dBm	

Electrical Characteristics ($T_{OP} = 0$ to 70°C , $V_{CC} = 3.1$ to 3.47 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Supply Voltage	$V_{CC1}, V_{CCTx}, V_{CCRx}$	3.1		3.47	V	
Supply Current	I_{CC}			0.9	A	1
Link turn-on time						
Transmit turn-on time				2000	ms	2
Transmitter (per Lane)						
Single-ended input voltage tolerance	V_{inT}	-0.3		4.0	V	
Differential data input swing	$V_{in,pp}$	120		1200	mVpp	3
Differential input threshold			50		mV	
AC common mode input voltage tolerance (RMS)		15			mV	
Differential input return loss		Per IEEE P802.3ba, Section 86A.4.1.1			dB	4
J2 Jitter Tolerance	J_{t2}	0.17			UI	
J9 Jitter Tolerance	J_{t9}	0.29			UI	
Data Dependent Pulse Width Shrinkage	DDPWS	0.07			UI	
Eye mask coordinates {X1, X2, Y1, Y2}		0.11, 0.31 95, 350			UI mV	5
Receiver (per Lane)						
Single-ended output voltage		-0.3		4.0	V	
Differential data output swing	$V_{out,pp}$	200 300 400 600		400 600 800 1200	mVpp	6, 7
AC common mode output voltage (RMS)				7.5	mV	
Termination mismatch at 1 MHz				5	%	
Differential output return loss		Per IEEE P802.3ba, Section 86A.4.2.1			dB	4
Common mode output return loss		Per IEEE P802.3ba, Section 86A.4.2.2			dB	4
Output transition time, 20% to 80%		28			ps	
J2 Jitter output	J_{o2}			0.42	UI	
J9 Jitter output	J_{o9}			0.65	UI	
Eye mask coordinates #1 {X1, X2, Y1, Y2}		0.29, 0.5 150, 425			UI mV	5
Power Supply Ripple Tolerance	PSR	50			mVpp	

Notes:

- Will be $<2.5\text{W}$ in link established mode. If the input optical signal is without data, the CDR will keep searching and push the supply current over the maximum spec.

2. From power-on and end of any fault conditions.
3. After internal AC coupling. Self-biasing 100Ω differential input.
4. 10 MHz to 11.1 GHz range.
5. Hit ratio = 5×10^{-5} .
6. AC coupled with 100Ω differential output impedance.
7. Output voltage is settable in 4 discrete steps via I2C.

Optical Characteristics (T_{OP} = 0 to 70°C, V_{CC} = 3.1 to 3.47 Volts)

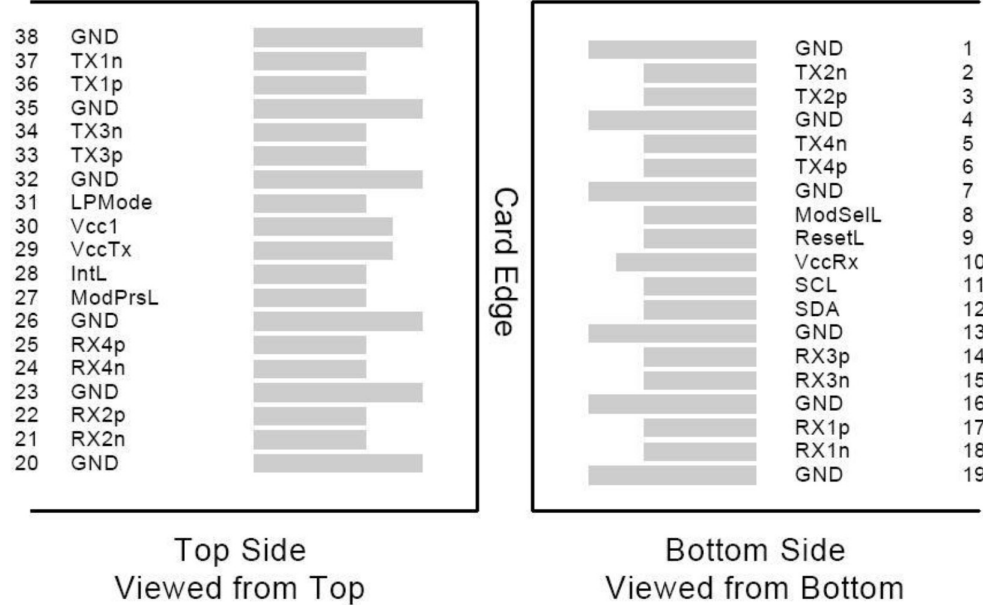
Per-channel optical characteristics vary over the 4 wavelengths. Below are the worst-case.

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter (each lane)						
Signaling Speed per Lane			10.3125		GBd	1
Lane center wavelengths			850 880 910 940		nm	
Spectral width @ 850nm	SBW			0.53		
Spectral width @ 880nm, 910nm, 940nm	SBW			0.59	nm	
Total Average Launch Power	POUT	-1.6		9.0	dBm	3
Average Launch Power per Lane	TXPx	-7.6		3.0	dBm	2,3
Transmit OMA per Lane	TxOMA	-5.3		3	dBm	2
Launch Power Tx OMA - TDP		-6.6			dBm	
Transmitter and Dispersion Penalty	TDP			4.9	dB	2
Optical Extinction Ratio	ER	3.0			dB	
Average launch power of OFF transmitter, per lane				-30	dBm	
Relative Intensity Noise	RIN			-128	dB/Hz	4
Optical Return Loss Tolerance		12			dB	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		0.23, 0.34, 0.43, 0.27, 0.35, 0.4				
Receive (each lane)						
Signaling Speed per Lane			10.3125		GBd	5
Lane center wavelengths			850 880 910 940		nm	
Average Receive Power per Lane	RXPx	-9.0		3.0	dBm	2,6
Receive Power (OMA) per Lane	RxOMA			3	dBm	2
Receiver Sensitivity (OMA) per Lane	Rxsens			-9.1	dBm	2,7
Stressed Receiver Sensitivity (OMA) per Lane @ 850nm	SRS			-5.7	dBm	2
Stressed Receiver Sensitivity (OMA) per Lane @ 880nm, 910nm, 940nm	SRS			-4.4	dBm	2
Return Loss	RL			12	dB	
LOS De-Assert	LOSD			-13	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

Notes:

- 1. Transmitter consists of 4 lasers operating at 10.3Gb/s each.
- 2. This value varies among the 4 channels. The value shown is for the worst-case channel.
- 3. Minimum value is informative.
- 4. Maximum value is informative. TDP guarantees Tx performance
- 5. Receiver consists of 4 photodetectors operating at 10.3 Gb/s each.
- 6. Minimum value is informative, equals min TxOMA with infinite ER and max channel insertion loss.
- 7. Maximum value is informative based on a theoretical perfect unstressed optical source

Electrical Pin-out Details



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	LVTTL-I	MODSEIL	Module Select	2
9	LVTTL-I	ResetL	Module Reset	2
10		VCCRx	+3.3v Receiver Power Supply	
11	LVC MOS-I	SCL	2-wire Serial interface clock	2
12	LVC MOS-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	LVTTL-O	ModPrsL	Module Present, internal pulled down to GND	
28	LVTTL-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	LVTTL-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.

Mechanical Specifications

The mechanical specifications are compliant to the QSFP+ MSA transceiver module specifications.

