SKYLANE OPTICS®

Q28QD010C04D000

MSA Compliant 100GBase-LR4 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 10km, LC, DOM)

Product Description

This MSA compliant QSFP28 transceiver provides 100GBase-LR4 throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1295nm to 1309nm via an LC connector. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

- SFF-8665 Compliance
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free

Applications:

- 100GBase Ethernet
- Access and Enterprise

For your product safety, please read the following information carefully before any manipulation of the transceiver:

ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.

LASER SAFETY

This is a Class1 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).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Maximum Supply Voltage	Vcc	-0.5		3.6	V
Storage Temperature	TS	-40		85	°C
Operating Case Temperature	Tc	0	25	70	°C
Operating Humidity	RH	5		85	%
Receiver Damage Threshold, per Lane	Rxdmg	5.5			dBm

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Dissipation	PD			3.5	W	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Transmitter						
Differential data input swing per lane	Vin			900	Mvp-p	
Input Impedance (Differential)	Zin			10	%	
Stressed Input Parameters						
Eye width		0.46			UI	
Applied pk-pk sinusoidal jitter		IEEE 802.3bm Table 88-13				
Eye height		95			mv	
DC common mode voltage		-350		2850	mv	
Receiver						
Differential output amplitude		200		900	Mvp-p	
Output Impedance (Differential)	Zout			10	%	
Output Rise/Fall Time	tr/tf	12			ps	20%~80%
Eye width		0.57			UI	
Eye height differential		228			mv	
Vertical eye closure				5.5	db	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Signaling Speed per Lane	Brave		25.78		Gbps	
Data Rate Variation		-100		+100		
Lane_0 Center Wavelength	λC0	1294.53	1295.56	1296.59	nm	
Lane_1 Center Wavelength	λC1	1299.02	1300.05	1301.09	nm	
Lane_2 Center Wavelength	λC2	1303.54	1304.58	1305.63	nm	
Lane_3 Center Wavelength	λC3	1308.09	1309.14	1310.19	nm	
Average Launch Power each Lane	P_{each}	-4.3		4.5	dBm	1
Optical Modulation Amplitude (OMA) each Lane	TxOMA	-1.3		4.5	dBm	
Difference in launch power between any two lanes (OMA)				5	dB	
Launch power in OMA minus TDP, each lane		-2.3			dBm	
Transmitter and dispersion penalty (TDP), each lane				2.2	dB	
Extinction Ratio	ER	4			dB	
Side-mode Suppression ratio	SMSRmin	30			dB	
Average launch power of OFF transmitter per lane				-30	dBm	
Relative Intensity Noise	RIN			-130	dB/hz	
Transmitter Reflectance				-12	dB	
Optical Return Loss Tolerance				20	dB	
Transmitter eye mask definitions: X1, X2, X3, Y1, Y2, Y3	0.25, 0.4, 0.45, 0.25, 0.28, 0.4					2
Receiver						
Signaling Speed per Lane	BRAVE		25.78		Gbps	
Data Rate Variation		-100		+100	ppm	
Damage threshold per lane	Rxdmg	5.5			dBm	
Lane_0 Center Wavelength	λC0	1294.53	1295.56	1296.59	nm	
Lane_1 Center Wavelength	λC1	1299.02	1300.05	1301.09	nm	
Lane_2 Center Wavelength	λC2	1303.54	1304.58	1305.63	nm	
Lane_3 Center Wavelength	λC3	1308.09	1309.14	1310.19	nm	
Average Receive Power per Lane	Rxpow	-10.6		4.5	dBm	3
Receive Power (OMA) per Lane	RxOMA			4.5	dBm	
Receive Sensitivity in OMA per Lane	Rxsens			-8.6	dBm	
Receiver 3 dB electrical upper cutoff frequency, per lane				31	GHz	
Stressed Receiver Sensitivity (OMA) per Lane	RXSRS			-6.8	dBm	4

Optical Return Loss	ORL			-26	dB	
LOS Assert	LOSA	-25			dBm	
LOS De-Assert	LOSD			-12	dBm	
LOS Hysteresis		0.5			dB	
Conditions of stressed receiver sensitivity test						
Vertical eye closure penalty	VECP	1.8			dB	5
Stressed eye J2 Jitter	J2	0.3			UI	5
Stressed eye J9 Jitter	J9	0.47			UI	5

Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Hit ratio $5x10^{-5}$.
3. 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.
4. Measured with conformance test signal at TP3 for BER = 10–12.
5. Vertical eye closure penalty, stressed eye J2 Jitter, and stressed eye J9 Jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

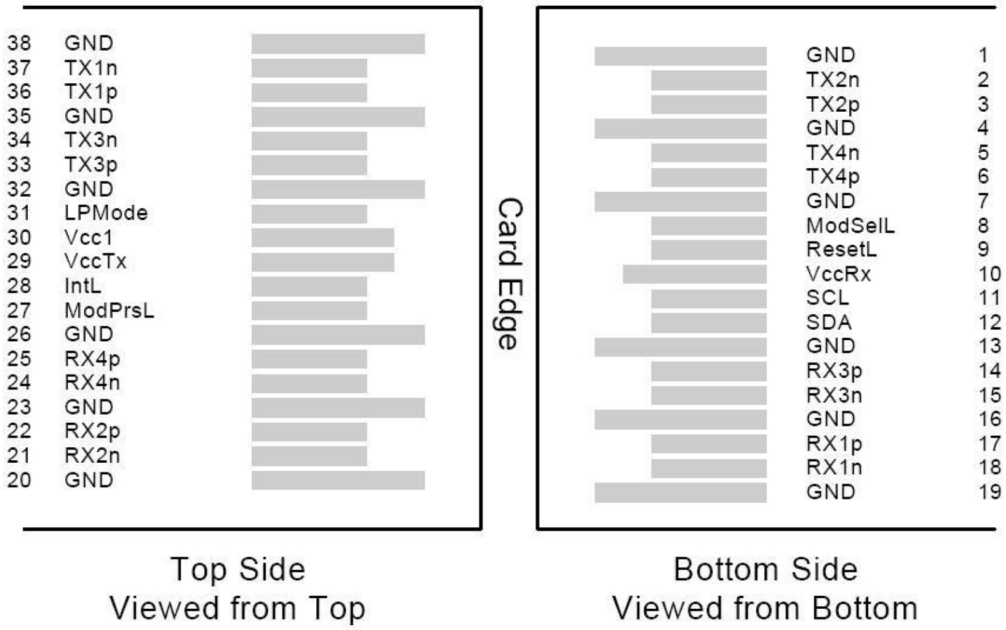
Pin Descriptions

Pin	Logic	Symbol	Name/Descriptions	Ref.
1		GND	Module Ground	1
2	CML-I	Tx2-	Transmitter inverted data input	
3	CML-I	Tx2+	Transmitter non-inverted data input	
4		GND	Module Ground	1
5	CML-I	Tx4-	Transmitter inverted data input	
6	CML-I	Tx4+	Transmitter non-inverted data input	
7		GND	Module Ground	1
8	LVTTL-I	MODSEIL	Module Select	2
9	LVTTL-I	ResetL	Module Reset	2
10		VCCRx	+3.3v Receiver Power Supply	
11	LVCMOS-I	SCL	2-wire Serial interface clock	2
12	LVCMOS-I/O	SDA	2-wire Serial interface data	2
13		GND	Module Ground	1
14	CML-O	RX3+	Receiver non-inverted data output	
15	CML-O	RX3-	Receiver inverted data output	
16		GND	Module Ground	1
17	CML-O	RX1+	Receiver non-inverted data output	
18	CML-O	RX1-	Receiver inverted data output	
19		GND	Module Ground	1
20		GND	Module Ground	1
21	CML-O	RX2-	Receiver inverted data output	
22	CML-O	RX2+	Receiver non-inverted data output	
23		GND	Module Ground	1
24	CML-O	RX4-	Receiver inverted data output	
25	CML-O	RX4+	Receiver non-inverted data output	
26		GND	Module Ground	1
27	LVTTL-O	ModPrsL	Module Present, internal pulled down to GND	
28	LVTTL-O	IntL	Interrupt output, should be pulled up on host board	2
29		VCCTx	+3.3v Transmitter Power Supply	
30		VCC1	+3.3v Power Supply	
31	LVTTL-I	LPMode	Low Power Mode	2
32		GND	Module Ground	1
33	CML-I	Tx3+	Transmitter non-inverted data input	
34	CML-I	Tx3-	Transmitter inverted data input	
35		GND	Module Ground	1
36	CML-I	Tx1+	Transmitter non-inverted data input	
37	CML-I	Tx1-	Transmitter inverted data input	
38		GND	Module Ground	1

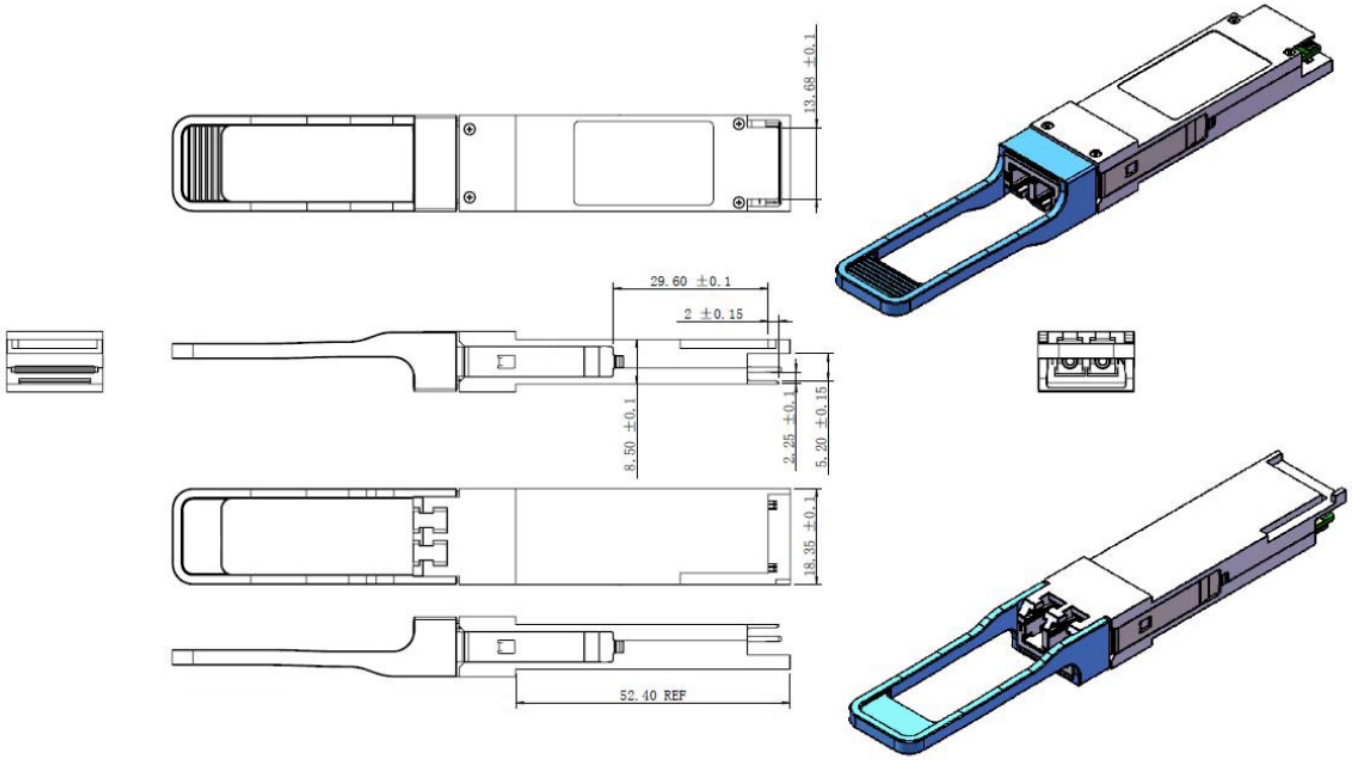
Notes:

1. Module circuit ground is isolated from module chassis ground with in the module.
2. Open collector; should be pulled up with 4.7k-10k ohms on host board to a voltage between 3.15V and 3.6V.

Electrical Pin-out Details



Mechanical Specifications



About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.