

# 40GBASE-SR4 QSFP+ 850nm 150m MTP/MPO Transceiver for MMF

SM40G-SR-LL



## Application

- 40GBASE-SR4 40G Ethernet
- Breakout to 4 x 10GBASE-SR Ethernet
- Proprietary interconnections

## Features

- Four-channel full-duplex transceiver module
- Hot Pluggable QSFP+ form factor
- Maximum link length of 100m on OM3 Multimode Fiber (MMF) and 150m on OM4 MMF
- Single 1x12 MPO receptacle
- Unretimed XLPP electrical interface
- Max power dissipation <1.5W
- Reliable VCSEL array technology
- Built-in digital diagnostic functions, including optical power monitoring
- Commercial operating case temperature range: 0° C to 70° C

## Description

QSFP+ transceiver modules are designed for use in 40 Gigabit per second links over multimode fiber. They are compliant with the QSFP + MSA and IEEE 802.3ba 40GBASE-SR4 and breakout to 4 10GBASE-SR. Digital diagnostics functions are available via an I2C interface, including Tx and Rx power monitoring. The optical transceiver is compliant per the RoHS Directive 2011/65/EU.

## Product Specifications

### I. General Product Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Operating Case Temperature</b>	TOPR	0	-	70	°C	
<b>Power Supply Voltage</b>	Vcc	3.135	3.3	3.465	V	
<b>Power Supply Current</b>	Icc			475	mA	
<b>Maximum Power Dissipation</b>	PD	-	-	1.5	W	
<b>Data Rate per Lane</b>	DR	-	10.3125	-	Gb/s	
<b>Operating Distance (MMF OM3)</b>	-	0.5	-	100	m	
<b>Operating Distance (MMF OM4)</b>	-	0.5	-	150	m	

## II. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Storage Temperature</b>	T <sub>s</sub>	-40	-	+85	°C	
<b>Relative Humidity (non-condensing)</b>	RH	5	-	95	%	
<b>Supply Voltage</b>	V <sub>cc</sub>	-0.5	-	3.6	V	
<b>Input Voltage</b>	V <sub>in</sub>	-0.5	-	V <sub>cc</sub> +0.5	V	

### III. Electrical Characteristics (TOP= 0 to 70 °C, VCC = 3.315 to 3.465 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Supply Voltage</b>	Vcc	3.315		3.465	V	
<b>Supply Current</b>	Icc			450	mA	
<b>Input Differential Impedance</b>		90	100	110		
<b>Differential Data Input Swing</b>	VIN, P-P	300	-	1100	mVpp	
<b>Differential Data Output Swing</b>	Vout, P-P	300		850	mVpp	
<b>Input Logic Level High</b>		2		Vcc		
<b>Input Logic Level Low</b>		0		0.8		
<b>Output Logic Level High</b>		Vcc-0.5		Vcc		
<b>Output Logic Level Low</b>		0		0.4		

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Host 2-wire Vcc voltage</b>	Vcc_Host_2w	3.14	-	3.46	V	
<b>SCL and SDA Voltage</b>	V_OL	0	-	0.4	V	
<b>SCL and SDA Voltage</b>	V_OH	$V_{cc\_Host\_2w}-0.5$	-	$V_{cc\_Host\_2w}+0.3$	V	
<b>SCL and SDA Voltage</b>	V_IL	-0.3	-	$V_{ccT}*0.3$	V	
<b>SCL and SDA Voltage</b>	V_IH	$V_{ccT}*0.7$	-	$V_{ccT}+0.5$	V	
<b>Input current on the SCL and SDA contacts</b>	li	-10	-	10	mA	

#### IV. Optical Characteristics (TOP = 0 to 70°C , VCC = 3.315 to 3.465 Volts)

##### Transmitter (per Lane)

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Mean Wavelength (Each Lane)</b>		840	850	860	nm	
<b>Data rate per lane</b>	DR		10.3125		Gbps	
<b>Spectral Width (RMS)</b>				0.65	nm	
<b>Optical Power (Each Lane)</b>	POUT	-7.6	-	2.4	dBm	
<b>OMA per lane</b>	Poma	-5.6		3	dBm	
<b>Peak power, each lane</b>	P_peak			4	dBm	
<b>Extinction Ratio</b>	ER	3	50		dB	
<b>TDP, each lane</b>	TDP			3.5	dB	
<b>Optical return loss tolerance</b>				12	dB	
<b>Average Launch Power Tx_ Off (Each Lane)</b>	Jt2					

## Receiver (per Lane)

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Wavelength (Each Lane)</b>		840	850	860	nm	
<b>Data rate per lane</b>	DR		10.3125		Gbps	
<b>Average power at receiver, each lane</b>	-	-0.95	-	2.4	dBm	
<b>Rx OMA per Lane</b>	OMA	-	-	3	dBm	
<b>Stressed Receiver Sensitivity OMA (Each Lane)</b>	SRS	-	-	-5.4	dBm	
<b>Peak Power (Each lane)</b>	-	-	-	4	dBm	
<b>Receiver Reflectance</b>	RXR	-	-	-12	dB	
<b>LOS Assert</b>	LOSA	-30	-	-	dBm	
<b>LOS De-Assert</b>	LOSD	-	-	-12	dBm	
<b>LOS Hysteresis</b>	-	0.5	-		dB	

### Notes:

Measured with a PRBS231-1 test pattern @10.3125Gbps, BER 10<sup>-12</sup>

## V. Pin Description

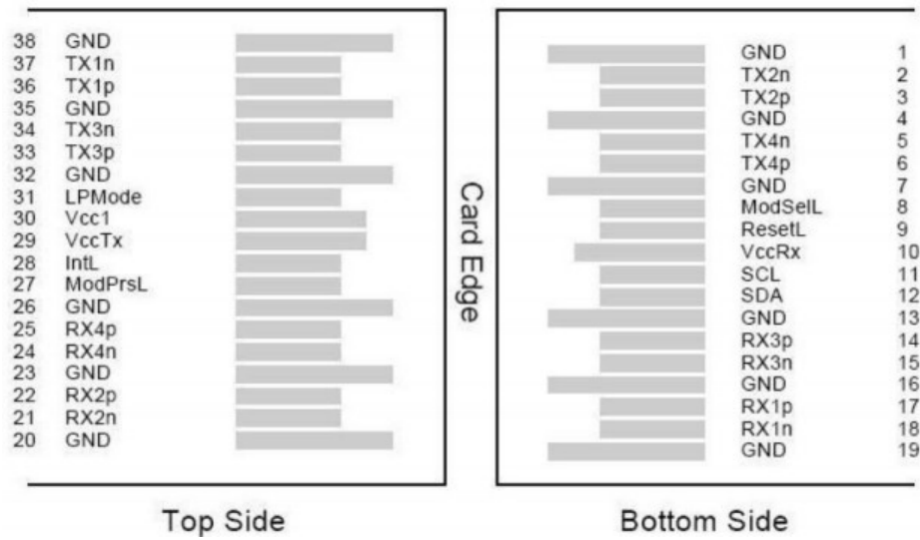


Figure1 QSFP+ Module Pad Layout

Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
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	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3 V Power supply transmitter	2
30	Vcc1	+3.3 V Power Supply	2
31	LPMoDe	Low Power Mode	
32	GND	Ground	1

33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

**Note:**

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. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP+ transceiver module in any combination. The connector pins are each rated for a maximum current of 500 mA.

**VI. Mechanical Specifications**

