



SFP-1000BASE-EZX-160-I-C-SKY

Cisco® Compatible 1000Base-ZX SFP Transceiver (SMF, 1550nm, 160km, LC, DOM, -40 to 85C)

Product Description

This Cisco® compatible SFP transceiver provides 1000Base-ZX throughput up to 160km over single-mode fiber (SMF) using a wavelength of 1550nm via an LC connector. It is capable of withstanding rugged environments and can operate at temperatures between -40 and 85C. It is guaranteed to be 100% compatible with the equivalent Cisco® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. 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:

- Duplex LC Connector
- 1550nm DFB Laser Transmitter
- Operating Data Rate up to 1.25Gbps
- Single 3.3V Power Supply and LVTTTL Logic Interface
- Hot-Pluggable
- Class 1 Laser Safety Complaint
- RoHS Compliant and Lead-Free
- Operating Temperature: -40 to 85 Celsius
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



Applications:

- 1000Base-ZX Ethernet
- Access and Enterprise
- 1x Fibre Channel

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
Operating Case Temperature		Tc	-40		85	°C	
Storage Temperature		Tstg	-40		85	°C	
Relative Humidity		RH			95	%	
Data Rate	GBE	DR		1.25		Gbps	
	FC			1.063			
9µm Core Diameter SMF		L		160		km	

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		Vcc	3.15	3.3	3.45	V	
Power Supply Current		Icc			300	mA	
Transmitter							
LVPECL Differential Input		VIN	500		2400	mVp-p	1
Input Differential Impedance		ZIN	85	100	115	Ω	2
Tx_Disable	Disable		2		Vcc+0.3	V	
	Enable		0		0.8	V	
Tx_Fault	Fault		2		Vcc+0.3	V	
	Normal		0		0.8	V	
Receiver							
LVPECL Differential Output		VOUT	370		2000	mVp-p	3
Output Differential Impedance		ZOUT	85	100	115	Ω	
Rx_LOS	LOS		2		Vcc+0.3	V	
	Normal		0		0.8	V	
MOD_DEF(0.2)		VOH	2.5			V	
		VOL	0		0.8	V	4

Notes:

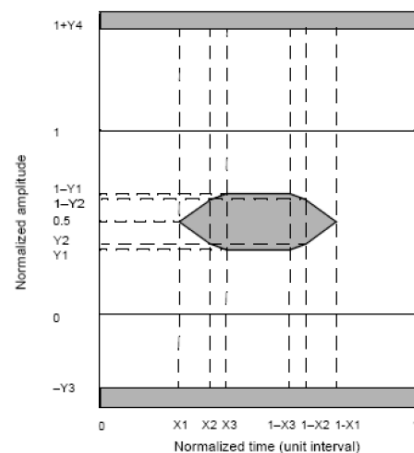
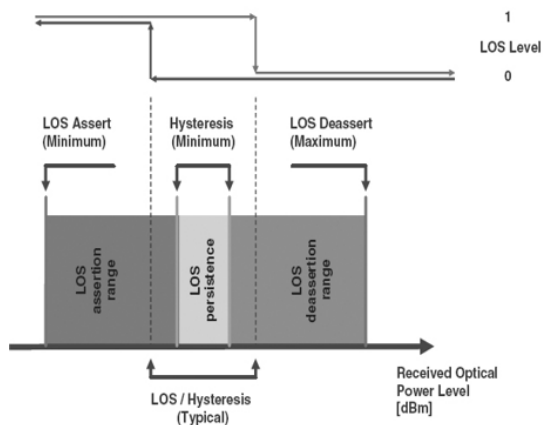
1. AC coupled inputs. LVPECL logic. Internally AC coupled.
2. RIN > 100kΩ @DC.
3. AC coupled outputs. LVPECL logic. Internally AC coupled.
4. With serial ID.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	1500	1550	1580	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	POUT	3		7	dBm	1
Side-Mode Suppression Ratio	SMSR	30			dB	2
Extinction Ratio	ER	9			dB	
Rise/Fall Time (20-80%)	Tr/Tf			0.26	ns	
POUT @Tx_Disable Asserted	POUT			-45	dBm	
Total Jitter	TJ			0.43	UI	
Tx Disable Assert Time	Toff			10	us	
Output Optical Eye	Compliant with IEEE 802.3ah-2004					2, 6
Receiver						
Center Wavelength	λ_C	1260		1600	nm	
Receiver Sensitivity	Pmin			-37	dBm	3
Receiver Overload	Pmax	-10			dBm	
Return Loss		12			dB	
Optical Path Penalty				1	dB	4
LOS Assert	LOSA	-45			dBm	
LOS De-Assert	LOSD			-38	dBm	
LOS Hysteresis	LOSH	0.5			dB	5

Notes:

- Output is coupled into a 9/125 μ m SMF.
- Filtered, measured with a PRBS 2^7-1 test pattern @1.25Gbps.
- Minimum average optical power is measured at BER less than $1E^{-12}$ with a 2^7-1 NRZ PRBS and ER=9dB.
- Measured with a PRBS 2^7-1 test pattern @1.25Gbps, G.652 SMF, BER $\leq 1 \times 10^{-10}$.
- LOS Hysteresis.
- Eye Pattern Mask.



Pin Descriptions

Pin	Symbol	Name/Description	Plug Seq.	Notes
1	VeeT	Transmitter Ground.	1	5
2	Tx_Fault	Transmitter Fault Indication.	3	1
3	Tx_Disable	Transmitter Disable. Module disables on “high” or “open.”	3	2
4	MOD_DEF2	SDA. 2-Wire Serial ID Interface.	3	3
5	MOD_DEF1	SCL. 2-Wire Serial ID Interface.	3	3
6	MOD_DEF0	MOD_ABS. Grounded within the module.	3	3
7	Rate Select	No User Connection. Function not available.	3	
8	LOS	Loss of Signal.	3	4
9	VeeR	Receiver Ground.	1	5
10	VeeR	Receiver Ground.	1	5
11	VeeR	Receiver Ground.	1	5
12	RD-	Receiver Inverse Data Out.	3	6
13	RD+	Receiver Data Out.	3	7
14	VeeR	Receiver Ground.	1	5
15	VccR	3.3 ± 5% Receiver Power.	2	7
16	VccT	3.3 ± 5% Transmitter Power.	2	7
17	VeeT	Transmitter Ground.	1	5
18	TD+	Transmitter Data In.	3	8
19	TD-	Transmitter Inverse Data In.	3	8
20	VeeT	Transmitter Ground.	1	5

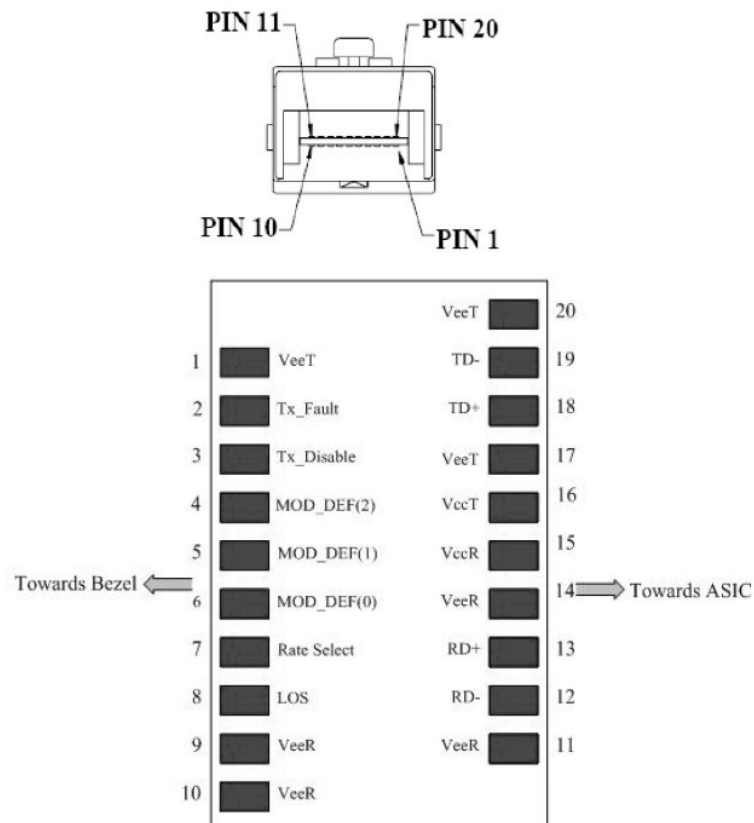
Notes:

1. Tx_Fault is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull-up voltage between 2.0V and VccT/R+0.3V. When “high,” output indicates a laser fault of some kind. “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.8V.
2. Tx_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7kΩ to 10kΩ resistor. Its states are:
 - Low (0V – 0.8V): Transmitter On
 - (>0.8V, <2.0V): Undefined
 - High (2.0V – 3.465V): Transmitter Disabled
 - Open: Transmitter Disabled.
3. MOD-DEF0, 1, & 2. These are the module definition pins. They should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
 - MOD-DEF0 is grounded by the module to indicate that the module is present.
 - MOD-DEF1 is the clock line of the 2-wire serial interface for serial ID.
 - MOD-DEF2 is the data line of the 2-wire serial interface for serial ID.
4. LOS (Loss of Signal) is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ

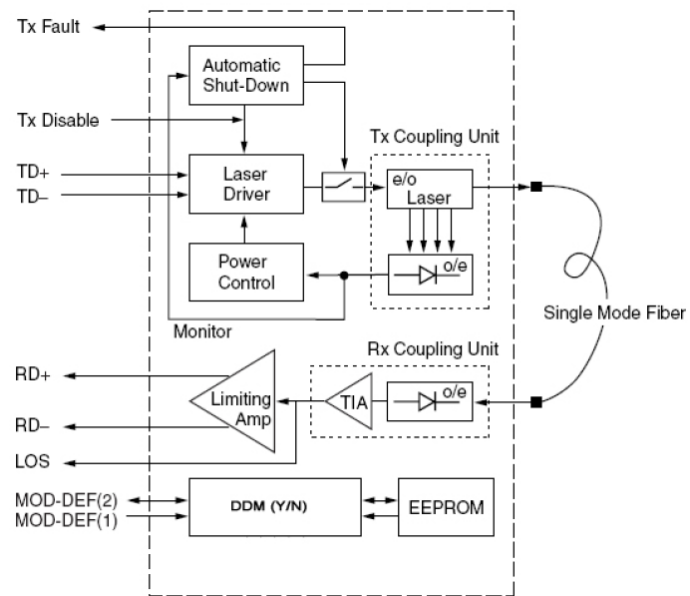
resistor. Pull-up voltage between 2.0V and $V_{ccT}/R+0.3V$. When “high,” this output indicates that the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.8V.

5. VeeR and VeeT may be internally connected within the SFP module.
6. RD-/+. These are the differential receiver outputs. They are AC-coupled, 100Ω differential lines that should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as $3.3V \pm 5\%$ at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot-plugging of the SFP transceiver module will result in an in-rush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8. TD-/+. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module.

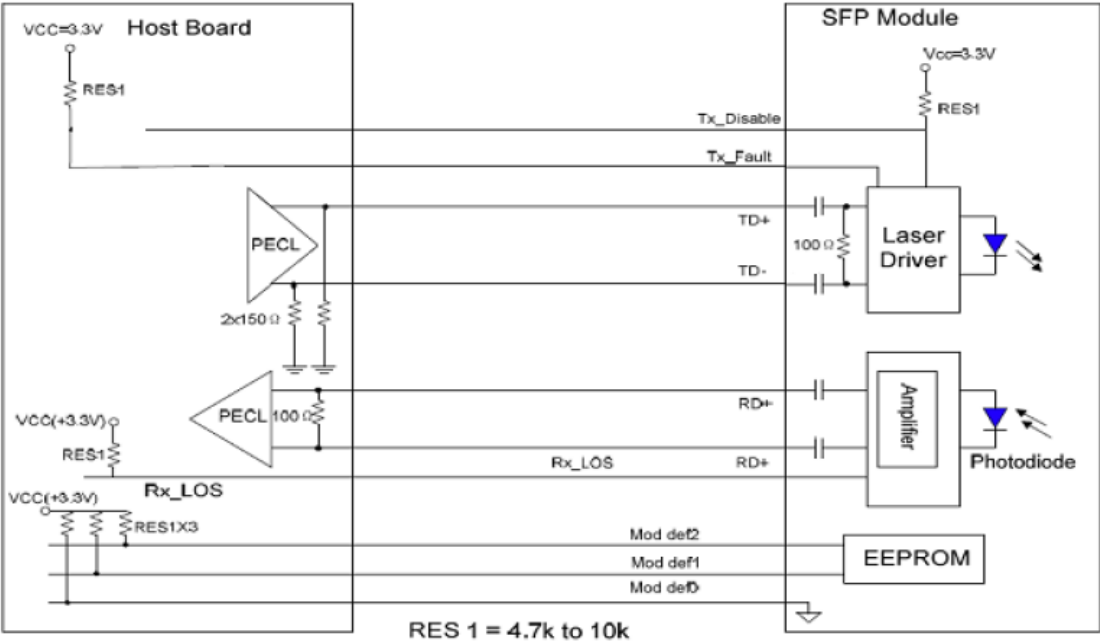
Electrical Pad Layout



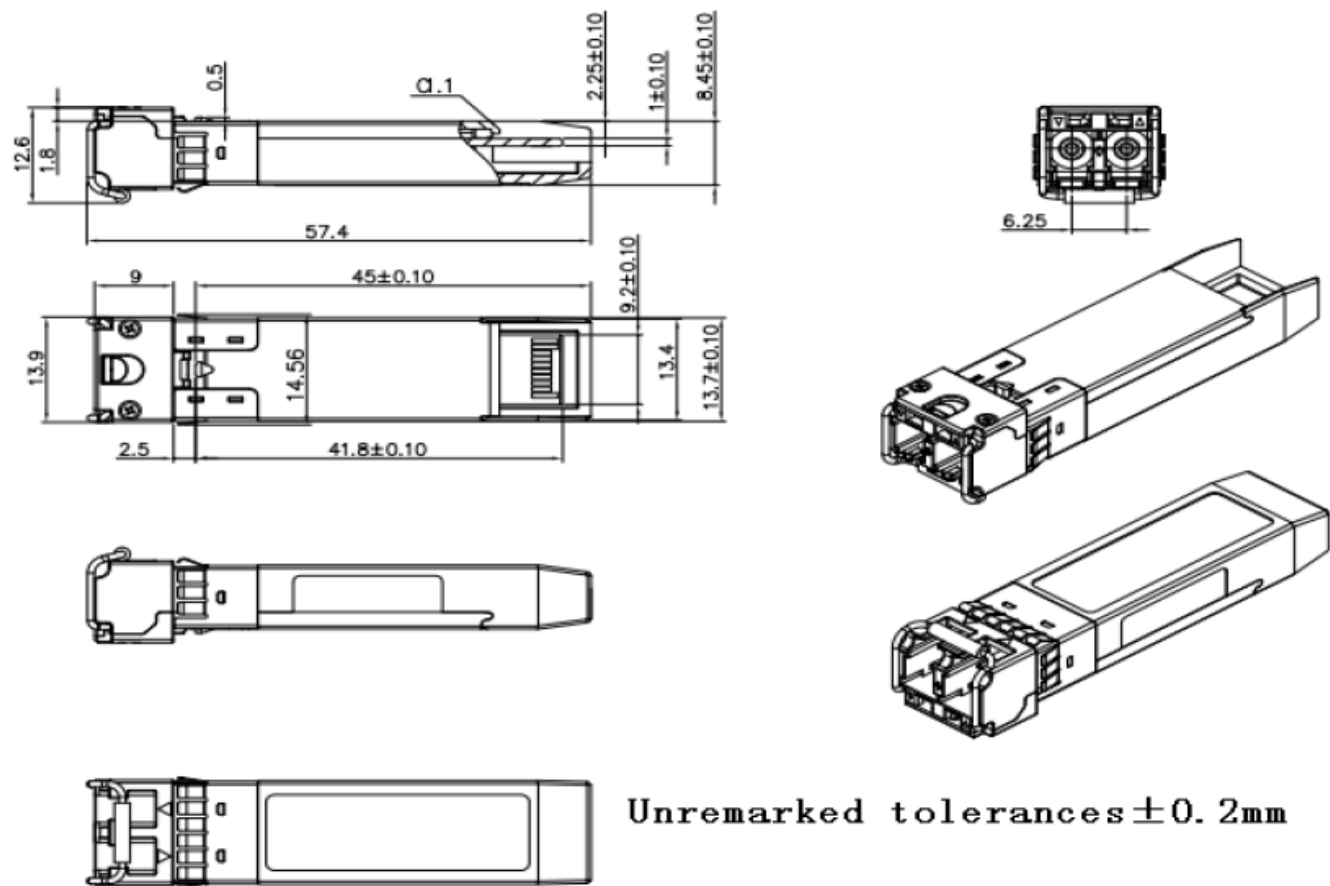
Functional Description



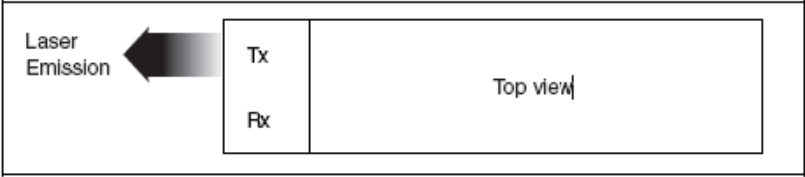
Recommended Circuit Schematic



Mechanical Specifications



Laser Emission



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.

