QSFP28-100G-CWDM4

DATASHEET | Rev.D00A **TRANSCEIVER**

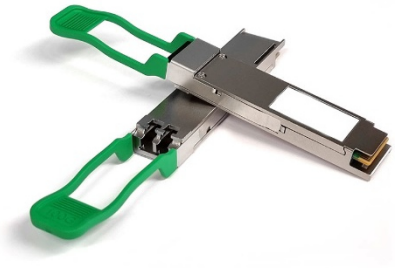
Optosa's QSFP28-100G-CWDM4 is a Four-Channel, Pluggable, dual LC, Fiber-Optic QSFP28 Transceiver for 100G Ethernet applications. The QSFP28 full-duplex optical module offers 4 independents transmit and receive channels, each capable of 25Gbps operation for an aggregate data rate of 100G 2km using single mode fiber. These modules are designed to operate over single mode fiber systems using 1310nm DFB laser array. QSFP28 CWDM4 is one kind of transceiver which provides increased port density and total system cost savings. They are compliant with the QSFP28 MSA, CWDM4 MSA and portions of IEEE P802.3bm.

The QSFP28 CWDM4 can be used for Cisco QSFP-100G-CWDM4-S, Juniper JNP-QSFP-100G--CWDM, Extreme 10404 and for many more OEMs like D-Link, H3C, Palo Alto, Meraki, Netgear, Arista, Brocade, Huawei, Dell, Alcatel, Nokia, HP, Mellanox, Intel, Broadcom, Lenovo…

RoHS Compliance

Optosa is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substances from all of its products. The relevant evidence of RoHS compliance is held as part of our controlled documentation for each of our compliant products. RoHS compliance parts are available to order, please refer to the ordering information section for further details.

Product Features



- Compliant with 100G CWDM4 MSA Specification
- Uncooled 4x25Gb/s CWDM transmitter
- Wide Operating Temperature (0° C~70°C)
- Maximum link length of 2km via Single Mode Fiber (SMF)
- Low power consumption <3.5W
- Operating case temperature 0℃ to 70℃
- 3.3V power supply voltage
- RoHS 6 compliant
- Hot Pluggable QSFP form factor, LC connector receptacle
- Built-in digital diagnostic function

Applications

- 100G Ethernet
- Proprietary High-Speed Interconnections
- Datacenter
- 100G CWDM4 application with FEC

Ordering Information

Part Number	Description
QSFP28-100G-CWDM4	100GBASE-CWDM4 QSFP28, 1270nm – 1330nm CWDM DML, 2km over SMF. C-Temp

Absolute Maximum Rating

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	℃	
Operating Case Temperature	TOP	0	70	℃	
Supply Voltage	VCC	-0.3	3.6	V	
Input Voltage	VIN	-0.3	VCC + 0.3	V	
Relative Humidity	RH	15	85	%	Non-condensing

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	℃	
Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate (Each Lane)	DR		25.78125		Gb/s	
Power Consumption	PC			3.5	W	
Data Speed Tolerance	△DR	-100		100	ppm	
Link Distance with G.652	D	0		2	km	

Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Differential Input Impedance	Zin	90	100	110	Ω	
Differential Output Impedance	Zout	90	100	110	Ω	
Differential Input Voltage amplitude	△Vin	300		1100	mVp-p	
Differential Output Voltage amplitude	△Vout	500		800	mVp-p	
Input Logic Level High	VIH	2		VCC	V	
Input Logic Level Low	VIL	0		0.7	V	
Output Logic Level High	VOH	VCC - 0.5		VCC	V	
Output Logic Level Low	VOL	0		0.4	V	

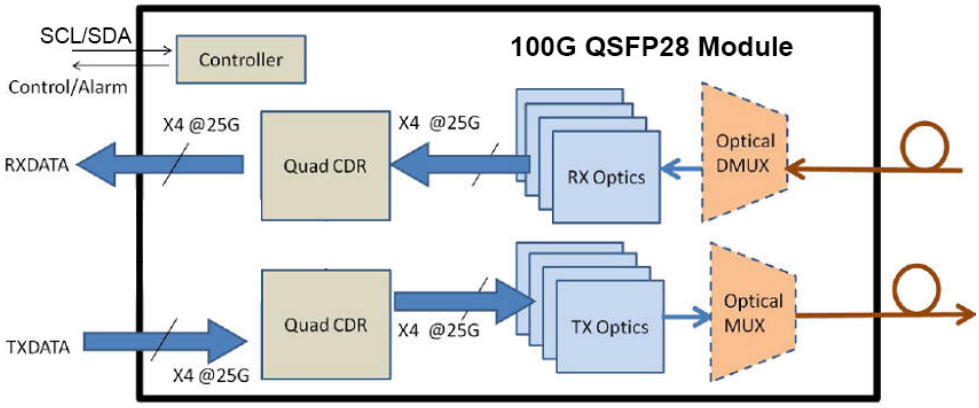
Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Wavelength Assignment	L0	1264.5	1271	1278	nm	
	L1	1284.5	1291	1298	nm	
	L2	1304.5	1311	1318	nm	
	L3	1324.5	1331	1338	nm	
Transmitter						
RMS Spectral Width	λRMS			3.5	nm	1
Average Launch Power (Each Lane)	PAVG	-6.5		2.5	dBm	
Optical Modulation Amplitude (OMA)	POMA	-4		2.5	dBm	
Transmitter and Dispersion Penalty (Each Lane)	TDP			3	dB	
Rise/Fall Time	TR/TF			30	ps	
Extinction Ratio	ER	3.5			dB	
Transmitter Reflectance	RT			-12	dB	
Average Launch Power OFF Transmitter (Each Lane)	POFF			-30	dBm	
Transmitter Eye Mask Definition (X1,X2,X3,Y1,Y2,Y3)	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}					Hit Ratio 5E-5
Receiver						
Wavelength Assignment	L0	1264.5	1271	1278	nm	
	L1	1284.5	1291	1298	nm	
	L2	1304.5	1311	1318	nm	
	L3	1324.5	1331	1338	nm	
Damage Threshold (Each Lane)	DT	3.5			dBm	
Average Power at Receiver Input (Each Lane)	OVL	-10		2.5	dBm	
Receiver Sensitivity in OMA (Each Lane)	SEN			-10	dBm	2
Rx_LOS of Signal Assert	PA	-30			dBm	
Rx_LOS of Signal De-assert	PD		-	-12	dBm	
Rx_LOS of Signal Hysteresis	PHy	0.5	-	6	dB	

Note:

1. Transmitter wavelength, RMS spectral width and power need to meet the OMA minus TDP specs to guarantee link performance.
2. Sensitivity is specified at $5x10^{-5}$ BER.

Block Diagram of Transceiver



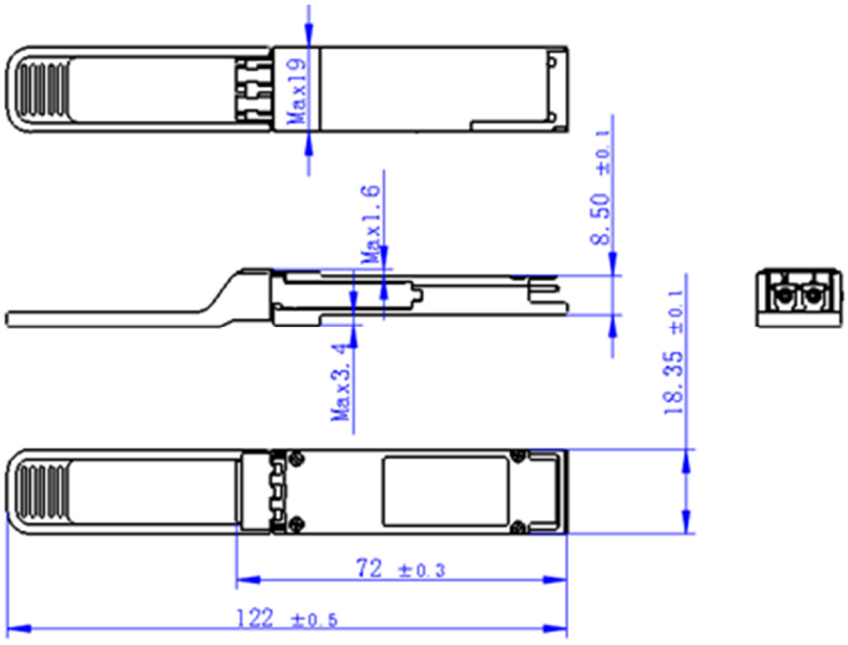
Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-5	5	℃	
Supply voltage monitor absolute error	DMI_VCC	-0.1	0.1	V	
Channel RX power monitor absolute error	DMI_RX_Ch	-3	3	dB	
Channel Bias current monitor	DMI_Ibias_Ch	-10%	10%	mA	
Channel TX power monitor absolute error	DMI_TX_Ch	-3	3	dB	

Mechanical Dimensions

Units: nm



Pin Assignment and Description

Pin Assignment

Pin	Logic	Symbol	Description	Plug Sequence
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3
7		GND	Ground	1
8	LVTTL-I	ModSelL	Module Select	3
9	LVTTL-I	ResetL	Module Reset	3
10		Vcc Rx	+3.3V Power Supply Receiver	2
11	LVCMOS-I/O	SCL	2-wire serial interface clock	3
12	LVCMOS-I/O	SDA	2-wire serial interface data	3
13		GND	Ground	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3
15	CML-O	Rx3n	Receiver Inverted Data Output	3
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3
18	CML-O	Rx1n	Receiver Inverted Data Output	3
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	3
28	LVTTL-O	IntL	Interrupt	3
29		Vcc Tx	+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
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3
34	CML-I	Tx3n	Transmitter Inverted Data Input	3
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3
37	CML-I	Tx1n	Transmitter Inverted Data Input	3
38		GND	Ground	1

ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).