

NXQ28-8504-M1D

QSFP28 100GBASE-SR4 850nm 100m Multimode

Features

- QSFP28 Form Factor
- 100 Gb/s bitrate
- Up to 100 m over Multimode
- MPO connector
- 850 nm, VCSEL laser, PIN photodiode
- Up to 3,5W power consumption
- +0/+70°C temperature range
- Built in digital diagnostic monitoring



Applications

- 100GBase Ethernet
- Access and Enterprise

Optical specifications



Optical budget : 2.0 dB

Transmitter & Receiver optical Specifications

Parameter	Min	Max	Unit
Tx Power	-6.2	4	dBm
Rx Sensitivity	-8.2	4	dBm

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Maximum Supply Voltage	V _{CC}	-0.5	3.6	V	
Storage Temperature	T _S	-40	85	°C	
Operating Case Temperature	T _{OP}	10	70	°C	
Operating Relative Humidity	RH	0	85	%	
Damage Threshold	TH _d	5		dBm	
Data Rate Accuracy		-100	100	ppm	
Pre-FEC Bit Error Ratio				2.4x10 ⁻⁴	
Post-FEC Bit Error Ratio				1x10 ⁻¹²	1
Link Distance	OM3	D1	70	m	2
	OM4	D2	100	m	2
	OM5	D3	150	m	2

Notes:

1. FEC provided by host system.
2. FEC required on host system to support maximum distance.

Electrical Characteristics

Parameter	Test Point	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Power Consumption				4	W	
Supply Current	Icc			1.21	A	
Transmitter						
Overload Differential Voltage pk-pk	TP1a	900			mV	
Common Mode Voltage (Vcm)	TP1	-350		2850	mV	1
Differential Termination Resistance Mismatch	TP1			10	%	At 1MHz
Differential Return Loss (SDD11)	TP1			See CEI-28G-VSR Equation 13-19	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC11, SCD11)	TP1			See CEI-28G-VSR Equation 13-20	dB	
Stresses Input Test	TP1a	See CEI-28G-VSR Section 13.3.11.2.1				
Receiver						
Differential Voltage, pk-pk	TP4			900	mV	
Common Mode Voltage (Vcm)	TP4	-350		2850	mV	1
Common Mode Noise, RMS	TP4			17.5	mV	
Differential Termination Resistance Mismatch	TP4			10	%	At 1MHz
Differential Return Loss (SDD22)	TP4			See CEI-28G-VSR Equation 13-19	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC22, SCD22)	TP4			See CEI-28G-VSR Equation 13-21	dB	
Common Mode Return Loss (SCC22)	TP4			-2	dB	2
Transition Time, 20 to 80%	TP4	9.5			ps	
Vertical Eye Closure (VEC)	TP4			5.5	dB	
Eye Width at 10^{-15} probability (EW15)	TP4	0.57			UI	
Eye Height at 10^{-15} probability (EH15)	TP4	228			mV	

Notes:

1. Vcm is generated by the host. Specification includes effects of ground offset voltage.
2. From 250MHz to 30GHz

Optical Characteristics

Parameter	Symbol	KP4 FEC Mode			Unit	Notes
		Min.	Typ.	Max.		
Transmitter						
Center Wavelength Line0	λ_c	844		863	nm	
Center Wavelength Line1	λ_c	900		918	nm	
RMS Spectral Width	$\Delta\lambda_{rms}$			$\lambda_1: 0.6$ $\lambda_2: 0.65$	nm	
Average Launch Power, each Lane	P_{AVG}	-6.2		4	dBm	1
Optical Modulation Amplitude (OMA), each Lane	P_{OMA}	-4.2		3	dBm	
Launch power in OMA minus TDP, each lane		-5.6			dBm	
TDECQ, each lane				4.5	dBm	
Extinction Ratio	ER	3.0			dB	
Transmitter transition time, each lane (max)				31	ps	
RIN12 OMA				-128	dB/Hz	
Optical Return Loss Tolerance	TOL			12	dB	
Average Launch Power OFF Transmitter, each Lane	P_{off}			-30	dBm	
Encircled Flux			$\geq 86\% \text{ at } 19 \mu\text{m}$ $\leq 30\% \text{ at } 4.5 \mu\text{m}$			2
Signaling rate, each lane			26.5625± 100ppm		Gbps	
Receiver						
Center Wavelength Lane0	λ_c	844	850	863	nm	
Center Wavelength Lane1	λ_c	900	910	918	nm	
Damage Threshold, each Lane	TH_d	5			dBm	3
Average Receive Power, each lane		-8.2			dBm	4
Average power at receiver input, each lane (overload)				4	dBm	
Receiver Reflectance	R_R			-12	dB	
Stressed receiver sensitivity in OMA, Lane2				-3.5	dBm	5
Receiver sensitivity (OMA outer), each lane				Max(-6.6, SECQ-8) as per IEEE cl 150	dBm	
LOS Assert	LOSA	-30		-14.2	dBm	
LOS Deassert	LOSD			-11.2	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Even if the mTDEC <0.9 db, the OMA (min) must exceed this value.
2. If measured into type A1a.2 50um fiber in accordance with IEC 61280-1-4.
3. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.

4. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
5. Measured with conformance test signal at TP3 as per the following:

Stressed eye closure (SECq), each lane	4.5	dB
OMA of each aggressor, each lane	3	dBm

Pin Descriptions

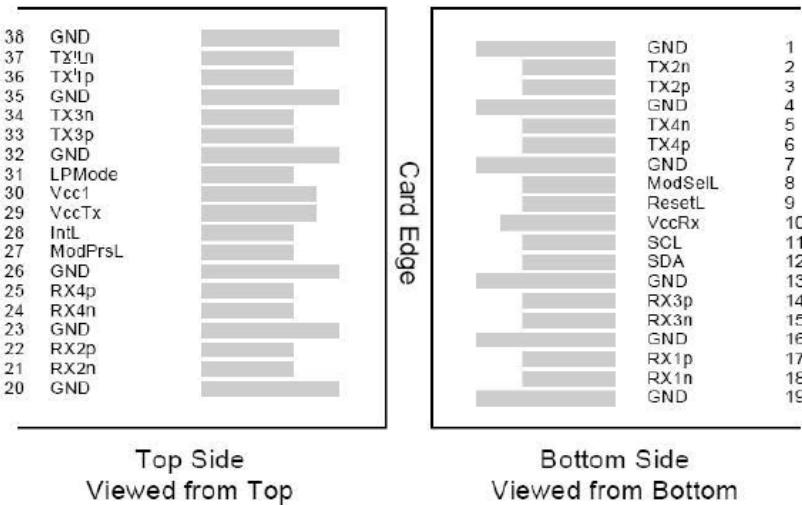
Pin	Logic	Symbol	Name/Descriptions	Notes
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	1
8	LVTLI-I	ModSelL	Module Select	
9	LVTLI-I	ResetL	Module Reset	
10		VccRx	+3.3V Power Supply Receiver	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTLO	ModPrsL	Module Present	
28	LVTTLO	IntL	Interrupt	

29		VccTx	+3.3 V Power Supply transmitter	2
30		Vcc1	+3.3 V Power Supply	2
31	LVTTI-I	LPMode	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	1

Notes:

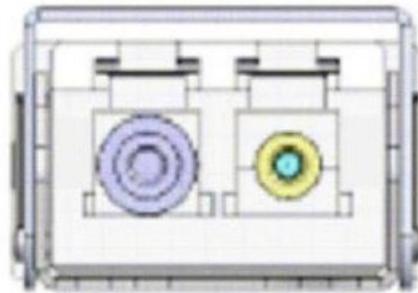
1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. VccRx, Vcc1 and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 4 below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

Electrical Pin-Out Details

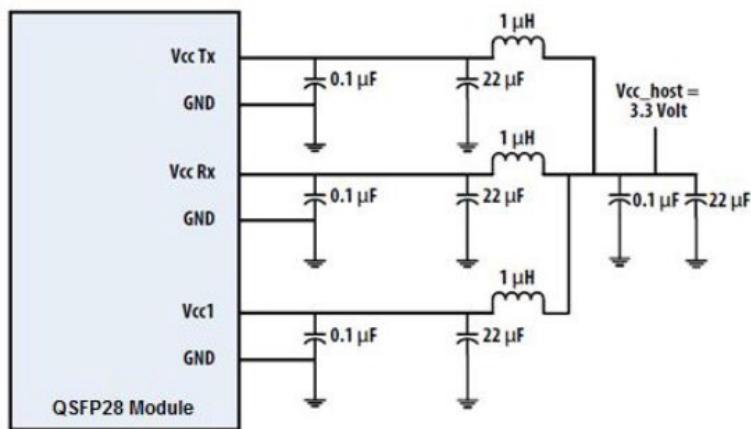


Optical Interface Lanes and Assignments

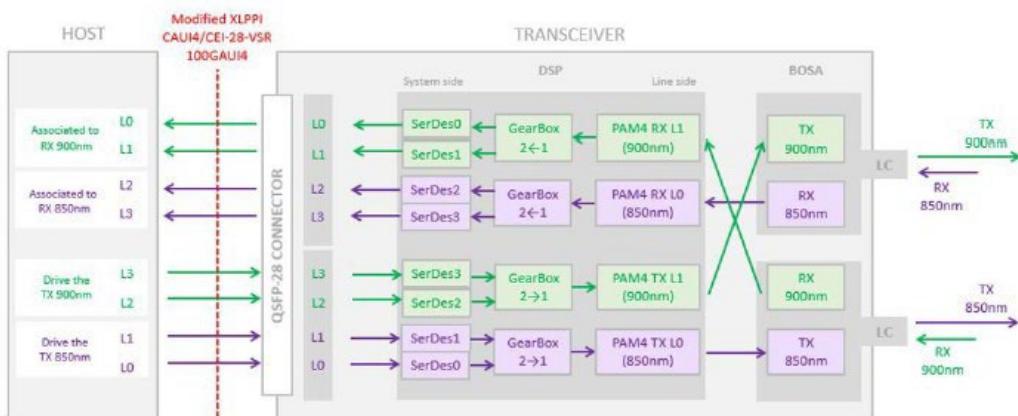
The orientation of the multi-mode fiber facets of the optical connector



Recommended Power Supply Filter



Transceiver Block Diagram



Mechanical Specifications

