



FG-TRAN-SFP28-LR-SKY

Fortinet® FG-TRAN-SFP28-LR Compatible 25GBase-LR SFP28 Transceiver (SMF, 1310nm, 10km, LC, DOM)

Product Description

This Fortinet® FG-TRAN-SFP28-LR compatible SFP28 transceiver provides 25GBase-LR throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Fortinet®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide 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-8402 and SFF-8472 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:

- 25GBase-LR Ethernet
- Access, Metro 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	Notes
Supply Voltage	V _{CC}	-0.5		4.0	V	
Storage Temperature	T _S	-40		85	°C	
Operating Case Temperature	T _C	0	25	70	°C	
Relative Humidity	RH	5		95	%	
Data Rate	BR		25.78		Gb/s	
Bit Error Rate	BER			5x10 ⁻⁵		1
Supported Link Length on 9/125um SMF, 25.78GB/s	L		10		km	2

Notes:

1. Tested with a PRBS 231-1 test pattern for 25.78Gb/s operation.
2. Distances are based on FC-P1-6 Rev 3.1 and IEEE 802.3 standards.

Electrical Characteristics

Parameter		Symbol	Min	Typ	Max	Unit	Notes
Supply Voltage		V _{CC}	3.135	3.3	3.465	V	
Data Rate				25.78		GB/s	
Module Supply Current		I _{CC}			450	mA	
Power Dissipation		PD			1500	mW	
Transmitter							
Input Differential Impedance		Z _{IN}		100		Ω	
Differential Data Input Swing		V _{IN} , P-P	180		700	mVp-p	
TX_FAULT	Transmitter Fault	V _{OH}	2.0		V _{CCHOST}	V	
	Normal Operation	V _{OL}	0		0.8	V	
TX_DISABLE	Transmitter Disable	V _{IH}	2.0		V _{CCHOST}	V	
	Transmitter Enable	V _{IL}	0		0.8	V	
Receiver							
Output Differential Impedance		Z _O		100		Ω	
Differential Data Output Swing		V _{OUT} , P-P	300		850	mVp-p	1
Data Output Rinse Time, Fall Time		t _r , t _f	15			Ps	2
Rx_LOS	Loss of Signal (LOS)	V _{OH}	2.0		V _{CCHOST}	V	3
	Normal Operation	V _{OL}	0		0.8	V	3

Notes:

1. Internally AC coupled, but requires an external 100Ω differential load termination.
2. 20-80%
3. LOS is an open collector output. Should be pulled up with 4.7Ω on the host board.

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter						
Launch Optical Power	Po	-5		2	dBm	1
Extinction Ratio	ER	4			dB	
Center Wavelength Range	λ_c	1295	1310	1325	nm	
Optical Modulation Amplitude	OMA	631			uW	
Transmitter Dispersion Penalty	TDP			2.7	dB	
Spectral Width	$\Delta\lambda$			1	nm	2
Optical Rise/Fall Time @25.78 Gb/s	tr/tf			15	ps	3
Optical Return Loss Tolerance	ORLT			12	dB	
Pout @TX-Disable Asserted	POFF			-30	dBm	1
Receiver						
Center Wavelength	λ_c	1260	1310	1370	nm	
Receiver OMA Sensitivity	RxSENS			-11.4	dBm	4
Receiver Overload (P avg)	POL	2			dBm	
Optical Return Loss	ORL	26			dB	
LOS De-Assert	LOSD			-13	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. 20dB spectral width.
3. Unfiltered, 20-80%.
4. Measured with PRBS 2³¹-1 at 5×10⁻⁵ BER

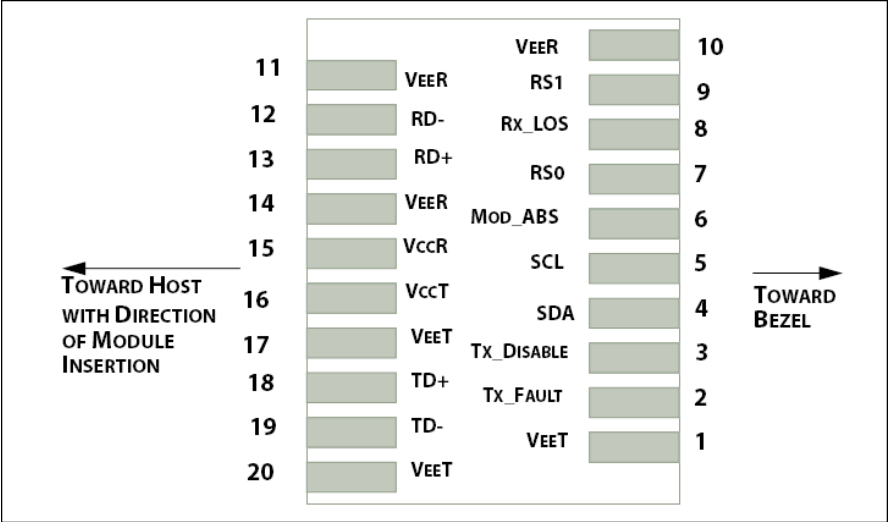
Pin Descriptions

Pin	Symbol	Name/Descriptions	Notes
1	VeeT	Transmitter Ground	1
2	TX_Fault	Transmitter Fault (LVTTTL-O) - High indicates a fault condition	2
3	TX_Disable	Transmitter Disable (LVTTTL-I) – High or open disables the transmitter	3
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	4
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	4
6	MOD_ABS	Module Absent (Output), connected to VeeT or VeeR in the module	5
7	RS0		6
8	RX_LOS	Receiver Loss of Signal (LVTTTL-O)	2
9	RS1		6
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inverse Received Data out (CML-O)	
13	RD+	Received Data out (CML-O)	
14	VeeR	Receiver Ground	
15	VccR	Receiver Power - +3.3V	
16	VccT	Transmitter Power - +3.3 V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Data In (CML-I)	
19	TD-	Inverse Transmitter Data In (CML-I)	
20	VeeT	Transmitter Ground	1

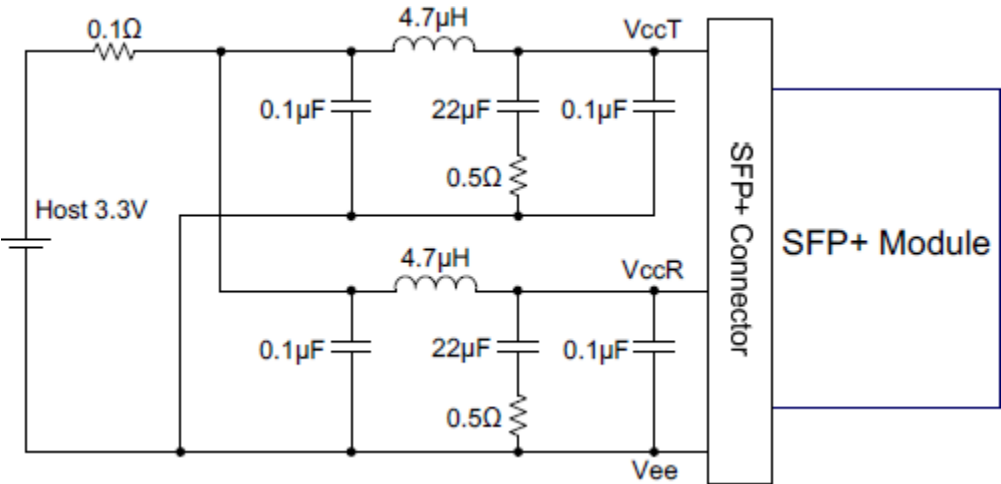
Notes:

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 4.7K Ω to 10K Ω pull-up resistor to VccHost.
3. This input is internally biased high with a 4.7K Ω to 10K Ω pull-up resistor to VccT.
4. Two-Wire Serial interface clock and data lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that on the host board requires a 4.7K Ω to 10K Ω pull-up resistor to VccHost.
6. Rate select can also be set through the 2-wire bus in accordance with SFF-8472 v. 12.1, Rx Rate Select is set at Bit 3, Byte 110, Address A2h. Tx Rate Select is set at Bit 3, Byte 118, Address A2h.
Note: writing a “1” selects maximum bandwidth operation. Rate select is the logic OR of the input state of Rate Select Pin and 2-wire bus.

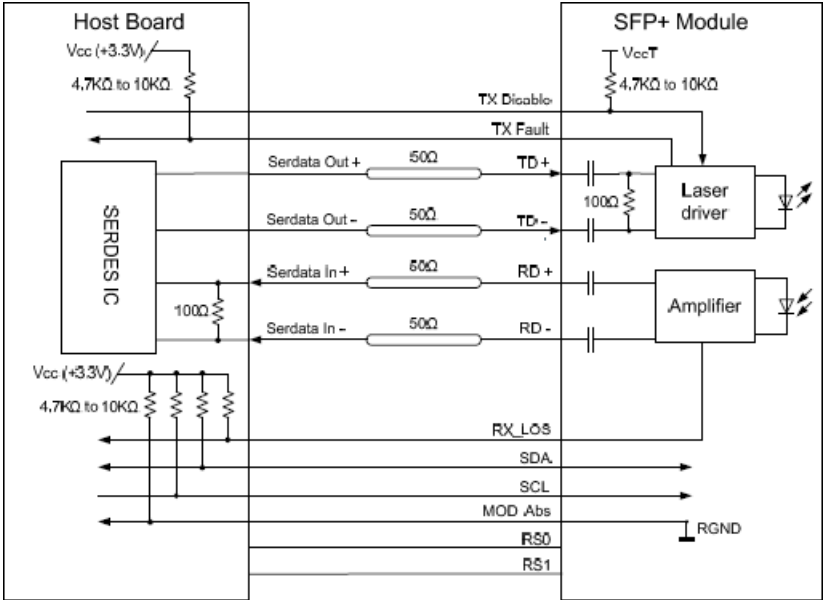
Electrical Pin-Out Details



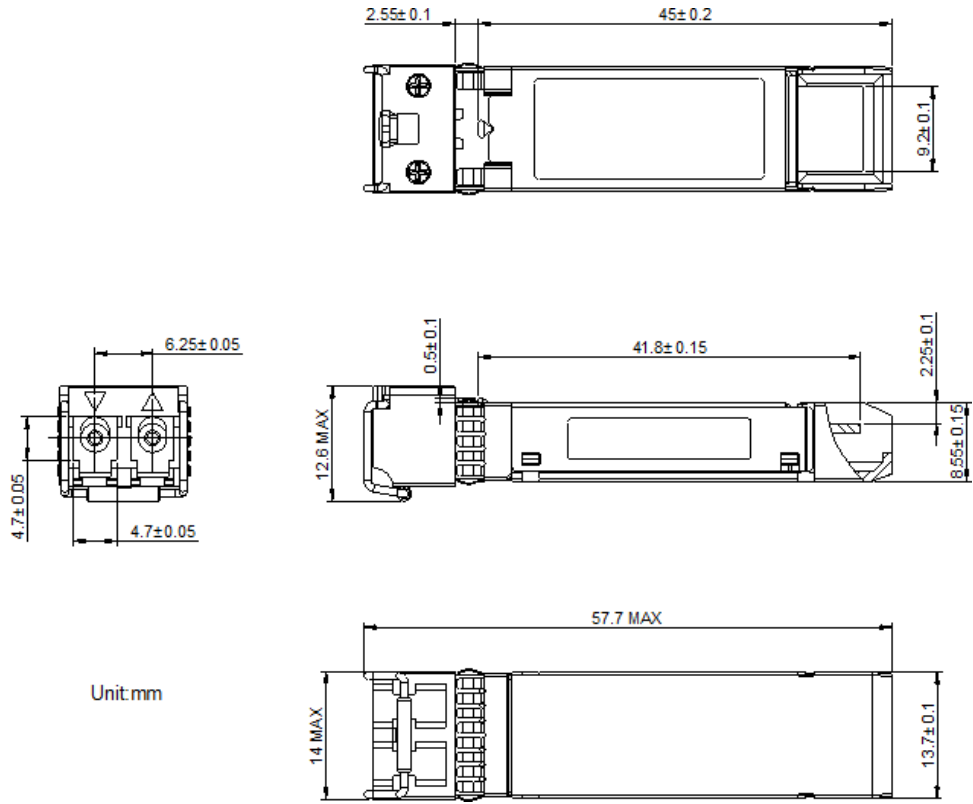
Recommended Host Board Power Supply Filter Network



Recommended Application Interface 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.

