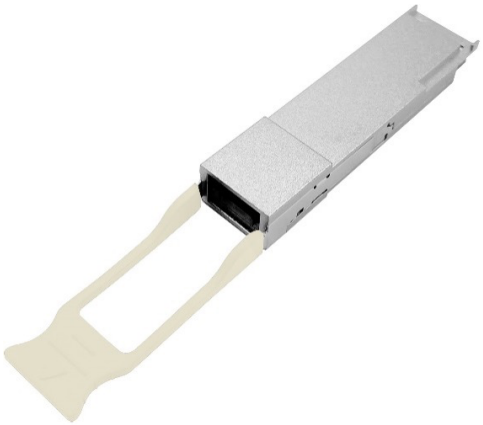
400 Gb/s QSFP-DD SR8 Transceiver
QSFP-DD-400G-SR8



Features

- 8 channels full-duplex transceiver modules
- Transmission data rate up to 53Gbps per channel
- 8x53Gbps PAM4 transmitter and PAM4 receiver
- 8 channels 850nm VCSEL array
- 8 channels PIN photo detector array
- Internal CDR circuits on both receiver and transmitter channels
- Power consumption <8.5W
- Hot Pluggable QSFP DD form factor and Compliant with CMIS
- Maximum link length of 70m on OM3 Multimode Fiber MMF and 100m on OM4 MMF with FEC
- MPO16 connector receptacle
- Built-in digital diagnostic functions
- Operating case temperature 0°C to +70°C
- 3.3V power supply voltage

Applications

- Data centers and Cloud Networks
- 400GE Interconnect Requirements.

Description

The 400G QSFP-DD SR8 Transceiver is designed to transmit and receive serial optical data links up to 8 x

53.125Gbps data rate by PAM4 modulation format over multi-mode fiber.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.3	3.6	V

Input Voltage	Vin	-0.3	Vcc+0.3	V
Storage Temperature	Tst	-20	85	ºC
Case Operating Temperature	Top	0	70	ºC
Humidity(non-condensing)	Rh	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Case temperature	Tca	0		70	ºC
Data Rate Per Lane	fd		26.5625		GBd
Humidity	Rh	5		85	%
Power Dissipation	Pm		7.8	8.5	W

Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Differential input impedance	Zin	90	100	110	ohm
Differential Output impedance	Zout	90	100	110	ohm
Differential input voltage amplitude aAmplitude	ΔVin			1000	mVp-p
Differential output voltage amplitude	ΔVout			900	mVp-p
Skew	Sw			300	ps
Bit Error Rate	BER			2.4E-4	
Near-end Eye Width at 10^-6 probability(EW6)		0.265			UI
Near-end Eye Height at 10^-6 probability(EH6)		70			mV
Far-end Eye Width at 10^-6 probability(EW6)		0.20			UI
Far-end Eye Height at 10^-6 probability(EH6)		30			mV
Near-end Eye Linearity		0.85			

Note:
1. BER=2.4E-4; PRBS31Q@26.5625GBd. Pre-FEC
2.Differential input voltage amplitude is measured between TxnP and TxnN.
3.Differential output voltage amplitude is measured between RxnP and RxnN.

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Centre Wavelength	λc	840	850	860	nm	
RMS spectral width	Δλ			0.6	nm	
Average launch power, each lane	Pout	-6.5		4	dBm	
Optical Modulation Amplitude (OMAouter), each lane	OMA	-4.5		3	dBm	
Transmitter and dispersion eye closure(TDEC),each lane	TDEC			4.5	dB	
Extinction Ratio	ER	3			dB	
Average launch power of OFF transmitter, each lane				-30	dB	
Receiver						
Centre Wavelength	λc	840	850	860	nm	
Receiver Sensitivity in OMAout	RXsen			-6.5	dBm	1
Stressed Receiver Sensitivity in OMAout				-3	dBm	1
Maximum Average power at receiver , each lane input, each lane				4	dBm	
Minimum Average power at receiver , each lane		-7.9			dBm	
Receiver Reflectance				-12	dB	
LOS Assert				-10	dBm	
LOS De-Assert				-8.5	dBm	
LOS Hysteresis		0.5			dB	

Note:
1.Measured with conformance test signal at TP3 for BER = 2.4E-4 Pre-FEC

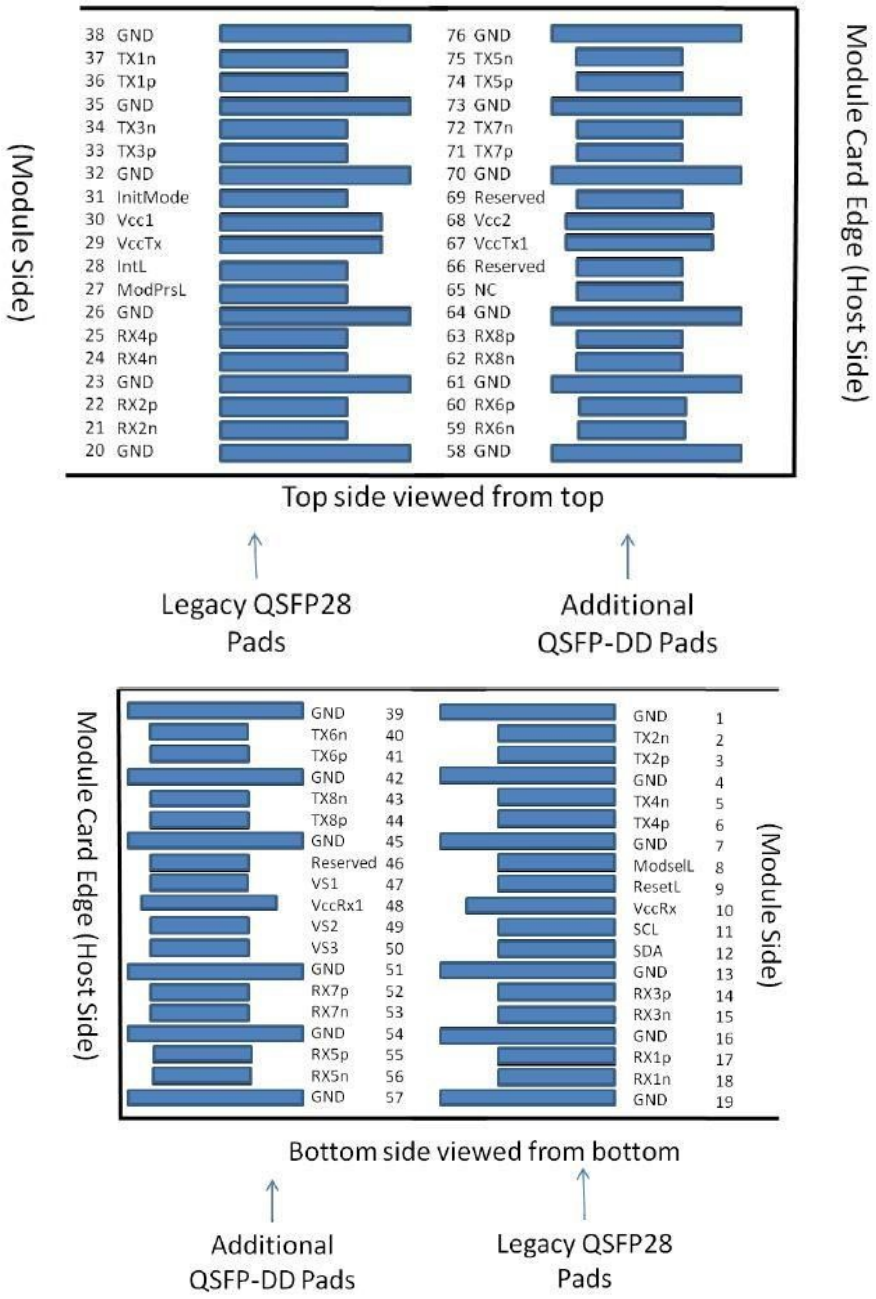
Pin Description

Pin #	Logic	Symbol	Definition
1		GND	Ground
2	CML-I	Tx2n	Transmitter Inverted Data Input
3	CML-I	Tx2p	Transmitter Non-inverted Data Input
4		GND	Ground

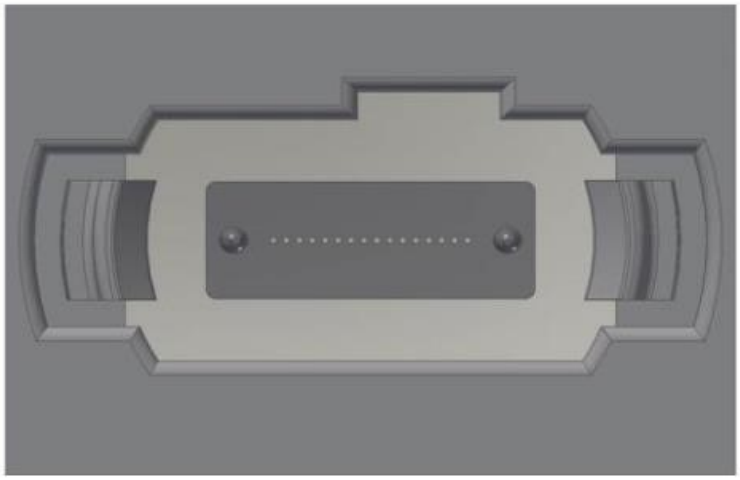
5	CML-I	Tx4n	Transmitter Inverted Data Input
6	CML-I	Tx4p	Transmitter Non-inverted Data Input
7		GND	Ground
8	LVTTL-I	ModSelL	Module Select
9	LVTTL-I	ResetL	Module Reset
10		VccRx	+3.3V Power Supply Receiver
11	LVCMOS-I/O	SCL	2-wire serial interface clock
12	LVCMOS-I/O	SDA	2-wire serial interface data
13		GND	Ground
14	CML-O	Rx3p	Receiver Non-inverted Data Output
15	CML-O	Rx3n	Receiver Inverted Data Output
16		GND	Ground
17	CML-O	Rx1p	Receiver Non-inverted Data Output
18	CML-O	Rx1n	Receiver Inverted Data Output
19		GND	Ground
20		GND	Ground
21	CML-O	Rx2n	Receiver Inverted Data Output
22	CML-O	Rx2p	Receiver Non-inverted Data Output

23		GND	Ground
24	CML-O	Rx4n	Receiver Inverted Data Output
25	CML-O	Rx4p	Receiver Non-inverted Data Output
26		GND	Ground
27	LVTTL-O	ModPrsL	Module Present
28	LVTTL-O	IntL	Interrupt
29		VccTx	+3.3V Power Supply Transmitter
30		Vcc1	+3.3V Power Supply
31	LVTTL-I	InitMode	Initialization mode
32		GND	Ground
33	CML-I	Tx3p	Transmitter Non-inverted Data Input
34	CML-I	Tx3n	Transmitter Inverted Data Input
35		GND	Ground
36	CML-I	Tx1p	Transmitter Non-inverted Data Input
37	CML-I	Tx1n	Transmitter Inverted Data Input
38		GND	Ground
39		GND	Ground
40	CML-I	Tx6n	Transmitter Inverted Data Input
41	CML-I	Tx6p	Transmitter Non-inverted Data Input

42		GND	Ground
43	CML-I	Tx8n	Transmitter Inverted Data Input
44	CML-I	Tx8p	Transmitter Non-inverted Data Input
45		GND	Ground
46		Reserved	
47		VS1	Module Vendor Specific 1
48		VccRx1	3.3V Power Supply
49		VS2	Module Vendor Specific 2
50		VS3	Module Vendor Specific 3
51		GND	Ground
52	CML-O	Rx7p	Receiver Non-inverted Data Output
53	CML-O	Rx7n	Receiver Inverted Data Output
54		GND	Ground
55	CML-O	Rx5p	Receiver Non-inverted Data Output
56	CML-O	Rx5n	Receiver Inverted Data Output
57		GND	Ground
58		GND	Ground
59	CML-O	Rx6n	Receiver Inverted Data Output
60	CML-O	Rx6p	Receiver Non-inverted Data Output
61		GND	Ground
62	CML-O	Rx8n	Receiver Inverted Data Output
63	CML-O	Rx8p	Receiver Non-inverted Data Output
64		GND	Ground
65		NC	Not connected
66		Reserved	
67		VccTx1	3.3V Power Supply
68		Vcc2	3.3V Power Supply
69		Reserved	
70		GND	Ground
71	CML-I	Tx7p	Transmitter Non-inverted Data Input
72	CML-I	Tx7n	Transmitter Inverted Data Input
73		GND	Ground
74	CML-I	Tx5p	Transmitter Non-inverted Data Input
75	CML-I	Tx5n	Transmitter Inverted Data Input
76		GND	Ground


(Module Side)
38 GND
37 TX1n
36 TX1p
35 GND
34 TX3n
33 TX3p
32 GND
31 InitMode
30 Vcc1
29 VccTx
28 IntL
27 ModPrsL
26 GND
25 RX4p
24 RX4n
23 GND
22 RX2p
21 RX2n
20 GND
76 GND
75 TX5n
74 TX5p
73 GND
72 TX7n
71 TX7p
70 GND
69 Reserved
68 Vcc2
67 VccTx1
66 Reserved
65 NC
64 GND
63 RX8p
62 RX8n
61 GND
60 RX6p
59 RX6n
58 GND
Module Card Edge (Host Side)
Top side viewed from top
Legacy QSFP28 Pads
Additional QSFP-DD Pads
Module Card Edge (Host Side)
GND 39
TX6n 40
TX6p 41
GND 42
TX8n 43
TX8p 44
GND 45
Reserved 46
VS1 47
VccRx1 48
VS2 49
VS3 50
GND 51
RX7p 52
RX7n 53
GND 54
RX5p 55
RX5n 56
GND 57
GND 1
TX2n 2
TX2p 3
GND 4
TX4n 5
TX4p 6
GND 7
ModselL 8
ResetL 9
VccRx 10
SCL 11
SDA 12
GND 13
RX3p 14
RX3n 15
GND 16
RX1p 17
RX1n 18
GND 19
(Module Side)
Bottom side viewed from bottom
Additional QSFP-DD Pads
Legacy QSFP28 Pads

Optical interface



MPO-16 Single Row

Ordering Information

Part Number	Product Description
QSFP-DD-400G-SR8	400G QSFP56-DD, 70m on OM3 Multimode Fiber MMF and 100m on OM4 MMF, MPO16(MTP16) APC connector

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sales@duke-villa.com
www.duke-villa.com

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