

## QSFP-40G-SR4-C

Cisco® QSFP-40G-SR4 Compatible TAA 40GBase-SR4 QSFP+ Transceiver (MMF, 850nm, 150m, MPO, DOM)

### Features:

- 4-Channel Full-Duplex Transceiver Module
- Hot-Pluggable
- Maximum Link Length of 150m on OM4 MMF
- Multi-Rate Capability: 1.06Gbps to 10.5Gbps Per Channel
- Maximum Power Dissipation: 1W
- Reliable VCSEL Array Technology
- Single 1x12 MPO Receptacle
- Operating Temperature: 0 to 70 Celsius
- RoHS Compliant and Lead-Free
- Excellent ESD Protection
- RoHS Compliant and Lead Free



### Applications:

- 40GBase Ethernet
- 4x10G Breakout Option
- Access and Enterprise

### Product Description

This Cisco® QSFP-40G-SR4 compatible QSFP+ transceiver provides 40GBase-SR4 throughput up to 150m over multi-mode fiber (MMF) using a wavelength of 850nm via an MPO connector. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Cisco®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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	Notes
Maximum Supply Voltage	Vcc	-0.5		3.6	V	
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	
Relative Humidity (Non-Condensing)	RH	0		85	%	
Damage Threshold (Per Lane)	DT	3.4			dBm	
Maximum Aggregate Data Rate			42.0		Gbps	
Bit Rate Per Lane	BR	1062		10500	Mbps	1
Bit Error Ratio	BER			$10^{-12}$		2
Link Distance on OM3 MMF	D			100	m	3
Link Distance on OM4 MMF	D			150	m	3

### Notes:

1. Compliant with 40G Ethernet. Compatible with 1/10 Gigabit Ethernet and 1/2/4/8/10G Fibre Channel.
2. Tested with a PRBS  $2^{31}-1$  test pattern.
3. Per 40GBASE-SR4, IEEE 802.3ba.

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.15	3.3	3.45	V	
Supply Current	Icc			300	mA	
Transmit Turn-On Time				2000	ms	1
Power Consumption			1		W	
Transmitter						
Single-Ended Input Voltage Tolerance	VINT	-0.3		4.0	V	
Differential Data Input Swing	VIN,pp	180		1200	mVp-p	2
Differential Input Threshold			50		mV	
AC Common-Mode Input Voltage Tolerance (RMS)		15			mV	
J2 Jitter Tolerance	Jt2	0.17			UI	
J9 Jitter Tolerance	Jt9	0.29			UI	
Data-Dependent Pulse Width Shrinkage	DDPWS	0.07			UI	
Differential Input Return Loss		Per IEEE P802.3ba, Section 86A.4.1.1			dB	3
Eye Mask Coordinates: (X1, X2, Y1, Y2)		(0.11, 0.31, 95, 350)			UI, mV	4
Receiver						
Single-Ended Output Voltage		-0.3		4.0	V	
Differential Data Output Swing	VOUT,pp	0		800	mVp-p	3, 4
AC Common-Mode Output Voltage (RMS)				7.5	mV	
Termination Mismatch at 1MHZ				5	%	
Output Transition Time (20-80%)		28			ps	
J2 Jitter Output	Jo2			0.42	UI	
J9 Jitter Output	Jo9			0.65	UI	
Power Supply Ripple Tolerance	PSR	50			mVp-p	
Differential Output Return Loss		Per IEEE P802.3ba, Section 86A.4.2.1			dB	5
Common-Mode Output Return Loss		Per IEEE P802.3ba, Section 86A.4.2.2			dB	5
Eye Mask Coordinates #1: (X1, X2, Y1, Y2)		(0.29, 0.5, 150, 425)			UI, mV	6

## Notes:

1. From power-on and end of any fault conditions.
2. After internal AC coupling. Self-biasing 100Ω differential input.
3. AC coupled with 100Ω differential output impedance.
4. Settable in 4 discrete steps via the I2C interface.
5. 10MHz to 11.1GHz range.
6. Hit ratio =  $5 \times 10^{-5}$ .

## Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Signaling Speed Per Lane					10.5	GBd	1
Center Wavelength			840		860	nm	
RMS Spectral Width		SW			0.65	nm	
Average Launch Power Per Lane		TXP <sub>x</sub>	-7.6		-1.0	dBm	
Transmit OMA Per Lane		TxOMA	-5.6		3.0	dBm	2
Difference in Power Between Any Two Lanes (OMA)		DP <sub>x</sub>			4.0	dB	
Peak Power Per Lane		PP <sub>x</sub>			4.0	dBm	
Launch Power (OMA) Minus TDP Per Lane		P-TDP	-6.5			dBm	
TDP Per Lane		TDP			3.5	dBm	
Optical Extinction Ratio		ER	3.0			dB	
Optical Return Loss Tolerance		ORL			12	dB	
Average Launch Power of Off Transmitter Per Lane					-30	dBm	
Relative Intensity Noise		RIN			-128	dB/Hz	
Encircled Flux		FLX	>86% at 19μm <30% at 4.5μm			dBm	
Transmitter Eye Mask Definition: (X1, X2, X3, Y1, Y2, Y3)			(0.23, 0.34, 0.43, 0.27, 0.35, 0.4)				
Receiver Module Output (TP4)							
Signaling Speed Per Lane					10.5	GBd	3
Center Wavelength			840		860	nm	
Damage Threshold		DT	3.4			dBm	
Average Receive Power Per Lane		RXP <sub>x</sub>	-9.9		2.4	dBm	
Receive Power (OMA) Per Lane		RxOMA			3.0	dBm	
Stressed Receiver Sensitivity (OMA) Per Lane		SRS			-5.4	dBm	
Peak Power Per Lane		PP <sub>x</sub>			4	dBm	
Receiver Reflectance		Rfl			-12	dB	
Vertical Eye Closure Penalty Per Lane					1.9	dB	
Stressed Eye J2 Jitter Per Lane					0.3	UI	
Stressed Eye J9 Jitter Per Lane					0.47	UI	
OMA of Each Aggressor Lane					-0.4	dBm	
Rx Jitter Tolerance	Jitter Frequency		(75, 5)			kHz, UI	
	P-P Amplitude		(375, 1)				
LOS De-Assert		LOSD			-12	dBm	
LOS Assert		LOSA	-30			dBm	
LOS Hysteresis			0.5			dBm	

**Notes:**

1. The transmitter consists of 4 lasers operating at a maximum rate of 10.5Gbps each.
2. Even if the TDP is < 0.9dB, the OMA minimum must exceed this value.
3. Receiver consists of 4 photodetectors operating at a maximum rate of 10.5Gbps each.

**Pin Descriptions**

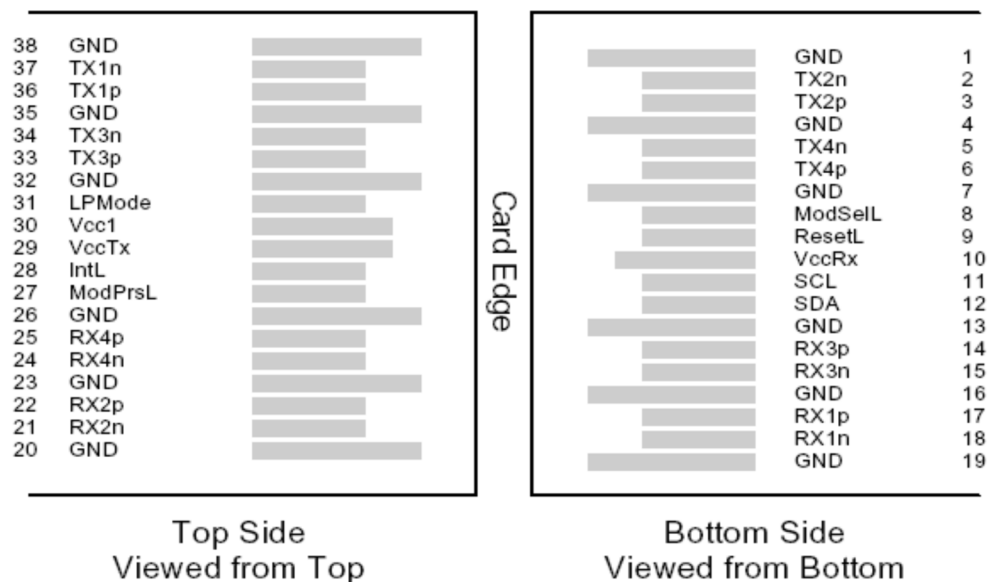
Pin	Symbol	Name/Descriptions	Notes
1	GND	Module Ground.	1
2	Tx2-	Transmitter Inverted Data Input.	
3	Tx2+	Transmitter Non-Inverted Data Input.	
4	GND	Module Ground.	1
5	Tx4-	Transmitter Inverted Data Input.	
6	Tx4+	Transmitter Non-Inverted Data Input.	
7	GND	Module Ground.	1
8	ModSelL	Module Select.	
9	ResetL	Module Reset.	
10	VccRx	+3.3V Receiver Power Supply.	
11	SCL	2-Wire Serial Interface Clock.	
12	SDA	2-Wire Serial Interface Data.	
13	GND	Module Ground.	1
14	Rx3+	Receiver Non-Inverted Data Output.	
15	Rx3-	Receiver Inverted Data Output.	
16	GND	Module Ground.	1
17	Rx1+	Receiver Non-Inverted Data Output.	
18	Rx1-	Receiver Inverted Data Output.	
19	GND	Module Ground.	1
20	GND	Module Ground.	1
21	Rx2-	Receiver Inverted Data Output.	
22	Rx2+	Receiver Non-Inverted Data Output.	
23	GND	Module Ground.	1
24	Rx4-	Receiver Inverted Data Output.	
25	Rx4+	Receiver Non-Inverted Data Output.	
26	GND	Module Ground.	1
27	ModPrsL	Module Present.	
28	IntL	Interrupt.	
29	VccTx	+3.3V Transmitter Power Supply.	

30	Vcc1	+3.3V Power Supply.	
31	LPMODE	Low-Power Mode.	
32	GND	Module Ground.	1
33	Tx3+	Transmitter Non-Inverted Data Input.	
34	Tx3-	Transmitter Inverted Data Input.	
35	GND	Module Ground.	1
36	Tx1+	Transmitter Non-Inverted Data Input.	
37	Tx1-	Transmitter Inverted Data Input.	
38	GND	Module Ground.	1

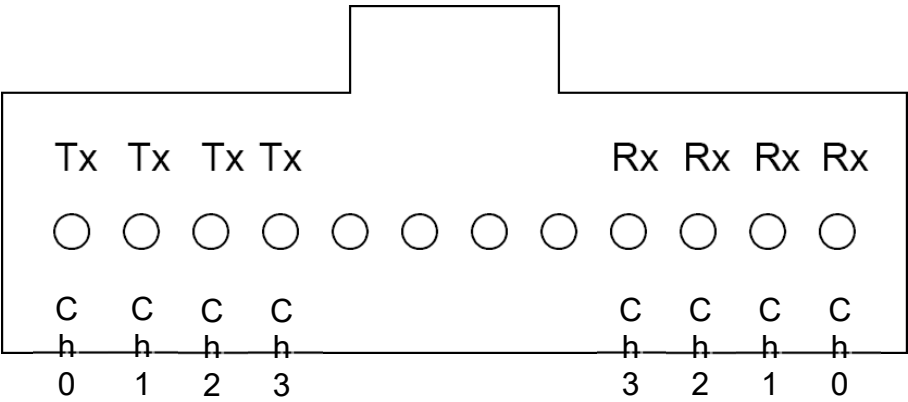
#### Notes:

1. The circuit ground is internally isolated from the chassis ground.

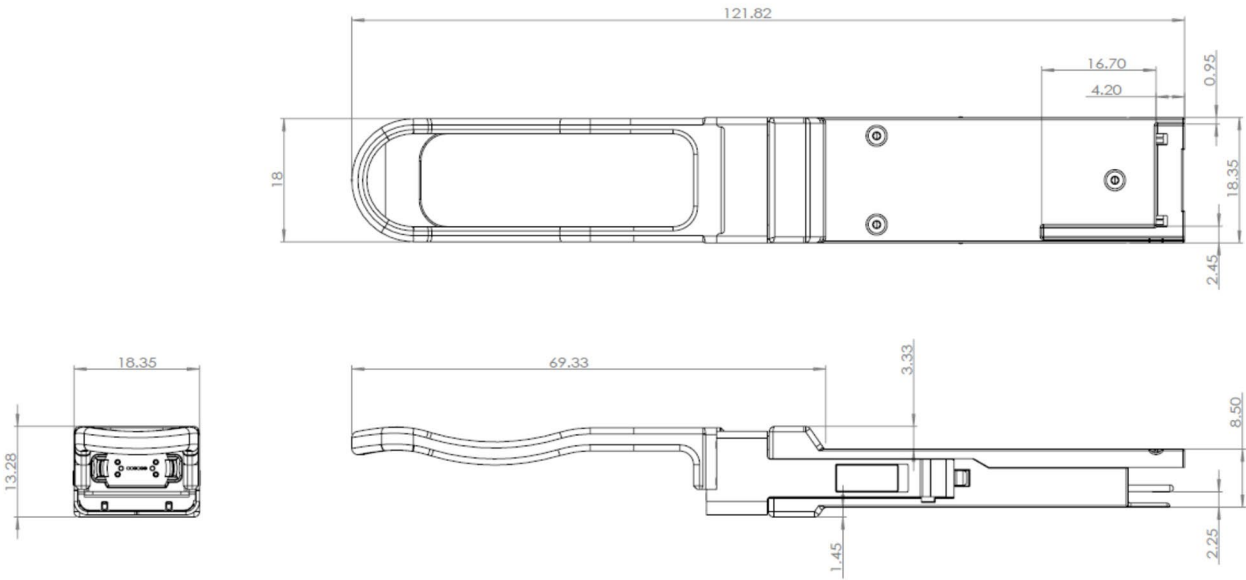
#### Electrical Pin-Out Details



Optical Lane Assignment (Front View of MPO Receptacle)



Mechanical Specifications



## About ProLabs

Our extensive experience comes as standard. For over 20 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 more than 100 optical switching and transport platforms.

## A 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 1.6T 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.

## The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. 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.



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