



FTL4S1QE2C-SKY

Finisar® FTL4S1QE2C Compatible 40GBase-SWDM4 QSFP+ Transceiver (MMF, 850nm, 300m, LC, DOM)

Product Description

This Finisar® FTL4S1QE2C compatible QSFP+ transceiver provides 40GBase-SWDM4 throughput up to 350m over multi-mode fiber (MMF) using a wavelength of 850nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Finisar® 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. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

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



Applications:

- 40GBase Ethernet
- Access and Enterprise

For your product safety, please read the following information carefully before any manipulation of the transceiver:



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



LASER SAFETY

This is a Class1 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).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

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)

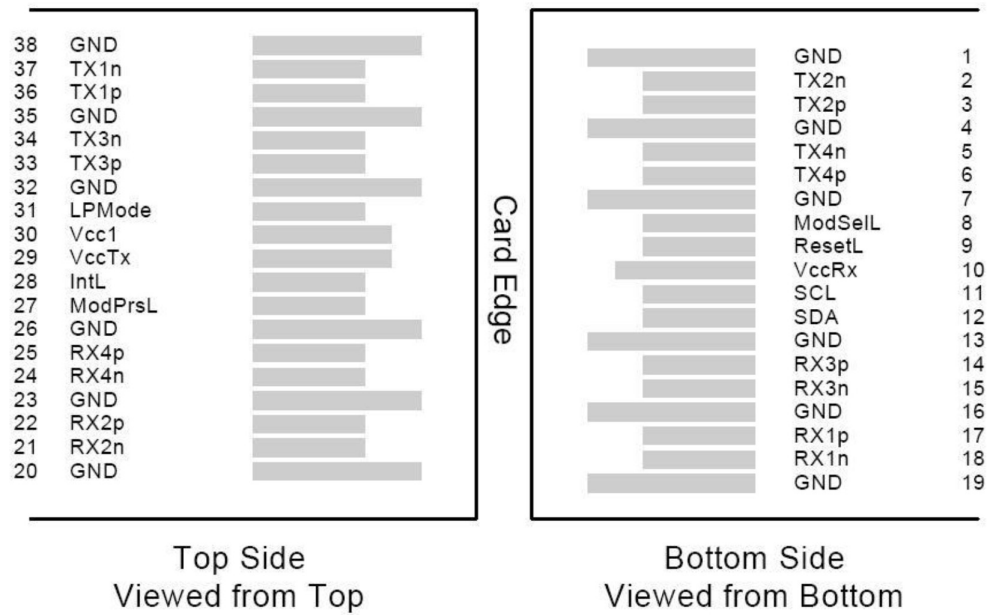
Per-channel optical characteristics vary over the 4 wavelengths. Below are the worst-case.

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

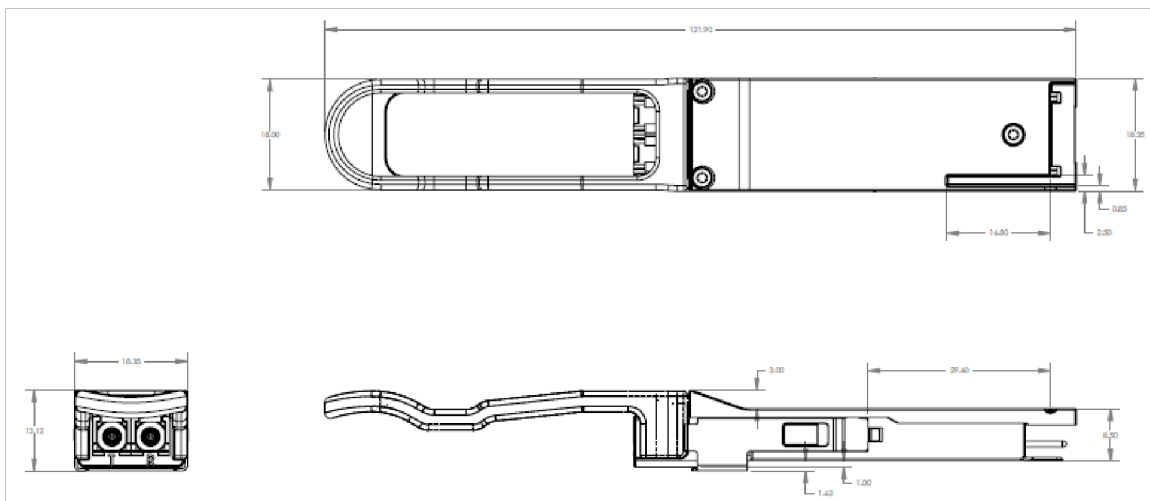
Pin	Logic	Symbol	Name/Descriptions	Ref.
1		GND	Module Ground	1
2	CML-I	Tx2-	Transmitter inverted data input	
3	CML-I	Tx2+	Transmitter non-inverted data input	
4		GND	Module Ground	1
5	CML-I	Tx4-	Transmitter inverted data input	
6	CML-I	Tx4+	Transmitter non-inverted data input	
7		GND	Module Ground	1
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.



About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

