

QSFP-100G-ER4-C Lite

100Gb/s QSFP28 ER4 Lite 40KM Transceiver

1. Features

- Hot Pluggable QSFP28 form factor
- Supports aggregate bit rate up to 103.125Gb/s
- LC Duplex optical interface
- 4x25Gb/s LAN-WDM transmitter,DML laser, APD array detector
- Operating case temperature:0 to 70 °C
- Low power consumption <4.2W
- Applicable for 40km G.652 SMF connection with FEC
- All-metal housing for superior EMI performance
- IIC management interface
- Single +3.3V power supply
- RoHS compliant (lead free)

2. Application

- 100G Ethernet
- Other optical links

The 40km 100GBase-ER4 Lite QSFP28 transceiver is designed to meet the requirements of 100G ethernet links over SMF up to 40km. It is compliant with QSFP28 MSA, IEEE 802.3ba. It is cost-effective, low power consumption with a single 3.3V power supply. The module has an aggregate bit rate up to 103.125Gbps by multiplexing of 4 independent LAN-WDM optical lanes, each lane capable of transmitting 25.78125Gb/s over 40km G.652 SMF links with FEC. It is fabricated with all-metal and compact size housing for superior EMI performance.

3. Order Information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
QSFP28-ER4	103.1Gbps	LAN WDM EML	SMF	40km	LC	0~70°C	Y

4. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature Range	T _s	-40	-	+85	°C	
Power Supply Voltage	V _{CC}	-0.5	-	+3.6	V	
Operating Relative Humidity	RH	-	-	+85	%	
Static electrical discharge (human body model)	-	500	-	-	V	

5. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T _C	0	-	+70	°C	
Power Supply Voltage	V _{CC}	3.14	3.3	3.46	V	
Power Supply Current	I _{CC}	-	-	1.27	A	
Maximum Power Dissipation	P _D	-	-	4.2	W	
Aggregate Bit Rate	BR _{AVE}	-	103.125	-	Gb/s	
Lane Bit Rate	BR _{LANE}	-	25.78125	-	Gb/s	
Transmission Distance	TD		-	40	km	Over SMF

6. Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Center Wavelength Lane 0	λ_0	1294.53		1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02		1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54		1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09		1310.19	nm	
Signal Speed Variation from Nominal	ΔfD	-100		100	ppm	
Side Mode Suppression Ratio	SMSR	30		-	dB	
Total Average launch Power	PTOTAL			10.5	dBm	
Average Launch Power, each lane	POUT	-2.5		6.5	dBm	
Optical Modulation Amplitude (OMA), each lane	POMA	0.1		5	dBm	
Difference in launch power between any two lanes(OMA)		-		5	dBm	
Transmitter and dispersion penalty (TDP), each lane		-		2.2	dB	
Average Launch Power of OFFtransmitter, each lane	POFF	-		-30	dBm	
Extinction Ratio	ER	4		-	dB	
RIN ₂₀ OMA		-		-130	dB/Hz	
Optical return loss tolerance		-		20	dB	
Transmitter reflectance		-		-12	dB	
Transmitter eye maskdefinition {X1,X2, X3,Y1,Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}					
Mask margin		5		-	%	1

Receiver						
Center Wavelength Lane 0	λ_0	1294.53		1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02		1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54		1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09		1310.19	nm	
Average receiver power, each lane		-20.9		-6	dBm	
Damage threshold, each lane			-	-4	dBm	
Receiver Sensitivity(AOP), each lane	PAVE	-	-	-18	dBm	2
Average Receive Power, each lane		-	-	-6	dBm	
ReceiverPower,eachlane(OMA)		-	-	-6	dBm	
Receiver Reflectance	RFL	-	-	-26	dB	
Receiver 3 dB electrical upper cutoff frequency, each lane		-		31	GHz	
LOS Assert	LOSA	-33	-	-	dBm	
LOS De-Assert	LOSD	-	-	-22	dBm	
LOS Hysteresis	LOSH	0.5			dB	

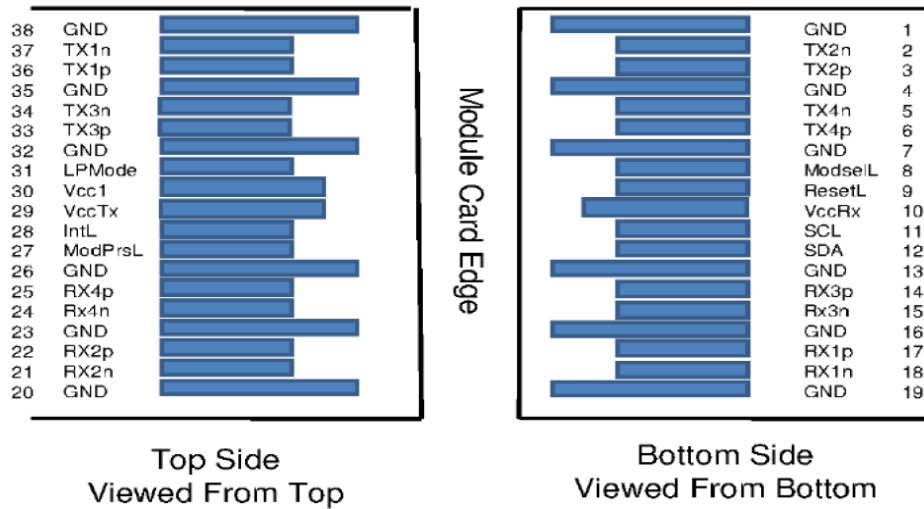
Notes

1. Hit ratio 5×10^{-5}
2. Sensitivity is specified at BER@5E-5.

7. Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Differential Input Voltage Swing	VIN	180	-	900	mV	
Tx Differential Input Impedence	ZIN	-	100	-	Ω	
Differential input return loss		Per 100Gbase-ER4			dB	
Common mode input return loss		Per 100Gbase-ER4			dB	
Differential output Voltage Swing	VOUT	300	-	900	mV	
Rx Differential Output Impedence	ZOUT	-	100	-	Ω	
Differential output return loss		Per 100Gbase-ER4			dB	
Common mode output return loss		Per 100Gbase-ER4			dB	

8. Pin Description



Pin	Name	Logic	Function	PlugSeq.	Notes
1	GND		Ground	1	
2	Tx2n	CML-I	Transmitter Inverted Data Input		
3	Tx2p	CML-I	Transmitter Non-Inverted Data Input		
4	GND		Ground	1	
5	Tx4n	CML-I	Transmitter Inverted Data Input		
6	Tx4p	CML-I	Transmitter Non-Inverted Data Input		
7	GND		Ground	1	
8	ModSelL	LVTTL-I	Module Select		
9	ResetL	LVTTL-I	Module Reset		
10	VCCRx		+3.3V Power Supply Receiver	2	
11	SCL	LVC MOS-I/O	2-wire serial interface clock		
12	SDA	LVC MOS-I/O	2-wire serial interface data		
13	GND		Ground	1	
14	Rx3p	CML-O	Receiver Non-Inverted Data Output		
15	Rx3n	CML-O	Receiver Inverted Data Output		
16	GND		Ground	1	
17	Rx1p	CML-O	Receiver Non-Inverted Data Output		
18	Rx1n	CML-O	Receiver Inverted Data Output		
19	GND		Ground	1	
20	GND		Ground	1	
21	Rx2n	CML-O	Receiver Inverted Data Output		

22	Rx2p	CML-O	Receiver Non-Inverted Data Output		
23	GND		Ground	1	
24	Rx4n	CML-O	Receiver Inverted Data Output		
25	Rx4p	CML-O	Receiver Non-Inverted Data Output		
26	GND		Ground	1	
27	ModPrsL	LVTTL-O	Module Present		
28	IntL	LVTTL-O	Interrupt		
29	VccTx		+3.3V Power supply transmitter	2	
30	Vcc1		+3.3V Power supply	2	
31	LPMODE	LVTTL-I	Low Power Mode		
32	GND		Ground	1	
33	Tx3p	CML-I	Transmitter Non-Inverted Data Input		
34	Tx3n	CML-I	Transmitter Inverted Data Input		
35	GND		Ground	1	
36	Tx1p	CML-I	Transmitter Non-Inverted Data Input		
37	Tx1n	CML-I	Transmitter Inverted Data Input		
38	GND		Ground	1	

Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 3 below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the module in any combination. The connector pins are each rated for a maximum current of 1000mA.

9. Digital Diagnostics

Performance Item	Related Bytes (A0[00] memory)	Monitor Error	Notes
Module temperature	22 to 23	$\pm 5^{\circ}\text{C}$	1, 2
Module voltage	26 to 27	$\pm 3\%$	2
LD bias current	42 to 49	$\pm 10\%$	2
Transmitter optical power	50 to 57	$\pm 3 \text{ dB}$	2
Receiver optical power	34 to 41	$\pm 3 \text{ dB}$	2

Notes

- 1: Actual temperature test point is fixed on module case around Laser.
- 2: Full operating temperature range.

10. Mechanical Dimension(mm)

