400GBase-ZR QSFP-DD Coherent 120km Transceiver
CL400GQDDZR-120

Features:

- Full Spectrum 400ZR Coherent 60GBaud DP-16QAM design
- Support rates: 400GbE, 4x100GbE
- Compliant with IEEE802.3-2018 standard: 4x100GAUI-2, 400GAUI-8, electrical interface; CEI-56G-PAM4-VSR electrical interface
- Compliant with OIF 400ZR OIF-400ZR-01.0 and IEEE 802.3cw R2.0 coherent standard: 400GBASE-ZR optical interface
- Compliant with QSFP-DD Type 2A (CMIS Rev 5.0)
- Support fully C-band tunable single carrier
- Support Interconnect up to 120km with EDFA
- Supports 3dB channel insertion loss
- Max power consumption 17W
- Case operating temperature 0°C to 75°C
- I2C Interface with digital diagnostic monitoring at rates of 100kb/s, 400kb/s, or 1Mb/s
- Complies with RoHS 2015/863/EU
- Class 1M Laser

Applications

- Metro / regional ROADM networks
- Data center interconnect

Table 1 – Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_{OPR}	-5	-	75	ºC	
Operating humidity		5		85	%	Non-condensing
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	I_{CC_IP}	-	-	4000	mA	
Sustained peak current at hot plug	I_{CC_SP}	-	-	3300	mA	
Maximum Power Dissipation	P_D	-		17	W	
Maximum Power Dissipation, Low Power Mode	P_{DLP}	-	-	3.5	W	
Signalling Rate per Lane	SRL	-	59.84375	-	Gbd	16QAM
Two Wire Serial Interface Clock Rate	-	-	400	1000	kHz	
Module power supply noise tolerance 10 Hz - 10 MHz (ptp)	-	-	-	66	mVpp	
Rx Differential Data Output Load	-	-	100	-	Ohm	
Operating Distance	-	-	80	120	km	

Functional Characteristics (Optical)

Table 2 – Transmitter Optical Specifications

Parameter	Min.	Typical	Max.	Unit	Notes
Tx provisionable carrier frequency range	191.25		196.125	THz	1
Carrier frequency fine-tuning range	-5		5	GHz	
Carrier frequency fine-tuning step size	100		100	MHz	
Carrier frequency error	-1.5		1.5	GHz	EOL
Local/In-band OSNR	42			dB/12.5GHz	
Global/Out-of-band OSNR	42			dB/12.5GHz	
Symbol rate		59.8438		GBd	
Modulated spectral width 100G-O-31.5 200G-O-31.5 400G-E-ZR+		 35.0 35.0 66.7		GHz	-20dB width
Tx Spectral Shaping		0.125		RRC	Fixed
Laser linewidth			500	kHz	
Tx DC I-Q offset			-26	dBm	
Tx I-Q instantaneous offset			-20	dB	
Tx I-Q amplitude imbalance			1	dB	
Tx I-Q phase error	-5		5	deg	
Tx X-Y power imbalance			1.5	dB	

Table 3– Transmitter Optical Power Specifications

Parameter	Min.	Typical	Max.	Unit	Notes
Tx provisionable output power range	-13.0		-9.0	dBm	
Tx provisionable output power step size		0.1		dB	
Tx total ouput power monitor accuracy	-1.0		1.0	dB	1
Output power stability	-0.5		+0.5	dB	2
Output power enable time			4	s	3
Output power during blanking			-20	dBm	
Output power disable time			100	ms	4
Tx optical return loss	20.0			dB	
Tolerable optical reflection			-24	dB	

Table 4 – Receiver Optical Specifications

Parameter	Min.	Typical	Max.	Unit	Notes
ROSNR 400G-E-ZR			23.7 26	dB/12.5GHz	1;2
Rx sensitivity 400G-E-ZR			-14	dBm	3
PMD tolerance(mean) 400G-E-ZR			10	ps	
SOP tracking tolerance 400G-E-ZR			50	Krad/s	<0.5dB ROSNR penalty
PDL tolerance(peak)			3.5	dB	<1.3dB ROSNR penalty

400G-E-ZR					
CD tolerance 400G-E-ZR	-2.4		2.4	ns/nm	<0.5dB ROSNR penalty

Table5– Receiver Optical Power Specifications

Parameter	Min.	Typical	Max.	Unit	Notes
Rx operating input power range	-6 -12		+5 +6	dBm	<0.5dB ROSNR penalty <1.5dB ROSNR penalty
Rx input power monitor range	-22		5	dBm	
Rx total input power monitor range	-2.0		2.0	dB	
Rx signal power monitor accuracy	-3.0		3.0	Krad/s	
Rx input power transient tolerance	-4.0		4.0	dB	Note 1
Rx optical return loss	-22			dB	400ZR compliant input signal
Rx LOS threshold		-18		dB	
Rx LOS hystersis	1.0			dB	

Ordering Information

Table 6- Ordering Information

Part No.	Application	Data Rate	Laser Source	Distance
CL400GQDDZR -120	400G-E-ZR 4x100G-E-ZR	425Gb/s 4x100Gb/s	C-band Tunable	120km in SMF with EDFA 25dB