



SPP130101R2D000

MSA Compliant 1/10GBase-LR SFP+ Dual-Rate Transceiver (SMF, 1310nm, 10km, LC, DOM, -40 to 85C)

Product Description

This MSA compliant SFP+ transceiver provides 10GBase-LR throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is also capable of withstanding rugged environments and can operate at temperatures between -40 to 85C. 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. 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:

- Supports rate selectable 1.25Gbps or 9.83Gbps to 11.3Gbps bit rates
- Compliant with SFF-8431
- Complaint with IEEE 802.3.2-2012 10GBASE-LR/LW and 1000BASE-LX
- 1310 DFB Laser Transmitter
- Built in Digital Diagnostic Functions
- Hot-Pluggable SFP+ Footprint
- Up to 10km on SMF
- Duplex LC Connector
- Operating Temperature: -40 to 85 Celsius
- Power Supply: 3.3V
- RoHS Compliant and Lead-Free



Applications:

- 10GBase-LR Ethernet

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	Notes
Maximum Supply Voltage	V _{CC}	-0.5		4	V	1
Storage Temperature	T _{stg}	-40		85	°C	
Operating Case Temperature	T _c	-40		85	°C	
Data Rate (RS0 = Low)	DR		1.25		Gbps	2
Data Rate (RS0 = High)	DR	9.83	10.3125	11.3	Gbps	2
Bit Error Rate	BER			10 ⁻¹²		

Notes:

1. For the electrical power interface.
2. IEEE 802.3-2012.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Voltage	V _{CC}	3.14	3.3	3.46	V	
Module Supply Current	I _{CC}		290	380	mA	1
Power Dissipation	P _{DISS}		1.0	1.3	W	
Transmitter						
Input Differential Impedance	R _{IN}		100		Ω	
Differential Data Input Swing	V _{IN,pp}	180		700	mVp-p	
Transmit Disable Voltage	V _D	2		Host_V _{CC}	V	
Transmit Enable Voltage	V _{EN}	V _{EE}		V _{EE} +0.8	V	
Receiver						
Differential Data Output Swing	V _{OUT,pp}	300		850	mVp-p	
Data Output Rise/Fall Time (20-80%)	T _r /T _f	28			ps	
LOS Assert	V _{LOSA}	2		Host_V _{CC}	V	
LOS De-Assert	V _{LOSD}	V _{EE}		V _{EE} +0.5	V	

Notes:

1. For the electrical power interface.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Output Optical Power @1.25Gbps	PTX1	-9.5		-3	dBm	1
Output Optical Power @10.3Gbps	PTX2	-8.2		0.5	dBm	1
Optical Center Wavelength	λ_C	1260		1355	nm	
Optical Modulation Amplitude	OMA	-5.2			dBm	2
Extinction Ratio @1.25Gbps	ER1	9			dB	
Extinction Ratio @10.3Gbps	ER2	3.5			dB	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter Dispersion Penalty	TDP			3.2	dB	
Launch Power of Off Transmitter	P _{off}			-30	dBm	1
Transmitter Jitter						2
Receiver						
Optical Center Wavelength	λ_C	1260		1600	nm	
Receive Overload	P _{OL}	0.5			dBm	
Receiver Sensitivity @1.25Gbps	R _{X_SEN1}			-19	dBm	3
Receiver Sensitivity @10.3Gbps	R _{X_SEN2}			-14.4	dBm	4
Receiver Reflectance	TR _{RX}			-12	dB	
LOS Assert @1.25Gbps	LOSA	-30			dBm	
LOS Assert @10.3Gbps	LOSA	-30			dBm	
LOS De-Assert @1.25Gbps	LOSD			-17	dBm	
LOS De-Assert @10.3Gbps	LOSD			-17	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Average.
2. According to IEEE 802.3ae requirements.
3. Average. Test the resulting value using the minimum ER value within the defined range: $BER < 10^{-12}$ and 2^7-1 PRBS.
4. Average. Test the resulting value using the minimum ER value within the defined range: $BER < 10^{-12}$ and $2^{31}-1$ PRBS.

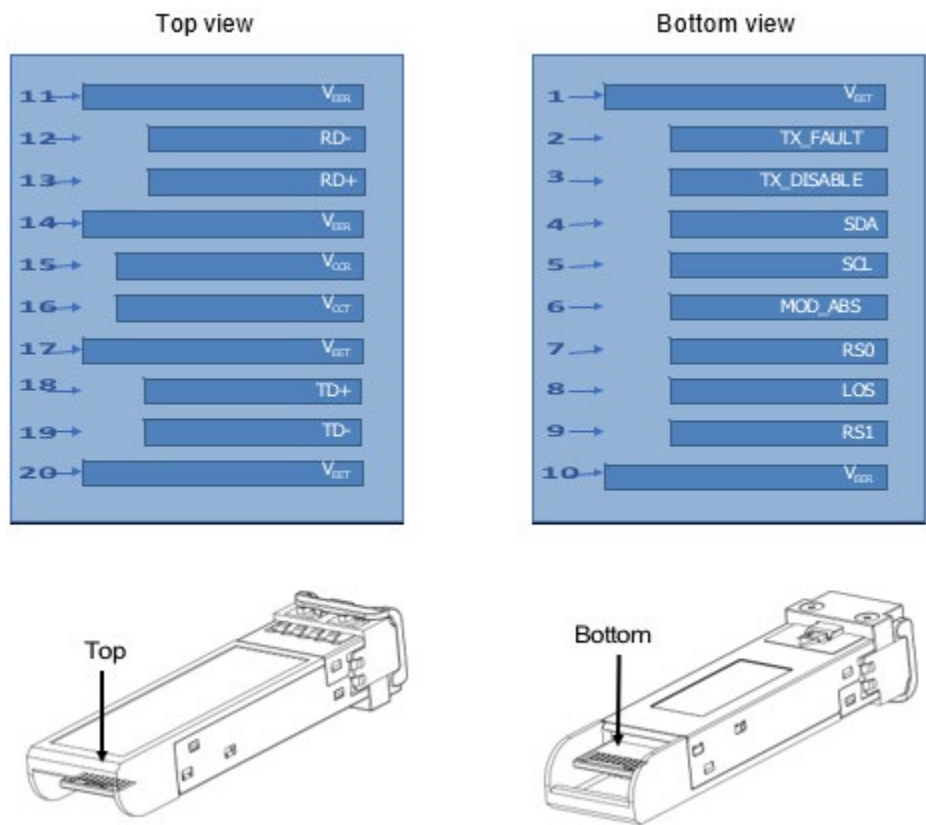
Pin Descriptions

Pin	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	Tx_Fault	Transmitter Fault.	2
3	Tx_Disable	Transmitter Disable. Laser output disables on “high” or “open.”	3
4	SDA	2-Wire Serial Interface Data.	4
5	SCL	2-Wire Serial Interface Clock.	4
6	MOD_ABS	Module Absent. Grounded within the module.	4
7	RS0	Module Rate Selection: “Open” or “Low” Level = 1.25Gbps rate (low bandwidth). “High” Level = 9.95-10.31Gbps rate (high bandwidth).	
8	LOS	Loss of Signal Indication. “Logic 0” indicates normal operation.	5
9	RS1	No Connection Required.	1
10	VeeR	Receiver Ground (Common with Transmitter Ground).	1
11	VeeR	Receiver Ground (Common with Transmitter Ground).	1
12	RD-	Inverse Receiver Data Out. AC Coupled.	
13	RD+	Received Data Out. AC Coupled.	
14	VeeR	Receiver Ground (Common with Transmitter Ground).	1
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	VeeT	Transmitter Ground (Common with Receiver Ground).	1
18	TD+	Transmitter Data In. AC Coupled.	
19	TD-	Inverse Transmitter Data In. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground).	1

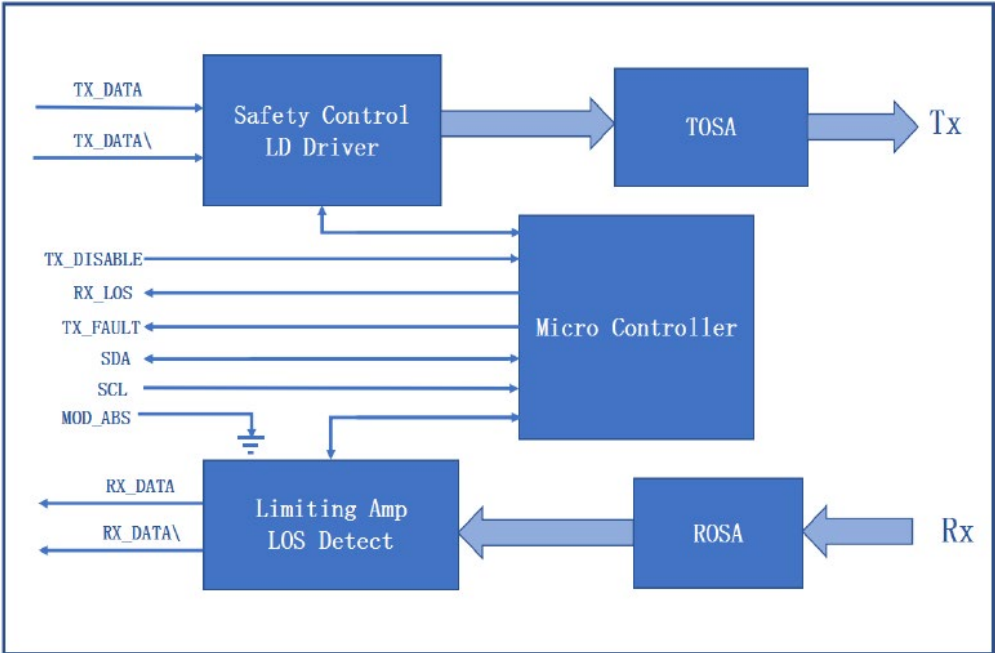
Notes:

1. The circuit ground is isolated from the chassis ground.
2. Tx_Fault is the open collector output and should be pulled up with 4.7k Ω to 10k Ω on the host board to a voltage between 2V and Vcc+0.3V.
3. Disabled: T_{DIS}>2V or open. Enabled: T_{DIS}<0.8V.
4. Should be pulled up with 4.7k Ω to 10k Ω on the host board to a voltage between 2V and Vcc+0.3V.
5. LOS is an open collector output and should be pulled up with 4.7k Ω to 10k Ω on the host board to a voltage between 2V and Vcc+0.3V. “Logic 0” indicates normal operation. “Logic 1” indicates that the receiver signal is lost.

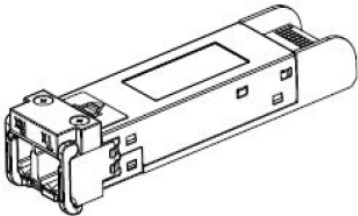
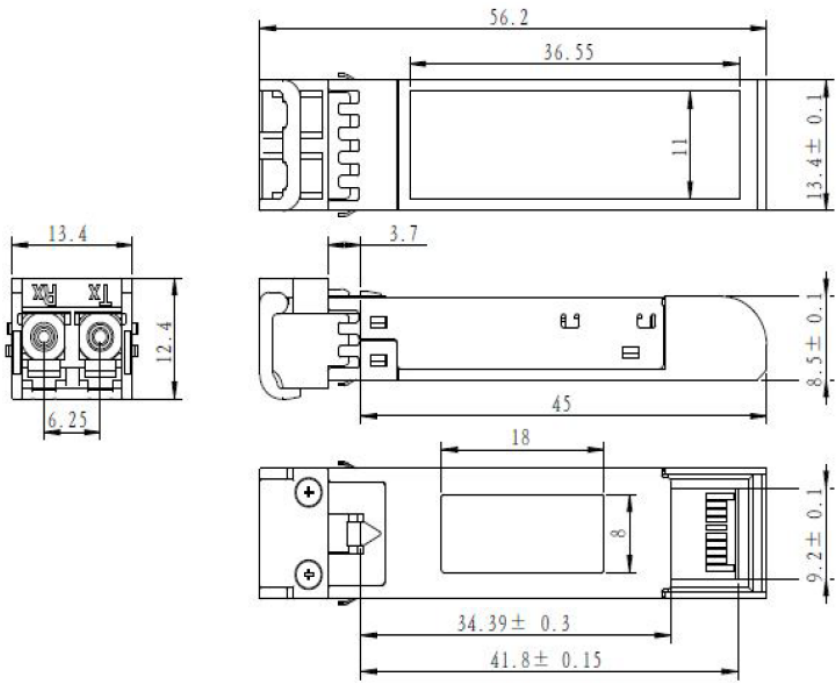
Electrical Pin-Out Details



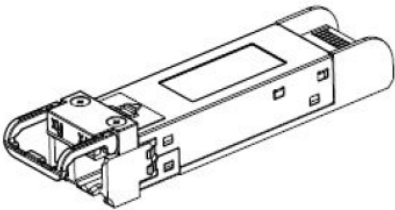
Block Diagram



Mechanical Specifications



LATCHED



UNLATCHED

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.

