Q2L21040C00F000

MSA and TAA Compliant 100GBase-ER1 QSFP28 Single Lambda Transceiver (SMF, 1310nm, 40km, LC, DOM)

Product Description

This MSA Compliant QSFP28 transceiver provides 100GBase-ER1 throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. 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:

- Compliant with QSFP28 MSA
- Duplex LC Connector
- Supports 106.25Gbps (PAM4)
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- High Sensitivity APD Receiver
- Excellent ESD Protection
- Hot Pluggable
- RoHS Compliant and Lead Free
- Metal with Lower EMI

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.	Max.	Unit
Maximum Supply Voltage	Vcc	0	3.6	V
Storage Temperature	TS	-40	85	°C
Operating Case Temperature	Tc	0	70	°C
Relative Humidity (No Condensation)	RH	0	85	%
Damage Threshold	THd	0		dBm
Link Distance	D		40	km

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc			1.66	A	
Power Consumption	P_{DISS}		4.5	5.5	W	
Transmitter High-Speed Electrical Characteristics						
Signaling Rate	Rate	25.78125 ± 100ppm			Gbps	
Input Differential Impedance	ZIN		100		Ω	
Differential Input Voltage Per Lane				900	mV	
Input Impedance Mismatch				10	%	
Input High Voltage	VIH	2		Vcc+0.3	V	
Input Low Voltage	VIL	-0.3		0.8	V	
Receiver High-Speed Electrical Characteristics						
Signaling Rate	Rate	25.78125 ± 100ppm			Gbps	
Common-Mode Voltage	Vcm	-350		2850	mV	
Common-Mode Noise (RMS)				17.5	mV	
Differential Termination Resistance Mismatch (At 1MHz)				10	%	
Differential Return Loss (SDD22)				Per CEI-28G-VSR	dB	
Common-Mode to Differential Conversion and Differential to Common-Mode Conversion (SDC22, SCD22)				Per CEI-28G-VSR	dB	
Common-Mode Return Loss (SCC22): From 250MHz to 30GHz				-2		
Transition Time: 20-80%		9.5			ps	
Vertical Eye Closure	VEC			6.5	dB	
Eye Width at 10-15 Probability	EW15	0.57			UI	

Eye Height at 10-15 Probability	EH15	228			mV	

Optical Characteristics (EOL)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Data Rate Per Lane			53.125 ± 100ppm			Gbps	
Modulation Format			PAM4				
Wavelength		λ	1308.09	1309.09	1310.19	nm	
Side-Mode Suppression Ratio		SMSR	30			dB	
Average Launch Power		Pavg	1.7		7.1	dBm	1
Outer Optical Modulation Amplitude (OMAouter)	**TDP<1.4dB**	POMA	4.7		7.9	dBm	
	TDP>1.4dB		3.3+TDP				
Transmitter and Dispersion Penalty		TDP			3.9	dB	
TECQ		TECQ			3.9	dB	
|TDP-TECQ|(Maximum)					2.7	dB	
Extinction Ratio		ER	5.0			dB	
Optical Return Loss Tolerance		ORLT			15	dB	
Transmitter Reflectance		RL			-26	dB	2
Average Launch Power Off Transmitter		Poff			-15	dBm	
RIN15.6 OMA		RIN			-136	dB/Hz	
Receiver							
Data Rate Per Lane			53.125 ± 100ppm			Gbps	
Modulation Format			PAM4				
Lane Wavelength		λ	1304.5~1317.5			nm	
Damage Threshold		THd	-2.4			dBm	3
Average Receive Power			-16		-3.4	dBm	4
Receive Power (OMAouter)					-2.6	dBm	
Receiver Reflectance		RL			-26	dB	

Receiver Sensitivity (OMAouter)	**TECQ<1.4 dB**				-13.8	dBm	
	TECQ>1.4 dB				TECQ-15.2		
Stressed Receiver Sensitivity (OMAouter) Per Lane - Maximum		SRS			-11.3	dBm	5
LOS Assert		LOSA	-30		-19.5	dBm	
LOS De-Assert		LOSD			-16.5	dBm	
LOS Hysteresis		LOSH	0.5			dB	
Conditions of Stress Receiver Sensitivity Test							

Stressed Eye Closure for PAM4 (SECQ) Lane Under Test				3.9	dB	

Notes:

1. Average launch power (minimum) 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. Transmitter Reflectance is defined looking into the transmitter.
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.
4. Average receive power (minimum) 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 a conformance test signal at TP3 for the BER specified in IEEE Std 802.3cd.

Pin Descriptions

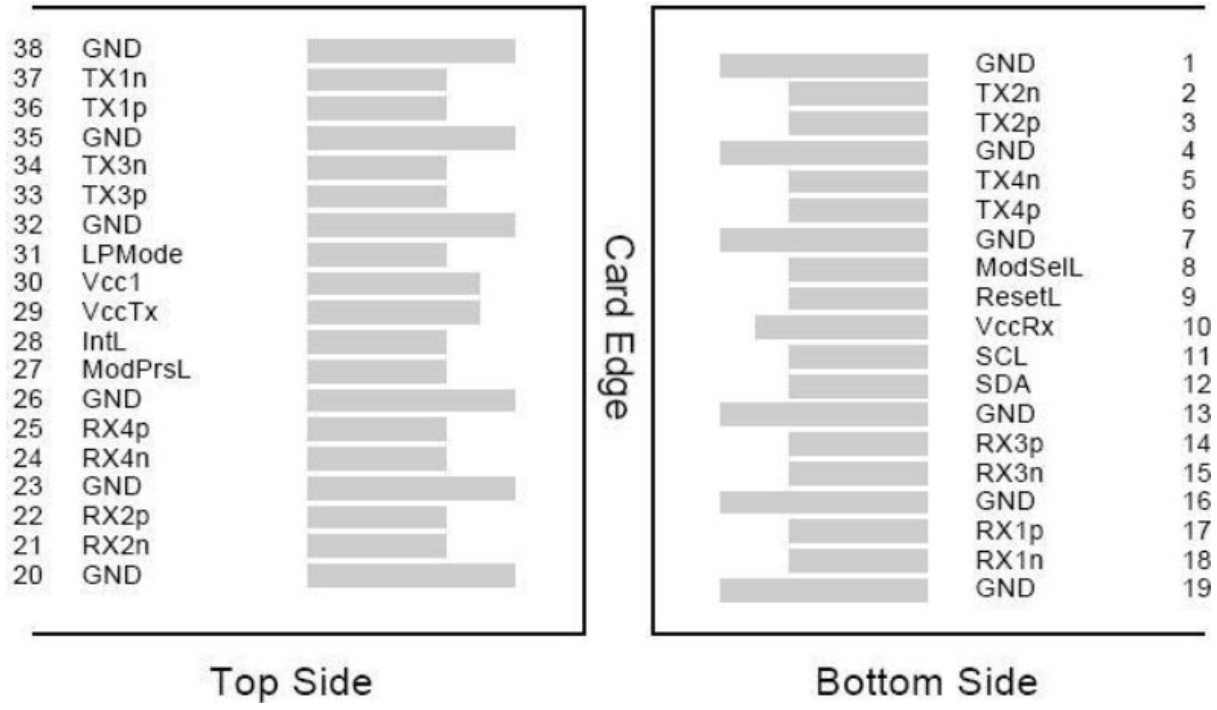
Pin	Symbol	Name/Descriptions	Ref.
1	GND	Transmitter Ground (Common with Receiver Ground).	1
2	Tx2-	Transmitter Inverted Data Input.	
3	Tx2+	Transmitter Non-Inverted Data Output.	
4	GND	Transmitter Ground (Common with Receiver Ground).	1
5	Tx4-	Transmitter Inverted Data Input.	
6	Tx4+	Transmitter Non-Inverted Data Output.	
7	GND	Transmitter Ground (Common with Receiver Ground).	1
8	ModSelL	Module Select.	2
9	ResetL	Module Reset.	2
10	VccRx	+3.3V Power Supply Receiver.	
11	SCL	2-Wire Serial Interface Clock.	2
12	SDA	2-Wire Serial Interface Data.	2
13	GND	Transmitter Ground (Common with Receiver Ground).	1
14	Rx3+	Receiver Non-Inverted Data Output.	
15	Rx3-	Receiver Inverted Data Output.	
16	GND	Transmitter Ground (Common with Receiver Ground).	1
17	Rx1+	Receiver Non-Inverted Data Output.	
18	Rx1-	Receiver Inverted Data Output.	
19	GND	Transmitter Ground (Common with Receiver Ground).	1
20	GND	Transmitter Ground (Common with Receiver Ground).	1
21	Rx2-	Receiver Inverted Data Output.	
22	Rx2+	Receiver Non-Inverted Data Output.	
23	GND	Transmitter Ground (Common with Receiver Ground).	1
24	Rx4-	Receiver Inverted Data Output.	1
25	Rx4+	Receiver Non-Inverted Data Output.	
26	GND	Transmitter Ground (Common with Receiver Ground).	1
27	ModPrsl	Module Present.	
28	IntL	Interrupt.	2
29	VccTx	+3.3V Power Supply Transmitter.	
30	Vcc1	+3.3V Power Supply.	
31	LPMode	Low-Power Mode.	2
32	GND	Transmitter Ground (Common with Receiver Ground).	1
33	Tx3+	Transmitter Non-Inverted Data Input.	
34	Tx3-	Transmitter Inverted Data Output.	

35	GND	Transmitter Ground (Common with Receiver Ground).	1
36	Tx1+	Transmitter Non-Inverted Data Input.	
37	Tx1-	Transmitter Inverted Data Output.	
38	GND	Transmitter Ground (Common with Receiver Ground).	1

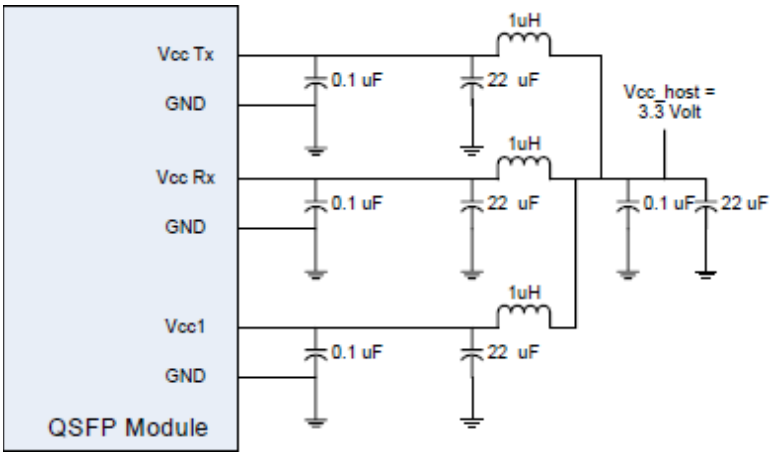
Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that, on the host board, requires a 4.7KΩ to 10KΩ pull-up resistor to Host_Vcc.

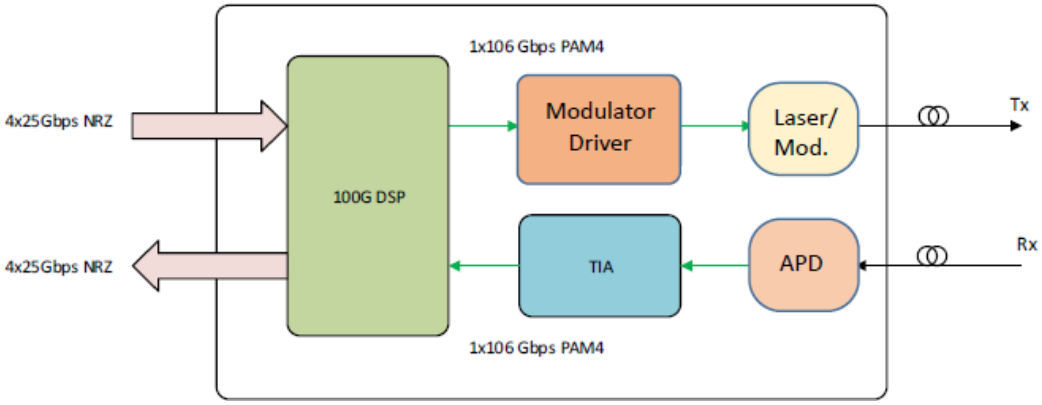
Electrical Pin-Out Details



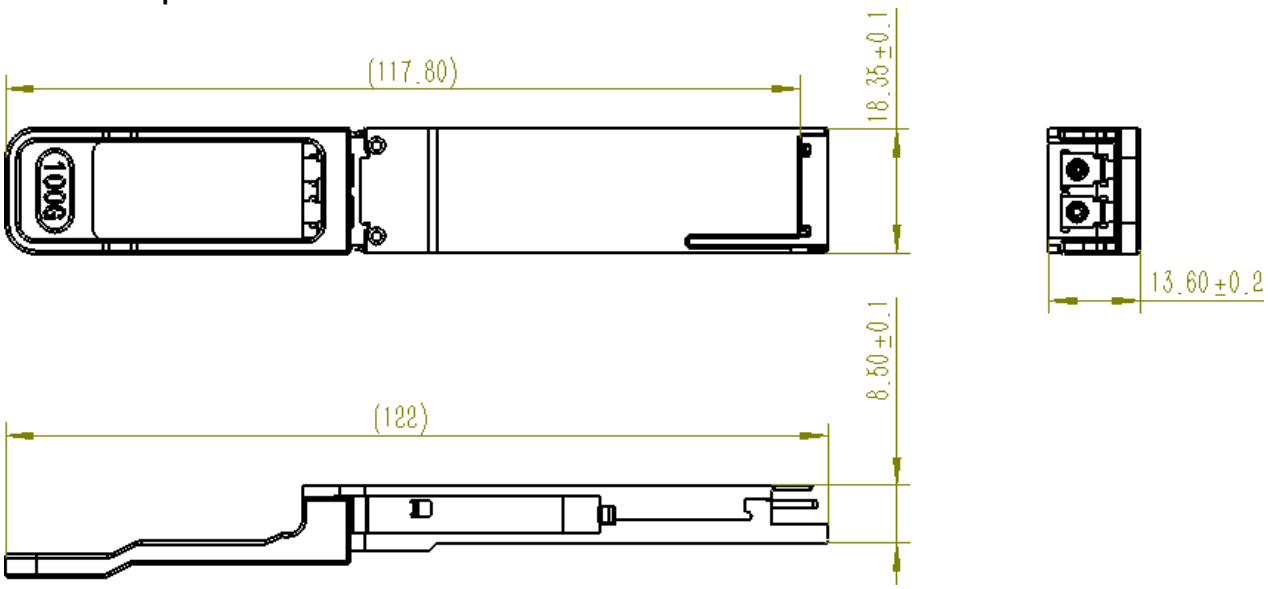
Recommended Power Supply Filter Network



Block Diagram



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.