800ZR+ Pro OSFP Coherent Transceiver

CL800GOSFPZR+

Product Features:

- Compliant with OSFP MSA, Type 2 package with the closed top heatsink
- Compliant with OIF 800ZR IA, OpenROADM MSA Ver 7.0
- Support 100GbE/200GbE/400GbE/800GbE client signal
- C-band tunable, supporting 150 GHz grid spacing and 0.1 GHz fine-tuning
- EDFA inside, TX output optical power ranging from +1 to -10 dBm tunable at C-band (up to +4 dBm at 193.7 THz)
- Support ingress LF hold-off time configuration
- Support hitless firmware upgrade
- Duplex LC connector
- Operating case temperature: 0°C to 75°C
- Single 3.3 V power supply
- Typical power consumption 29 W (800GbE ZR+)
- RoHS 2 compliant

Functional Characteristics (Optical)

The following tables list the performance specifications for the various functional blocks of the integrated optical transceiver module.

Table 1 – Transmitter Optical Specifications

Parameter		Min.	Typ.	Max.	Unit	Note
Modulation format	800ZR 118GB16QAM		16QAM		-	OFEC
	800ZR+ 118GB16QAM		16QAM		-	OFEC
	800ZR+ 124GB PCS-16QAM		PCS-16QAM		-	SDFEC
	400ZR++118GB QPSK		QPSK		-	OFEC
Baud rate	800ZR 118GB16QAM		118.2 ± 20 ppm		GBd	-
	800ZR+ 118GB16QAM		118.2 ± 20 ppm			-
	800ZR+ 124GB PCS-16QAM		123.8 ± 20 ppm			-
	400ZR++118GB QPSK		118.2 ± 20 ppm			-
Transmitter frequency range		191.3	-	196.1	THz	Center frequency
Flexible DWDM grid		3.125	-	-	GHz	-
Frequency fine-tuning step		0.1	-	-	GHz	-
Laser frequency accuracy		-1.8	-	1.8	GHz	-

Laser linewidth		-	-	300	kHz	Tx and LO
Laser frequency noise		-	-	See mask	Hz2/Hz	
Laser frequency noise-discrete tone amplitude		-	-	See mask	MHz	
Laser RIN	0.2 GHz ≤ f ≤ 10 GHz Avg	-	-	-145	dB/Hz	-
	0.2 GHz ≤ f ≤ 10 GHz Peak	-	-	-140		-
Tx clock phase noise (PN): maximum PN mask		-	-	See mask	dBc/Hz	
Maximum transmit output power	191.3-196.1THz	0	1	-	dBm	Maximum transmit output power over wavelength, temperature, and aging
	193.7 THz	3	4	-		
Minimum provisionable range of transmit output power	191.3-196.1THz	-10	-	1	dBm	-
	193.7 THz	-10	-	4		
Default transmit output power		0.5			dBm	-
Total output power with Tx disabled		-	-	-35	dBm	OutputDisableTx == true
Total output power during wavelength switching		-	-	-35	dBm	Applicable to modules with tunable optics.
Transmit output power stability		-0.5	-	0.5	dB	Output short-term power stability when operating at a fixed wavelength and temperature.Measurement condition: 1 ms averaging time for1-minute accumulation.
Optical power setting accuracy		-1	-	1	dB	-
Output power monitor accuracy		-1	-	1	dB	-
Transmit output power adjust step		0.1	-	-	dB	-
Inband (IB) OSNR		37	-	-	dB/12.5GHz	Inband OSNR is defined as the Tx signal power between the -20 dB Tx spectral mask frequency points, referenced to an optical noise bandwidth of12.5 GHz (0.1 nm @193.7 THz) at the Tx signal peak frequency.
Out-of-band (OOB) OSNR		27	-	-	dB/12.5GHz	Out-of-band OSNR is defined as the Tx signal power between the -20 dB Tx spectral mask frequency points, referenced to the maximum optical noise power within any optical bandwidth of12.5 GHz (0.1 nm @193.7 THz) outside of the -20 dB Tx spectral mask.
Transmitter reflectance		-	-	-20	dB	Looking into the Tx
Transmitter back reflection tolerance		-	-	-24	dB	Light reflected relative to Tx output power back to

					transmitter while still meeting Tx optical performance requirements.
Transmitter polarization dependent power	-	-	1.5	dB	-
X-Y skew	-	-	5	ps	-
DC I-Q offset (mean per polarization)	-	-	-26	dB	
I-Q instantaneous offset	-	-	-20	dB	Same formula definition as DC I-Q offset.However, any averaging period shall be < 1 μs to be consistent with the timescales of Rx DSP operations.Specification applies at any point in time.Allows for modulator bias controls/errors.
Mean I-Q amplitude imbalance	-	-	1	dB	-
I-Q phase error	-5	-	5	deg	-
I-Q skew	-	-	0.75	ps	-

Table 2 – Receiver Optical Specifications

Parameter		Min.	Typ.	Max.	Unit	Note
Modulation format	800ZR 118GB16QAM		16QAM		-	OFEC
	800ZR+ 118GB16QAM		16QAM		-	OFEC
	800ZR+ 124GB PCS-16QAM		PCS-16QAM		-	SDFEC
	400ZR++118GB QPSK		QPSK		-	OFEC
Baud rate	800ZR 118GB16QAM		118.2 ± 20 ppm		GBd	-
	800ZR+ 118GB16QAM		118.2 ± 20 ppm			-
	800ZR+ 124GB PCS-16QAM		123.8 ± 20 ppm			-
	400ZR++118GB QPSK		118.2 ± 20 ppm			-
Frequency offset between received carrier and LO		-3.6	-	3.6	GHz	Acquisition range
Input power	800ZR 118GB	-9	-	0	dBm	Signal power of the
range	16QAM					channel for the OSNR
(amplified, OSNRtolerance						tolerance defined
	800ZR+ 118GB16QAM	-9	-	0	dBm	
defined)	800ZR+ 124GB	-9	-	0	dBm	
	PCS-16QAM					
	400ZR++118GB QPSK	-12	-	0	dBm	

Input power range (single wavelength unamplified,193.7 THz)	800ZR 118GB16QAM	-19	-	0	dBm	RX OSNR > 35 dB,193.7 THz
	800ZR+ 118GB16QAM	-19	-	0	dBm	
	800ZR+ 124GB PCS-16QAM	-20	-	0	dBm	
	400ZR++118GB QPSK	-26	-	0	dBm	
Input power range (single wavelength unamplified, 191.3 -196.1 THz)	800ZR 118GB16QAM	-18	-	0	dBm	RX OSNR > 35 dB, 191.3-196.1 THz
	800ZR+ 118GB16QAM	-18	-	0	dBm	
	800ZR+ 124GB PCS-16QAM	-19	-	0	dBm	
	400ZR++118GB QPSK	-25	-	0	dBm	
Input power damage threshold		13	-	-	dBm	Instantaneous input power
OSNRtolerance	800ZR 118GB16QAM	-	25.5	27	dB/12.5GHz	The OSNR tolerance is referenced to an optical bandwidth of 12.5 GHz (0.1 nm @ 193.7 THz).
	800ZR+ 118GB16QAM	-	25.5	27		
	800ZR+ 124GB PCS-16QAM	-	23.8	25.5		
	400ZR++118GB QPSK	-	16.8	17.8		
Pre FEC BERthreshold	800ZR 118GB16QAM	-	1.6e-2	1.9e-2	-	Post FEC BER < 1e-15.Measured at back to back environment.
	800ZR+ 118GB16QAM	-	1.6e-2	1.9e-2	-	
	800ZR+ 124GB PCS-16QAM	-	2.0e-2	2.3e-2	-	
	400ZR++118GB QPSK	-	1.9e-2	2.2e-2	-	
Optical return loss		20	-	-	dB	Optical reflectance at Rx connector input.
Chromatic dispersion (CD)tolerance	800ZR 118GB 16QAM	2400			ps/nm	Tolerance to chromatic dispersion
	800ZR+ 118GB16QAM	10000	-	-		
	800ZR+ 124GB PCS-16QAM	17000	-	-		
	400ZR++118GB QPSK	48000	-	-		
CD OSNR tolerance penalty		-	-	0.5	dB	OSNR tolerance penalty over OSNR tolerance due to chromatic dispersion
PMDtolerance (DGD, SOPMD)	800ZR 118GB16QAM	10	-	-	ps	Tolerance to PMD with≤ 0.5 dB penalty against OSNR tolerance when change in SOP
	800ZR+	20	-	-	ps	

	118GB16QAM					is ≤ 1 krad/s.10 ps of average PMD (DGD, SOPMD)corresponds to:33 ps of DGDmax when SOPMD = 0 ps2272 ps2 of SOPMD when DGDmax = 23.3 psDue to the statistical nature of PMD the DGDmax to DGDmean ratio is calculated at 3.3 (4.1 x 10-6 probability that instantaneous DGD exceeds DGDmax).
	800ZR+ 124GB PCS-16QAM	20	-	-	ps	
	400ZR++118GB QPSK	30	-	-	ps	
Peak PDL tolerance		3.5	-	-	dB	Tolerance to peak PDL with ≤ 1.8 dB penalty to OSNR tolerance when change in SOP is ≤ 1 krad/s.Test configuration: PDL emulator applied before noise loading.
Tolerance to change in SOP	800ZR 118GB16QAM	50	-	-	krad/s	Tolerance to change in SOP with ≤ 0.5 dB additional OSNR penalty over all PMD and PDL values.
	800ZR+ 118GB 16QAM	300			krad/s	Tolerance to change in SOP with ≤ 1 dB additional OSNR penalty over all PMD and PDL values.
	800ZR+ 124GB PCS-16QAM	300	-	-	krad/s	Tolerance to change in SOP with ≤ 1 dB additional OSNR penalty over all PMD and PDL values.
	400ZR++118GB QPSK	500	-	-	krad/s	Tolerance to change in SOP with ≤ 1 dB additional OSNR penalty over all PMD and PDL values.
Optical input power transient tolerance		-2	-	2	dB	Tolerance to change in input power with ≤ 0.5 dB penalty to OSNR tolerance.Received power during transient shall be within the range defined by the input power range. OSNR penalty is referenced against the steady state required OSNR tolerance at the minimum power of the input transient.The 20% to 80% rise/fall times for the input power change shall be no faster than 50 microseconds, equivalent to a ≤ 24 mdB/ms maximum slew rate.
Adjacent channel crosstalk OSNR tolerance penalty		DWDM system dependent			dB	OSNR tolerance penalty due to crosstalk interference from neighboring channels.Back-to-back through the reference mux/demux filters

			specified.Neighboring channels conforming to the worst-case Tx spectral mask.Neighboring channels
			having 3 dB higher Tx output power relative to the channel under measurement and at worst case frequency offsets.
Intra-Channel filtering penalty	DWDM system dependent	dB	Due to filtering effects with the reference 150 GHz mux/demux filters specified.

Ordering Information

Table 3 - Ordering Information

Part No.	Specification					Application
	Package	Rate	Pout	Temperature	Reach	
CL800GOSDPZR+	OSFP	800G	+1 dBmto -10 dBm	0°C to 75°C	800G 480 km (CDsupports 850 km)400G 2400 km	800ZR/800ZR+/400ZR++

CONTACT:

Email: sales@c-light.com https://www.c-light.com