

200Gb/s QSFP-DD 2SR4 850nm 100m Optical Transceiver

Features

- QSFP-DD MSA compliant
- Up to 28Gbps data rate per channel
- 8 duplex channels transmitters and receivers
- Integrated 850nm VCSEL array and PD array
- Single MP024 connector receptacle
optical interface compliant
- Single +3.3V power supply
- DDM function implemented
- Hot-pluggable QSFP-DD form factor
- Maximum link length of 100m on 24 core MPO OM4 (MMF) fiber
- Power dissipation: < 4.5W
- International class 1 laser safety certified
- Operating temperature range: 0°C ~ +70 °C
- Compliant with RoHS10

Applications

- 200GBASE-SR8 Ethernet
- 2×100GBASE-SR4 Ethernet
- Switch & Router Connections
- Data Centers
- Other 200G Interconnect
Requirements

General Description

The QDD-200G-2SR4 Transceiver is designed to transmit and receive serial optical data links up to 28 Gb/s data rate(per channel) over multi-mode fiber. It is a small-form- factor hot pluggable transceiver module integrated with the high performance VCSEL laser and high sensitivity PIN receiver. It is compliant with 100G Ethernet specs; QSFP-DD MSA. It also functions as a 2x100G QSFP-DD SR8 transceiver that supports 2x100G connections to two 100G QSFP28 SR4 transceivers using a MPO breakout cable.

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings						
Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TSTG	-40		+85	°C	
Operating Relative Humidity (non-condensing)	RH	0		85	%	
Supply Voltage	VCC	-0.5		3.6	V	
Damage Threshold, each Lane	THd	5.5			dBm	

Recommended Operating Conditions

Table2-Recommended Operating Conditions						
Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	Top	0		+70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate, each Lane			25.78		GBd	PAM4
Data Rate Accuracy		-100		100	ppm	
Link Distance with OM3	D	0.5		100	m	

Electrical Characteristic

Table3-Electrical Characteristic						
Parameter	Symbol	Unit	Min.	Typical	Max.	Notes
Supply current	Icc			1300	mA	
Power Consumption				4.5	W	
Optical Transmitter Characteristics						
Single Ended Input Voltage Tolerance	VinT	V	-0.3		4.0	
Differential Data Input Swing	VIN	mVp-p	300		1200	
AC Common Mode Output		mV	15		dB	

Voltage(RMS)						
Differential Input Impedance		Ω	90	100	110	
Optical Receiver Characteristics						
Single Ended Input Voltage Tolerance	VoutR	V			0.2	
Differential Data Output Swing	Vout,PP	mVp-p	350		850	
AC Common Mode Output Voltage(RMS)		mV			7.5	
Differential Output Impedance		Ω	90	100	110	
IIC communication						
IIC Clock frequency		KHZ		100	400	
clock stretching		us			500	
Data hold time		ns	300			

Optical Characteristic

Table4-Optical Characteristic

Parameter	Symbols	Min.	Typical	Max.	Unit	Notes
Transmitter(per Lane)						
Signaling Speed per Lane			25.78125		Gbps	
Center wavelength		840	850	860	nm	
RMS Spectral Width	SW			0.6	nm	
Average Launch Power per lane	TXPx	-8.4		2.4	dBm	
Tx OMA per lane	TxOMA	-6.4		3	dBm	
Difference in power between any two lane(OMA)	DPx			4	dBm	
Average launch power of off transmitter per lane				-30	dBm	
Transmitter and Dispersion eye closure per lane	TDEC			4.3	dB	
Launch power in OMA minus TDEC		-7.3			dBm	
Optical Extinction Ratio	ER	2			dB	
Optical Return Loss Tolerance	ORL			12	dB	
Encircled Flux	FLX		>86% at 19um <30%at 4.5um			dBm

Relative Intensity Noise	RIN			RIN	dB/Hz	
Receiver(per Lane)						
Signaling Speed per Lane			25.78125		Gbps	NRZ
Center wavelength		840	850	860	nm	
Damage Threshold	DT	3.4			dBm	
Average receive power per lane	RxPx	-10.3		2.4	dBm	
Receiver power (OMA) per lane	RxOMA			3	dBm	
Receiver reflectance	Rfl			-12	dB	
vertical eye closure penalty, per lane				1.9	dB	
Stressed Receive Sensitivity(OMA) per lane	SRS			-5.2	dBm	
Sensitivity(OMA) per lane	S			-10.3	dBm	
LOS De-Assert	LOSD			-12	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dBm	

Digital Diagnostic Functions

Table5-Digital Diagnostic Functions

Parameter	Symbols	Min.	Max.	Unit	Notes
Temperature Monitor Absolute Error	DMI_Temp	-3	3	degC	Over operating temperature range
Supply Voltage Monitor Absolute Error	DMI_VCC	-0.1	0.1	V	Over full operating range
Supply Voltage Monitor Absolute Error	DMI_RX_Ch	-2	2	dB	1
Channel Bias Current Monitor	DMI_Ibias_Ch	-10%	10%	mA	
Channel TX Power Monitor Absolute Error	DMI_TX_Ch	-2	2	dB	1

Notes:

[1]Due to measurement accuracy of different single mode fibers, there could be an additional +/-1 dB fluctuation, or a +/- 3 dB total accuracy.

Pin Description

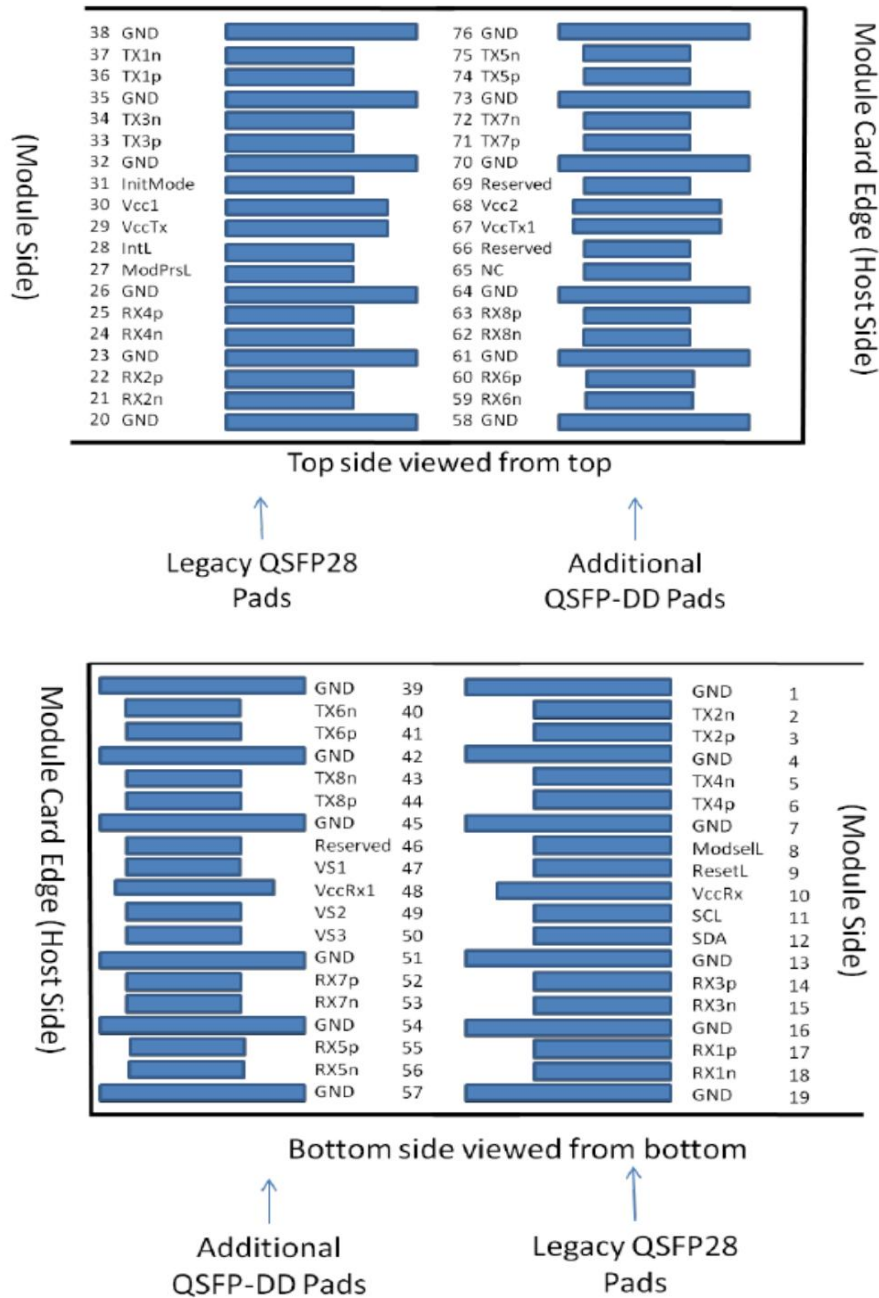


Figure 1 Pin view

Pin Function Definitions

Table6-Pin Function Definitions

Pin	Logic	Symbol	Description	Notes
1		GND	Ground	1B
2	CML-I	Tx2n	Transmitter Inverted Data Input	3B
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3B
4		GND	Ground	1B
5	CML-I	Tx4n	Transmitter Inverted Data Input	3B
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3B
7		GND	Ground	1B
8	LVTTL-I	ModSelL	Module Select	3B
9	LVTTL-I	ResetL	Module Reset	3B
10		Vcc Rx	+3.3V Power Supply Receiver	2B
11	LVC MOS-I/O	SCL	2-wire serial interface clock	3B
12	LVC MOS-I/O	SDA	2-wire serial interface data	3B
13		GND	Ground	1B
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3B
15	CML-O	Rx3n	Receiver Inverted Data Output	3B
16		GND	Ground	1B
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3B
18	CML-O	Rx1n	Receiver Inverted Data Output	3B
19		GND	Ground	1B
20		GND	Ground	1B
21	CML-O	Rx2n	Receiver Inverted Data Output	3B
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3B
23		GND	Ground	1B
24	CML-O	Rx4n	Receiver Inverted Data Output	3B
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3B
26		GND	Ground	1B
27	LVTTL-O	ModPrsL	Module Present	3B
28	LVTTL-O	IntL/RxLOSL	Interrupt. Optionally configurable as RxLOSL via the management interface (SFF-8636)	3B
29		VccTx	+3.3V Power supply transmitter	2B
30		Vcc1	+3.3V Power supply	2B
31	LVTTL-I	InitMode	Initialization mode; In legacy QSFP applications, the InitMode pad is called LPMODE	3B
32		GND	Ground	1B
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3B
34	CML-I	Tx3n	Transmitter Inverted Data Input	3B
35		GND	Ground	1B
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3B

37	CML-I	Tx1n	Transmitter Inverted Data Input	3B
38		GND	Ground	1B
39		GND	Ground	1A
40	CML-I	Tx6n	Transmitter Inverted Data Input	3A
41	CML-I	Tx6p	Transmitter Non-Inverted Data Input	3A
42		GND	Ground	1A
43	CML-I	Tx8n	Transmitter Inverted Data Input	3A
44	CML-I	Tx8p	Transmitter Non-Inverted Data Input	3A
45		GND	Ground	1A
46		Reserved	For future use	3A
47		VS1	Module Vendor Specific 1	3A
48		VccRx1	3.3V Power Supply	2A
49		VS2	Module Vendor Specific 2	3A
50		VS3	Module Vendor Specific 3	3A
51		GND	Ground	1A
52	CML-O	Rx7p	Receiver Non-Inverted Data Output	3A
53	CML-O	Rx7n	Receiver Inverted Data Output	3A
54		GND	Ground	1A
55	CML-O	Rx5p	Receiver Non-Inverted Data Output	3A
56	CML-O	Rx5n	Receiver Inverted Data Output	3A
57		GND	Ground	1A
58		GND	Ground	1A
59	CML-O	Rx6n	Receiver Inverted Data Output	3A
60	CML-O	Rx6p	Receiver Non-Inverted Data Output	3A
61		GND	Ground	1A
62	CML-O	Rx8n	Receiver Inverted Data Output	3A
63	CML-O	Rx8p	Receiver Non-Inverted Data Output	3A
64		GND	Ground	1A
65		NC	No Connect	3A
66		Reserved	For future Use	3A
67		VccTx1	3.3V Power Supply	2A
68		Vcc2	3.3V Power Supply	2A
69		Reserved	For future Use	3A
70		GND	Ground	1A
71	CML-I	Tx7p	Transmitter Non-Inverted Data Input	3A
72	CML-I	Tx7n	Transmitter Inverted Data Input	3A
73		GND	Ground	1A
74	CML-I	Tx5p	Transmitter Non-Inverted Data Input	3A
75	CML-I	Tx5n	Transmitter Inverted Data Input	3A
76		GND	Ground	1A

Transceiver Block Diagram

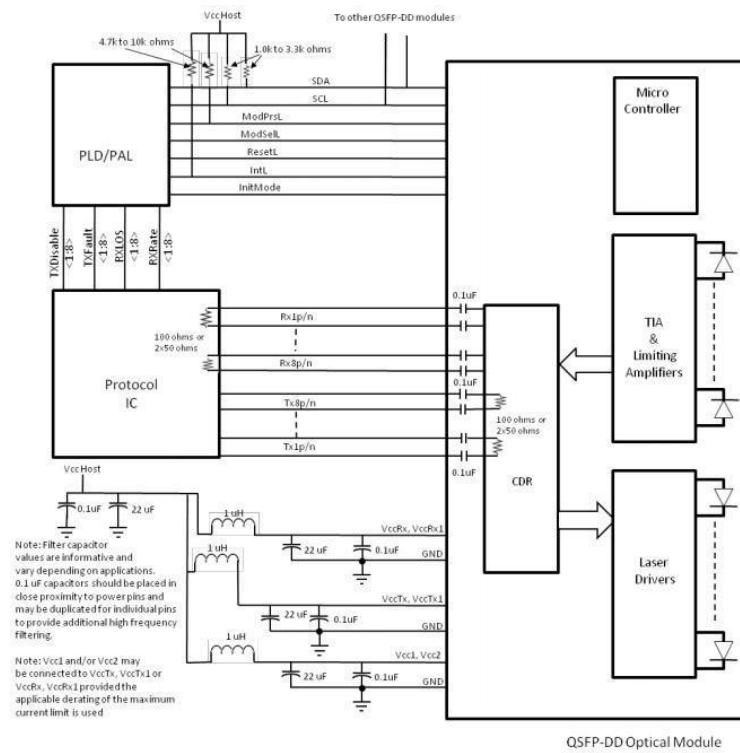


Figure 2 Transceiver Block Diagram

Digital Diagnostic Memory Map

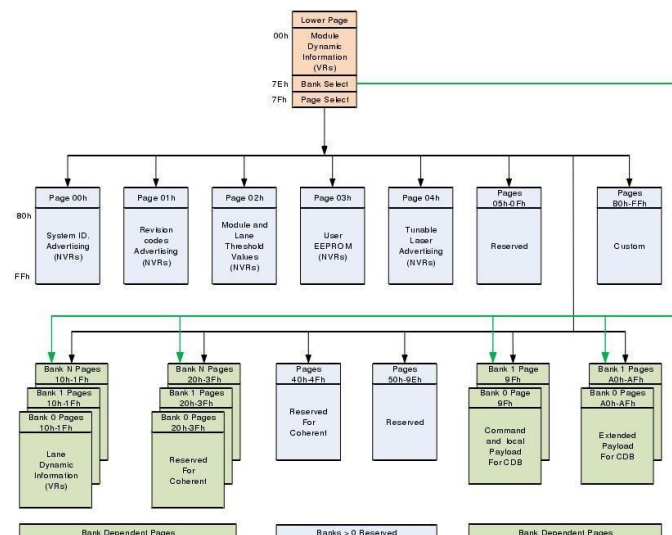


Figure 3 Digital Diagnostic Memory Map

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