

## TSQS-CW40G-02LC Optical Transceiver

### QSFP+ 40G LR4 2km Transceiver, With Diagnostic Monitoring

#### Features

- Reach: 2 km via SMF
- Uncooled CWDM DFB lasers, directly modulated
- Using ITU G.694.2 wavelength grid at 1271, 1291, 1311, and 1331nm
- User controllable Transmit Input Equalization and Receiver Output Amplitude
- MSA-compliant performance monitoring via I2C interface
- Fiber connector: SMF LC duplex connector
- Compliant with QDR/DDR InfiniBand data rates
- Hot-pluggable electrical interface
- 0–70°C operating temp
- Power dissipation < 3.5W
- RoHS6 compliant (lead free)



#### Applications

- 40G Ethernet
- Infiniband QDR and DDR interconnects

#### Description

The QSFP+ 40G-LR4-2km module is a highly integrated 4x10G transceiver focused on reach, bandwidth, density and cost for high port-count 40G systems, and client-side 40G interfaces. The 40G QSFP+ LR4 Lite transceiver is designed for applications based on the IEEE802.3ba 40GBASE-LR4 standard of up to 2km reach.

#### Optical Transmitter Performance

Parameter		Symbol	Min	Typical	Max	Unit
Center Wavelength	Ch0	$\lambda_0$	1264.5	-	1277.5	nm
	Ch1	$\lambda_1$	1284.5	-	1297.5	nm
	Ch2	$\lambda_2$	1304.5	-	1317.5	nm
	Ch3	$\lambda_3$	1324.5	-	1337.5	nm
Bit Rate per Channel		B	10.3125	-	-	Gb/s
Total Average Launch Power		POUT	-	-	8.0	dBm

Information and specifications are subject to change without notice.  
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Side Mode Suppression Ratio	SMSR	30	-	-	dB
Average launch power, each lane	-	-6.8	-	2.0	dBm
Optical Modulation Amplitude (each lane)	OMA	-6.0	-	3.5	dBm
Optical Modulation Amplitude (OMA) - TDP, per lane (min)	-	-7.8	-	-	dBm
Transmission & dispersion penalty, each lane	TDP	-	-	2.3	dB
RIN12 OMA	-	-	-	-128	dB/Hz
Transmitter Reflectance	-	-	-	-12	dB
Extinction Ratio	ER	3.5	-	-	dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				
Average launch power of OFF transmitter, each lane	-	-	-	-30	dBm
Optical return loss tolerance	-	-	-	20	dB

## Optical Receiver Performance

Parameter	Symbol	Min	Typical	Max	Unit	
Center Wavelength	Ch0	$\lambda_0$	1264.5	1271	1277.5	nm
	Ch1	$\lambda_1$	1284.5	1291	1297.5	nm
	Ch2	$\lambda_2$	1304.5	1311	1317.5	nm
	Ch3	$\lambda_3$	1324.5	1331	1337.5	nm
Bit Rate per Channel	B	10.3125	-	10.7546	Gb/s	
Damage threshold, each lane	-	3.4	-	-	dBm	
Average receive power, each lane	-	-13.5	-	2.0	dbm	
Unstressed Sensitivity (OMA) at $10 \times 10^{-12}$ BER	OMAIN	-	-	-10.5	dBm	
Stressed Sensitivity (OMA)	OMAIN,STR	-	-	-8.5	dBm	
Receiver Reflectance	ORL	-	-	-26	dB	
Vertical eye closure penalty, each lane	VECP	-	-	1.9	dB	
Receive electrical 3 dB upper cutoff frequency, per lane	-	-	-	12.3	GHZ	
Stressed eye J2 Jitter, each lane	J2	-	-	0.42	UI	
Stressed eye J9 Jitter, each lane	J9	-	-	0.65	UI	
Eye mask coordinates #1 {X1, X2 Y1, Y2} Hit ratio = $5 \times 10E-5$	{0.29, 0.5 150, 425}					

## Recommended Operating Environment

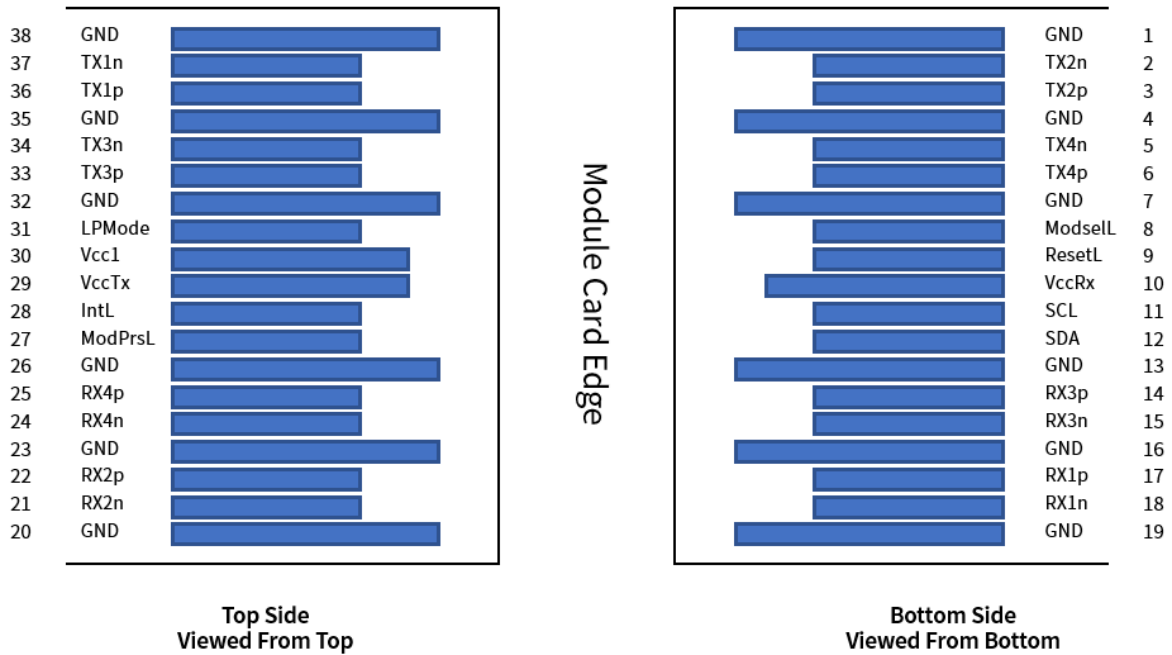
Parameter	Symbol	Min	Typical	Max	Unit
Power Supply Voltage	VCC	3.135	3.300	3.465	V
Operating Case Temperature	TC	0	25	70	°C

## Pin Definition

Pin	Symbol	Name/Description
1	GND	Ground
2	Tx2n	Transmitter Inverted Data Input
3	Tx2p	Transmitter Non-Inverted Data Input
4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input
6	Tx4p	Transmitter Non-Inverted Data Input
7	GND	Ground
8	ModSelL	Module Select
9	ResetL	Module Reset
10	Vcc Rx	+3.3 V Power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground
14	Rx3p	Receiver Non-Inverted Data Output
15	Rx3n	Receiver Inverted Data Output
16	GND	Ground
17	Rx1p	Receiver Non-Inverted Data Output
18	Rx1n	Receiver Inverted Data Output
19	GND	Ground
20	GND	Ground
21	Rx2n	Receiver Inverted Data Output
22	Rx2p	Receiver Non-Inverted Data Output
23	GND	Ground
24	Rx4n	Receiver Inverted Data Output
25	Rx4p	Receiver Non-Inverted Data Output
26	GND	Ground

27	ModPrsL	Module Present
28	IntL	Interrupt
29	Vcc Tx	+3.3 V Power supply transmitter
30	Vcc1	+3.3 V Power Supply
31	LPMODE	Low Power Mode
32	GND	Ground
33	Tx3p	Transmitter Non-Inverted Data Input
34	Tx3n	Transmitter Inverted Data Input
35	GND	Ground
36	Tx1p	Transmitter Non-Inverted Data Input
37	Tx1n	Transmitter Inverted Data Input
38	GND	Ground

### Pin Descriptions



### Ordering Information

Part Number	Product Description
TSQS-CW40G-02LC	QSFP+ 40G LR4 2km 0°C ~ +70°C

## Important Notice

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