

Multi-Mode 850nm 150m 40GBASE-SR4 QSFP+ Transceiver QSFP-40G85-1M-xx



Features

- Compliant to the IEEE802.3ba(40GBASE-SR4)
- Support interoperability with IEEE 802.3ae10GBASE-SR modules of various form factors such as SFP+, XFP, X2
- Compliant to the QSFP+ MSA SFF-8436 Specification
- Up to 100m on OM3 and 150m on OM4 MMF
- VCSEL array transmitter and PIN array receiver
- Single 3.3V Power Supply and Power dissipation < 1.5W
- Operates at 10.3125Gbps per channel
- Operating Case Temperature:0°C to 70°C
- I2C interface with integrated Digital Diagnostic Monitoring
- Utilizes a standard 12/8 lane optical fiber with MPO connector

Applications

- 40GBE and 10GBE interconnects
- Datacom/Telecom switch & router connections
- Data aggregation and backplane applications
- Proprietary protocol and density application

Description

The 40Gbps QSFP+ transceiver is well suited for Infiniband and 40GBASE-SR4 / 40GBASE-LR4 applications. It combines the higher density attractions of parallel modules with some of the key advantages normally associated with SFP+ based modules. It is intended for use short reach applications in switches, routers and data center equipment where it provides higher density and lower cost when compared with standard SFP+ modules.

Specifications

Table1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit
Storage Temperature	T _s	-40	-	85	°C
Supply Voltage	V _{cc}	-0.5	-	3.6	V
Operating Relative Humidity	RH	5	-	85	%

Table2-Recommend Operating Condition

Parameter	Symbol	Min	Typical	Max	Unit
Operating Temperature	T _A	0	-	70	°C
Supply Voltage	V _{cc}	3.15	3.3	3.45	V
Supply Current	I _{cc}	-	-	475	mA
Module Total Power	P	-	-	3.5	W
Aggregate Bit Rate	BR _{AVE}	-	41.25	-	Gbps
Lane Bit Rate	BR _{LANE}	-	10.3125	-	Gbps

Table3-Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Single ended input voltage tolerance	-	-0.3	-	4	V	Referred to TP1 signal common
AC common mode input voltage tolerance	-	15	-	-	mV	RMS
Input Impedance (Differential)	Z _{in}	85	100	115	ohms	R _{in} > 100 kohms @ DC
TX Disable	Disable	V _{IH}	2	V _{cc} +0.3	V	-
	Enable	V _{IL}	0	0.8		-
TX FAULT	Fault	V _{OH}	2.4	V _{cc} +0.3	V	-
	Normal	V _{OL}	0	0.5		-
Receiver						
Single ended output voltage		-0.3	-	4	V	Referred to TP1 signal common
AC common mode voltage		-	-	7.5	mV	RMS
Termination mismatch at 1MHz		-	-	5	%	-
Output Impedance (Differential)	Z _{out}	85	100	115	ohms	-
Output Rise/Fall Time	tr/tf	30	-	-	ps	10%~90%

RX_LOS	LOS	V _{OH}	2.4	-	V _{CC} +0.3	V	-
	Normal	V _{OL}	0	-	0.5		-

Table 4 - Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
OM3 MMF	L	0.5		100	
Aggregate Bit Rate	BR _{AVE}	-	41.25	-	Gbps
Lane Bit Rate	BRL _{LANE}	-	10.3125	-	Gbps
Transmitter					
Center Wavelength	λ_c	840	850	860	nm
RMS spectral width	RMS	-	-	0.65	nm
Average Launch Power, Each Lane*(note3)	P _{out} /lane	-7.6	-	2.4	dBm
Transmit OMA, per Lane	TX_OMA/lane	-5.6	-	3	dBm
Difference in launch power between any two lanes(OMA)		-	-	4	dB
Peak power, each lane		-	-	4	dBm
Transmitter and dispersion penalty, each lane	TDP/lane	-	-	3.5	dB
Extinction Ratio*(note4)	ER	3	-		dB
Optical Return Loss Tolerance		-	-	12	dB
Average launch power of OFF, each lane		-	-	-30	dBm
Output Optical Eye*(note4)	IEEE 802.3ba-2010 Compliant				
TX Disable Assert Time	t _{off}			100	us
Receiver					
Center Wavelength	λ_c	840	850	860	nm
Damage Threshold	-	3.4	-		dB
Stressed receiver sensitivity in OMA,each lane	P _{mins}	-	-	-5.4	dBm
Maximum Receive Power, each lane	P _{max}	-	-	-2.4	dBm
Average power, each lane	RX/lane	-7.9	-	+1.0	dBm
LOS De-Assert, OMA	LOSD	-	-	-7.5	dBm
Receiver reflectance	R _r	-	-	-12	dB
LOS Assert	LOSA	-30	-	-	dBm
LOS Hysteresis*(note7)		0.5	-	-	dB

Note3: Output is coupled into a 50/125 μ m multi-mode fiber.

Note4: Filtered, measured with a PRBS 231-1 test pattern @10.3125Gbps

Note5: High speed I/O, internally AC coupled.

Note6: Minimum average optical power measured at BER less than 1E-12, with a 231-1 PRBS

Note7: LOS Hysteresis

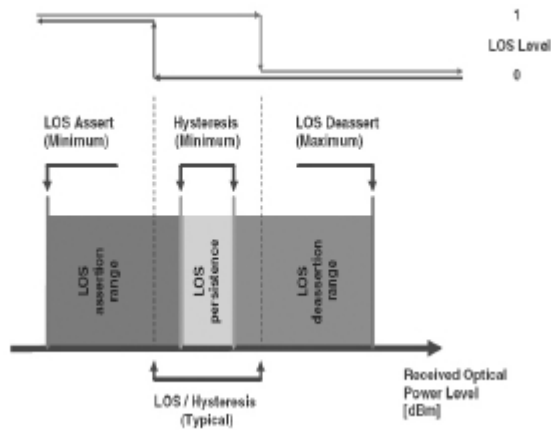


Table 5– Pin Descriptions

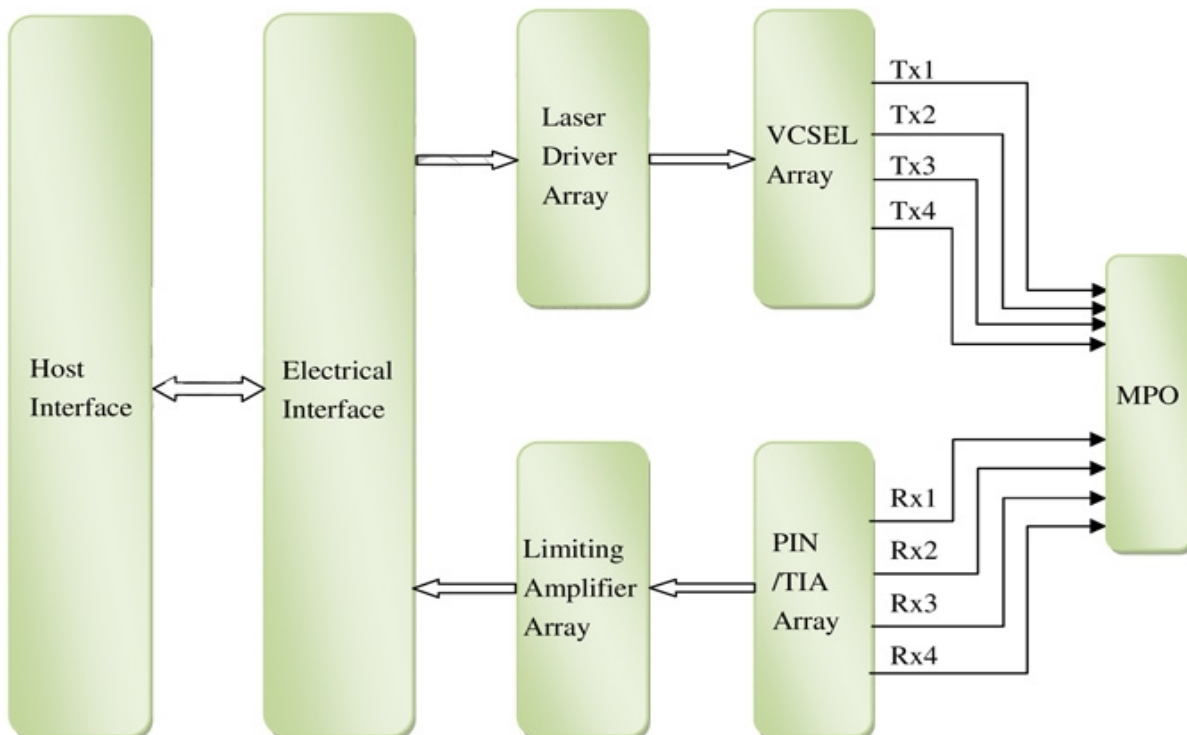
Pin	Logic	Symbol	Description	Plug Sequence	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTTL-I	ModSelL	Module Select	3	
9	LVTTTL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVCOS- I/O	SCL	2-wire serial interface clock	3	
12	LVCOS- I/O	SDA	2-wire serial interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Tx2n	Receiver Inverted Data Output	3	
22	CML-O	Tx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Tx4n	Receiver Inverted Data Output	3	
25	CML-O	Tx4p	Receiver Non-Inverted Data Output	3	

26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL	Interrupt	3	
29		VccTx	+3.3V Power supply transmitter	2	
30		Vcc1	+3.3V Power supply	2	
31	LVTTL-I	LPMODE	Low Power Mode	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

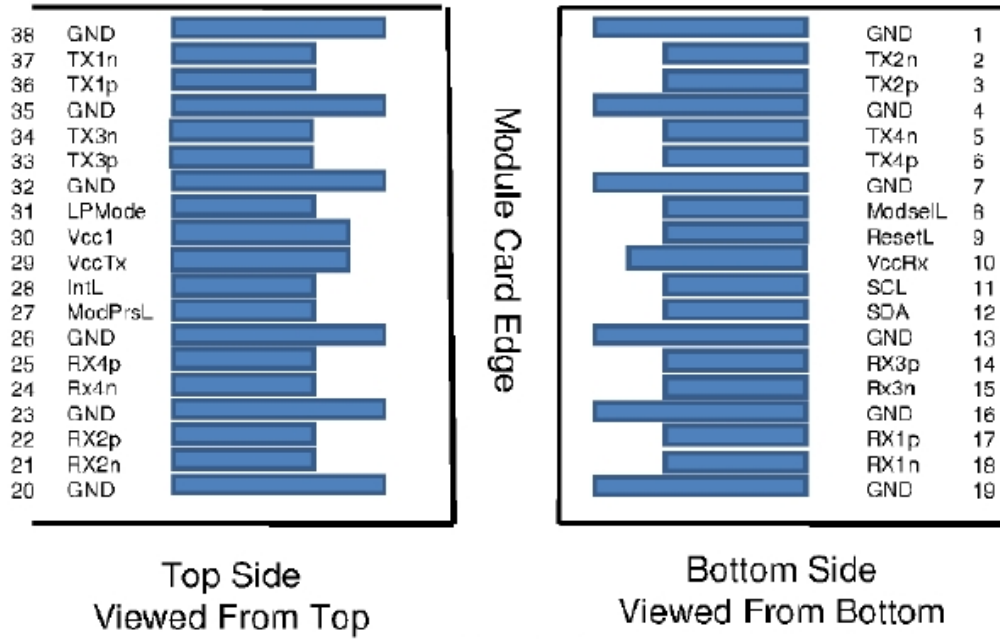
1: GND is the symbol for signal and supply (power) common for the QSFP+ module. All are common within the QSFP+ module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.

2: Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in Table 6. Recommended host board power supply filtering is shown in Figures 3 and 4. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP+ Module in any combination. The connector pins are each rated for a maximum current of 500mA.

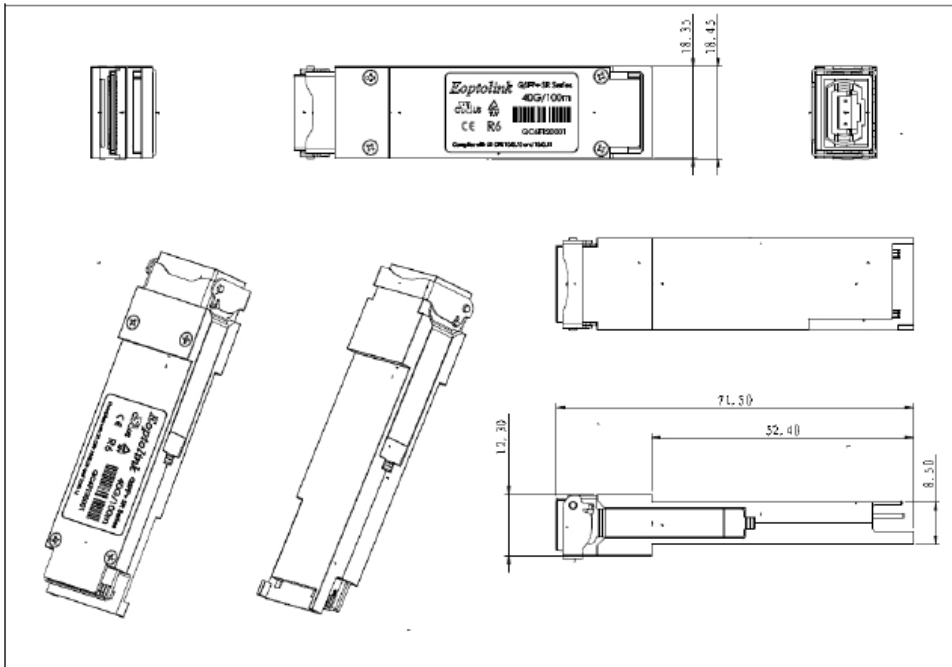
Functional Description of Transceiver



QSFP+ Transceiver Electrical Pad Layout



Mechanical Specifications



Ordering Information

Part No.	Data Rate (Gbps)	Wavelength (nm)	Transmission Distance	Fiber Type	Connector Type	Temp. Range	Digital Diagnostics
QSFP-40G85-1M-xx	40G	850nm	150m	MMF	MPO/MTP	0~70	Yes

Notes:

xx means compatible brand. (For example: CO= Cisco, JU=Juniper, FD=Foundry, EX=Extreme, NE=Netgear,etc.)

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